Introduction to Psychology

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About the Book

JAYSON SAN MIGUEL

Overview

This version of *Introduction to Psychology* has been adapted for PSYC 205 – Introductory Psychology at Concordia University. The chapters of the book have mainly been adopted from:

McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to psychology: Moving towards diversity and inclusion. BCcampus. https://opentextbc.ca/psych

Chapters that were taken from other sources are attributed in the Source Chapter Attributions page. Some chapter introductions were written by students at Concordia University, who have previously taken Introductory Psychology and were part of the team that received Open Textbook Grant from Concordia Library Services Fund.

Description from the main source material (Introduction to psychology: Moving towards diversity and inclusion, 2024).

This textbook aims to help create an engaging and inclusive learning environment and foster a life-long passion for the evolving discipline of psychology. It sets a high standard for academic excellence, scientific rigour, and inclusivity, making it essential for modern psychology instruction. It integrates discussions on the psychological impacts of colonization, offering a richer, more comprehensive view of psychology. Expert contributions from specialists bring deep understanding and practical relevance, while plain language descriptions make complex concepts accessible. Diverse voices—including those of women, BIPOC, queer, and disabled scholars—fill critical gaps left by traditional texts. Deep Dives and case studies provide in-depth exploration and real-world application, promoting critical thinking and peer-to-peer learning.

Source Chapter Attributions

JAYSON SAN MIGUEL

Authors are indicated within each chapter throughout this book, but are also listed here, along with links to the original source OER. Edits to the original content were made by Elisa Niunin, Vanessa Raspa, Ephrathah Hagdu, and Jayson San Miguel.

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Chapter 1:

- McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to Psychology: Moving Towards Diversity and Inclusion. BCcampus.

Chapter 2:

- Introduction by Vanessa Raspa
- McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to Psychology: Moving Towards Diversity and Inclusion. BCcampus.
- The Nature-Nurture question. Turkheimer, E. (2018). The Nature-Nurture Question. In R. Biswas-Diener & E. Diener (Eds), *Noba textbook series: Psychology*. Champaign, IL: DEF publishers.

Chapter 3:

- Introduction by Vanessa Raspa
- McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to Psychology: Moving Towards Diversity and Inclusion. BCcampus.

Chapter 4:

- Introduction by Ephrathah Radgu
- McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to Psychology: Moving Towards Diversity and Inclusion. BCcampus.

Chapter 5:

- Introduction by Ephrathah Radgu
- McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to Psychology: Moving Towards Diversity and Inclusion. BCcampus.
- Decision Making and Problem-Solving by Ephrathah Radgu

Chapter 6:

- Introduction by Ephrathah Radgu
- McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to Psychology: Moving Towards Diversity and Inclusion. BCcampus.
- Late Adulthood: Aging, Retiring, and Bereavement. Stangor, C., & Walinga, J. (2018). *Introduction to Psychology: 1st Canadian Edition*. B.C. Open Textbook Project.

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- Introduction by Elisa Niunin
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- McFarlane, J.M., Shi, A.L., Ramoo, D., & Yousef, T. (2024). Introduction to Psychology: Moving Towards Diversity and Inclusion. BCcampus.

CHAPTER 1. WHAT IS PSYCHOLOGY? AN INTRODUCTION TO HISTORY AND RESEARCH

Jessica Motherwell McFarlane

Asking the Right Questions: Why? What? and How?

In psychology, the questions “Why?”, “What?”, and “How?” are foundational. They guide us to explore behaviours, observe details, and understand processes. This questioning approach is essential for uncovering insights into human nature and behaviour.

The Importance of “Why?”

At the heart of psychology lies a simple yet profound question: “Why?” This isn’t just about curiosity; it’s the cornerstone of psychological inquiry that we use to understand human nature.

As you begin your study of psychology, you’ll discover that “Why?” is more than a question. It’s a deliberate and strategic approach to thinking — an inquiring mindset. It represents a practice of curiosity, a keen interest in the world, and an acknowledgment of our right, perhaps even responsibility, to ask “why.” This inquiring mindset is crucial for anyone aspiring to be a psychology professional; it drives us to look beyond the surface and uncover deeper meanings and motivations behind human actions and thoughts.

But “Why?” doesn’t stand alone. It’s complemented by two equally important questions: “What?” and “How?”

“What?”: The Art of Observation

The question “What?” calls for our careful, detailed, and unbiased observation. It requires us to gather facts and see the world as it is, not as we assume it to be. In psychology, this means observing behaviour, emotions, thoughts, and interactions with an open mind. This

textbook will guide you in building observational skills, teaching you to notice the subtleties and complexities of human behaviour. Without a clear understanding of "what" is happening, we cannot hope to answer "why" it happens. For example, "What happens physically, emotionally and mentally just before someone breaks out into a nervous laugh?" must come before we can answer, "Why do some people laugh when they are nervous?"

"How?": Understanding Mechanisms

The question, "How?" demands our exploration of the processes and mechanisms that explain all the phenomena that we can observe. It compels us to delve into the underlying workings and understand the precursors (i.e., what must be present before anything can happen), the step-by-step sequence of events, and the cause and effect — not just as it appears on the surface but at every level. In psychology, answering "how" often requires expert training and sometimes the use of specialised technology to reveal the processes of the human mind and body. This textbook will introduce you to some of the methods and tools psychology professionals use to understand how thoughts, feelings and behaviours are learned, processed, and expressed. From following a long chain of neural pathways to mapping family dynamics and social influences, you'll learn how it is that many variables and contexts come to shape us.

Learning Activity: Flex your Question-Storming Muscles



Figure IP.1. A student studies at a desk.

Here are some questions to get you started asking your own "why, what, and how" questions and growing your question-storming "muscles." First, read these sample questions. Then set your timer for two minutes and write down as many psychology-related questions (that you do not currently know the answer to) as you can think of in that time. Don't censor yourself. Don't let your fingers pause. Just go. Reset your timer and repeat three times: once for "Why?" once for "What?" and once for "How?" Share your questions with someone. What questions did you like the best? What questions made you laugh? What questions did you most want to know the answers to?

Why

- Why can't we tickle ourselves?
- Why do we yawn when we see someone else yawning?
- Why do we enjoy watching scary movies?
- Why do some people have a fear of clowns?
- Why do we find it hard to resist kittens and puppies?

... Your turn. You have 2 minutes. Go!

What

- What causes us to laugh?
- What causes us to have a "favourite colour"?
- What goes on in our minds when we are daydreaming?
- What causes "brain freeze" when we eat something cold too quickly?
- What causes our faces to scrunch up just before we sneeze?

... Your turn. You have 2 minutes. Go!

How

- How can we suddenly remember a forgotten memory out of nowhere?
- How does sleep deprivation affect exam grades?
- How can certain scents change our mood?
- How do we develop a"sense of direction" and navigate spaces?
- How does a song get stuck in your head and manage to play on an endless loop?

... Your turn. You have 2 minutes. Go!

Your Role: Embracing Why? What? and How?

As you read through this textbook, remember that you have a crucial role to play. Beyond learning from theorists and researchers, you need to bring your own 'Why? What? and How?' questions to the discussion. Let these questions be a constant companion in your exploration of psychology. These are the kinds of personal questions that can lead to profound psychological discoveries. Look for patterns, question social systems, and recognise injustices. Remember, every question you ask, every curiosity you pursue adds to the field of psychology.

If you are curious, you can watch the three videos in Supplement IP.2 to discover some of the quirkier questions and answers in psychology.

Section Summary

In this section, we explore the importance of questions in leading psychological inquiry. "Why?" allows us to dig deeper into the causes of human behaviours. "What?" emphasises the importance of observation, urging us to collect unbiased facts to accurately perceive the world around us. "How?" allows us to learn the mechanisms and processes behind observable phenomena.

Image Attributions

Figure IP.1. **Photo** by **Min An** is licensed under the **Pexels Licence**.

What is Psychology?

JESSICA MOTHERWELL MCFARLANE

Psychology is all about studying how we think, feel and act. It's not just about what's going on in our minds. It's about how our bodies react, how we respond emotionally, and how we behave, as both social and biological beings. Psychology researchers look into why we see things the way we do, why we think certain thoughts, why our feelings can change, and why we act differently in different places and with different people. They use scientific and other methods to understand these phenomena. They don't just guess; they do careful observations, studies, and research. This careful inquiry helps us understand ourselves and others better, no matter where we are or who we're with. Psychologists may be professionally trained and licensed therapists, qualified to diagnose and treat individuals experiencing neurological, behavioural, or psychological challenges. Other psychologists may work in research and education.

In the late 1800s, before the formal establishment of psychology as a distinct academic discipline, the exploration of the mind and human behaviour was deeply rooted in ancient wisdom traditions and Indigenous knowledge systems. These early foundations of psychological thought, spanning various cultures and continents, provided rich insights into the human condition.

In Asia, for instance, the teachings of Buddhism and Hinduism offered profound psychological insights thousands of years ago. Buddhist philosophy, with its focus on the mind and meditation, delved into concepts of mindfulness and the nature of suffering and happiness. Similarly, Hindu texts like the Bhagavad Gita explored the self, consciousness, and the interaction of emotions and duty.

Indigenous North American cultures also held sophisticated understandings of psychology. For example, many tribes viewed mental health as a balance between the individual, their community, and the natural world. Healing practices often involved community rituals, storytelling, and a deep connection with nature, reflecting a holistic approach to mental well-being.

Ancient civilizations, such as those in Greece and Egypt, also contributed to early psychological thought. Greek philosophers like Plato and Aristotle pondered questions of the mind, sensation, and perception, laying early groundwork for psychological inquiry. In Egypt, the concept of the soul and its journey after death, as depicted in the Book of the Dead, reflects an early form of psychological exploration.

These ancient and Indigenous perspectives on mind and behaviour were integral to the development of modern psychology. They underscore the diverse roots of psychological thought and highlight the importance of considering a wide range of cultural and historical perspectives in understanding the human mind and behaviour.

Modern psychology's journey to becoming a recognised academic discipline is a unique story. Before the late 1800s, the exploration of the mind was primarily a job for philosophers. They pondered questions about human thought, emotion, and behaviour, laying the groundwork for what would eventually become psychology.

As scientific methods began to evolve and the study of human behaviour became more systematic, psychology began to emerge as its own discipline. Today, we see psychology as a fundamental science, on par with fields like medicine, physics, and mathematics.

At its core, psychology delves into behaviours that have biological roots, aligning it with natural sciences such as biology. This connection highlights the concept that our behaviours are deeply intertwined with our biological makeup. Psychology, however, extends beyond just the biological aspect. It also encompasses the social dimension of human existence. Our behaviours are significantly shaped by our interactions with others, situating psychology firmly within the realm of social sciences as well.

This blended biological and social nature of psychology sets it apart from disciplines like literature, history, and sociology. Psychology uses naturalistic observation, rigorous scientific methods, including experimentation, and analysis, to understand the complexities of the human mind and behaviour. Modern psychology is a unique and vital science, bridging the biological and social aspects of human life.

Introduction to the Theories of Psychology

JESSICA MOTHERWELL MCFARLANE

Understanding Theory in Psychology

You are also about to discover in this chapter that there is a creative tension — a friction — between theories that may appear contradictory or opposite. This tension is not about conflict, but rather about how these differing perspectives can complement and enrich each other and offer us a better understanding of complex psychological phenomena.

For example, there is a creative tension between biopsychology and cultural psychology. Biopsychology, with its focus on the biological underpinnings of behaviour, such as brain function and genetics, might seem to be the opposite of cultural psychology, which emphasises the influence of cultural and societal factors on behaviour. Considering the research from both biopsychology and cultural psychology helps us to grow a more complete understanding of the many internal and external influencers of human behaviour. Together, they provide a more comprehensive view, acknowledging both the innate and environmental factors that shape human psychology.

In summary, this apparent creative tension in psychology is not about choosing one theory over another. It's about benefiting from the strengths and being mindful of the weaknesses of each approach to gain a deeper understanding of the human mind and behaviour. Our embracing this creative tension is our way of acknowledging that psychology is too complex to be fully explained by any single theory.

Table HP.1. Overview of Psychological Theories

Theory	Description
Functionalism	Studies mental life and emphasises adaptation to environments.
Structuralism	Analyses consciousness, breaking it into elemental structures.
Behaviourism	Observes behaviour, ignoring internal mental state analysis.
Cognitivism	Emphasises internal mental processes, beyond observable behaviour.
Humanism	Focuses on individual potential, emphasising personal growth.
Gestalt Psychology	Studies the mind's holistic processing of patterns.
Feminism	Explores systemic sexist discrimination and gender dynamics, advocating for women's equality.
Indigenous Psychology	Centres on Indigenous rights, traditions, and practices in understanding psychological processes.
Racial Theory and Identity	Explores systemic racial discrimination and race's impact on identity and experiences.
Multicultural Psychology	Explores diverse cultural influences on individual psychology.
Cross-Cultural Psychology	Compares psychological phenomena across different cultural contexts.

The Basic Process of Scientific Research

AMELIA LIANGZI SHI

Psychologists are not the only people who seek to understand human behaviour and solve social problems. Philosophers, religious leaders, and politicians, among others, also strive to provide explanations for human behaviour. However, psychologists believe that research is the best tool for understanding human beings and their relationships with others. Rather than accepting the claim that people do or do not have free will, a psychologist would collect data to empirically test whether or not people are able to actively control their own behaviour. Rather than accepting an argument that creating or abandoning a new centre for mental health will improve the lives of individuals in the inner city, a psychologist would empirically assess the effects of receiving mental health treatment on quality of life. The statements made by psychologists are **empirical**, which means they are based on systematic collection and analysis of data.

Some psychological research is **basic research**, and it answers important questions about how people behave. For example, biopsychologists study how nerves carry messages from our skin to our brain, while cognitive psychologists look at how our brains remember and use information. On the other hand, there is **applied research**. It looks into real-life issues and tries to find solutions to everyday problems. Applied researchers study things like how to help people with depression, which advertisements could reduce drug and alcohol abuse, what makes someone a successful manager, and how to tell if government programs are working. Basic and applied research complement each other and help us learn more about how we think and act.

The Scientific Method

The scientific method can be simplified into a series of steps. Basically, ideas (in the form of theories and hypotheses) are tested against the real world (in the form of empirical observations). Then, those empirical observations lead to more ideas that are tested against the real world, and so on. In this sense, the scientific process is circular. As psychologists learn more about something, that knowledge generates further questions that can be turned into hypotheses. As our knowledge is expanded, we may have to change a theory to account for it.

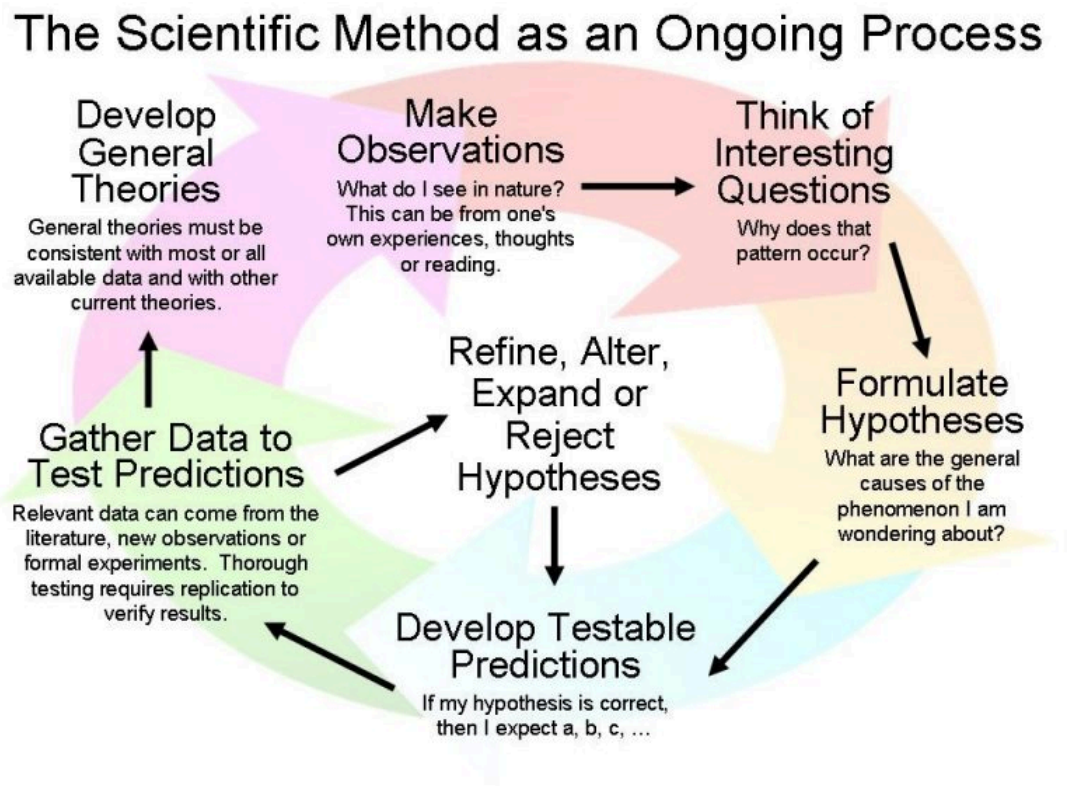


Figure PS.1. The Scientific Method as an Ongoing Process. *A scientific approach to knowledge acquisition starts with proposing a research question followed by a testable and tentative hypothesis. Then data will be gathered to verify or potentially falsify the hypothesis. [Image Description]* ***Source:*** *Figure PS.1. Scientific Method 3 by Whatiguana is used under a CC BY-SA 4.0 Licence.*

A **theory** is a well-developed set of ideas that proposes an explanation for observed phenomena. Theories are repeatedly checked against the world, but they tend to be too complex to be tested all at once; instead, researchers create hypotheses to test specific aspects of a theory. A **hypothesis** is a testable prediction about how the world will behave, and it is often worded as an if-then statement (e.g., if I study all night, then I will get a passing grade on the test). The hypothesis is extremely important as it bridges the gap between the realm of ideas and the real world. Psychological researchers may form their hypotheses based on both deductive and inductive processes. In the scientific context, **deduction** refers to testing theories against empirical observations. Imagine you want to deductively test the general idea that "playing video games will make people happy." You observe your friend Bob, who plays video games every day. You want to see whether he always seems happy during these gaming sessions. In this case, you are applying a general theory specifically to Bob. **Induction**, on the other hand, refers to using empirical observations to formulate theories. Let's say several of your friends all mention feeling happy while playing video games. From

these specific observations, you may inductively propose a hypothesis like, “People tend to feel happy when playing video games.” In this case, you are forming a theory based on the specific instances you’ve encountered.

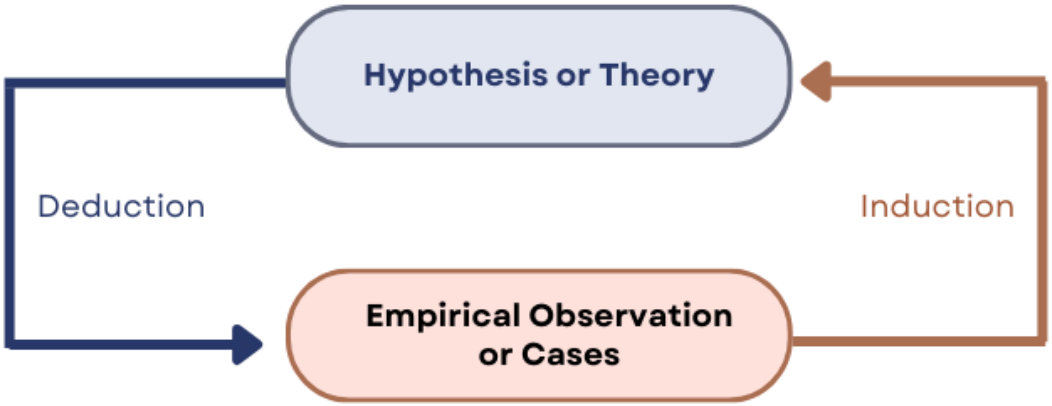


Figure PS.2. Deductive and Inductive Processes. *Scientific research involves both deductive and inductive processes. For example, case studies are closely associated with inductive processes as researchers gather massive amounts of observations and seek interesting patterns in the data. On the other hand, the experimental approach places great emphasis on deductive reasoning, where researchers design experiments to test their hypotheses.* ***Alt. text****: A diagram showing the cyclical relationship between “Hypothesis or Theory” and “Empirical Observation or Cases”. From “Empirical Observation or Cases”, use induction to make a “Hypothesis or Theory”. From “Hypothesis or Theory”, use deduction to make “Empirical Observation or Cases”.* ***Source:*** *Figure PS.2. Original image created for this text and has a CC BY-NC-SA Licence.*

In addition to requiring that science be empirical, the scientific method demands that the procedures used be **objective**, that is to say, free from the personal bias or emotions of the researcher. The scientific method prescribes the process for researchers to collect and analyze data, draw conclusions, and share their findings. By following these rules, other researchers can understand exactly how the data was collected and analyzed. They can draw their own conclusions and not rely solely on the interpretations of the original research. This promotes transparency and allows for diverse perspectives in scientific research. Some new research also aims to replicate previous findings. They can repeat, add to, modify or even falsify earlier findings. In this way, scientific knowledge grows as researchers report their findings, and other researchers add to or modify the procedures through continuous research and sharing of ideas.

The goal of research in psychology is to explain and predict relationships within a certain area of study. A good theory should offer a simple explanation of a phenomenon (that is, be parsimonious) and suggest ideas for future research. Most importantly, a good theory must be **falsifiable**, which means that the hypotheses generated from this theory are capable of being shown to be incorrect.

A good hypothesis is a testable prediction about relationships between clearly defined variables. Suppose that we want to test this idea: sleep is important for memory. Can you think of three different testable hypotheses? For example:

- People who get more than seven hours of sleep will get a higher score on the ABC Memory Test than people who get less than seven hours.
- There is a positive association between the amount of time students sleep and their grade point average.
- People suffering from insomnia show an increased ABC Memory Test score when they are successfully treated for insomnia.

Operational Definitions

As you read through these examples, you may have noticed that we use very specific methods to measure sleep and memory. Psychologists use the term "**operational definition"** to describe exactly how a variable is being measured. In contrast to the abstract concepts, the operational definitions are very specific. For example, we could measure sleep in many different ways: self-reported number of hours of sleep according to brain waves measured in a sleep lab, the number of hours of sleep reported by a fitness tracking device worn by participants, and so on. If we were measuring temperature, we would need to define what we mean by temperature: degrees Fahrenheit, degrees Celsius, or simply our best guess. Having clear operational definitions is crucial because. If a variable is not precisely defined, others may misunderstand the data collected, making it hard for future researchers to replicate the study.

Here are some operational definitions (OD) of variables that have been used in psychological research:

- **Concept = "aggression"**

- OD1: number of presses of a button that administers shock to another student
- OD2: number of seconds taken to honk the horn at the car ahead after a stoplight turns green

- **Concept = "interpersonal attraction"**
  - OD1: number of inches that an individual places his or her chair away from another person
  - OD2: number of millimeters of pupil dilation when one person looks at another
- **Concept = "employee satisfaction"**
  - OD1: number of days per month an employee shows up to work on time
  - OD2: rating of job satisfaction from 1 (not at all satisfied) to 10 (extremely satisfied)
- **Concept = "depression"**
  - OD1 = number of negative words used in a creative story
  - OD2 = number of appointments made with a psychotherapist

Peer Review

When psychologists complete a research project, they generally want to share their findings with other scientists. The American Psychological Association (APA, 2020) publishes a manual detailing how to write a paper for submission to peer-reviewed, scientific journals. The **Online Writing Lab (OWL)** at Purdue University can walk you through the APA writing guidelines.

Peer review is an important part of publishing research findings in many scientific disciplines. A peer-reviewed journal article is read by several other scientists (generally anonymously) with expertise in the subject matter. These peer reviewers provide feedback to both the author and the journal editor regarding the quality of the draft. Peer reviewers look for a strong rationale for the research being described, a clear description of how the research was conducted, and evidence that the research was conducted in an ethical manner. They also look for flaws in the study's design, methods, and statistical analyses. They check that the conclusions drawn by the authors seem reasonable given the observations made during the research. Peer reviewers also comment on how valuable the research is in advancing the discipline's knowledge. This helps prevent unnecessary duplication of research findings in the scientific literature and, to some extent, ensures that each research article provides

new information. Ultimately, the journal editor will compile all of the peer reviewer feedback and determine whether the article will be published in its current state (a rare occurrence), published with revisions, or not accepted for publication.

Peer review provides some degree of quality control for psychological research. Poorly conceived or executed studies can be weeded out, well-designed research can be improved, and ideally, studies can be described clearly enough to allow other scientists to replicate them, which helps to maintain reliability.

So why would we want to replicate a study? Imagine that our version of the Bobo doll study is done exactly the same as the original, only using a different set of participants and researchers. We use the same operational definitions, manipulations, measurements, and procedures, and our groups are equivalent in terms of their baseline levels of aggression. In our replication however, we receive completely different results and the children do not imitate aggressive behaviours any more than they would at the level of chance. If our experimental manipulation is exactly the same, then the difference in results must be attributable to something else that is different between our study and the original, which might include the researchers, participants, and location. If on the other hand, we were able to replicate the results of the original experiment using different researchers and participants at a different location, then this would provide support for the idea that the results were due to the manipulation and not to any of these other variables. The more we can replicate a result with different samples, the more reliable it is.

In recent years, there has been increasing concern about a "replication crisis" that has affected a number of scientific fields, including psychology. One study found that only about 62% of social science studies reviewed were replicable, and even then their effect sizes were reduced by half (Cramerer et al, 2018). In fact, even a famous Nobel Prize-winning scientist has recently retracted a published paper because she had difficulty replicating her results (BBC, 2020). These kinds of outcomes have prompted some scientists to begin to work together and more openly. One example of this more collaborative approach is the *Psychological Science Accelerator*, a network of over 500 laboratories, representing 82 countries. This network allows researchers to pre-register their study designs, which minimises any cherry-picking that might happen along the way to boost results. Cherry-picking is a biased approach where researchers selectively report data that supports a researcher's hypothesis, while ignoring any findings that do not support it. The network also facilitates data collection across multiple labs, allowing for the use of large, diverse samples and more widespread sharing of results. Hopefully with a more collaborative approach, we can develop a better process for replicating and checking the quality of research. If you'd like to learn more about the *Psychological Sciences Accelerator*, you can check out **Psychological Science Accelerator's website**.

Watch this video: **The Scientific Method (15 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=712#oembed-1***

“The Scientific Method: Crash Course Biology #2” video by CrashCourse is licensed under the Standard YouTube Licence.

Image Descriptions

Figure PS.1. The Scientific Method as an Ongoing Process image description:

1. **Make Observations:** What do I see in nature? This can be from one’s own experiences, thoughts, or reading.
2. **Think of Interesting Questions:** What does that pattern occur?
3. **Formulate Hypotheses:** What are the general causes of the phenomenon I am wondering about?
4. **Develop Testable Predictions:** If my hypothesis is correct, then I expect a, b, c, …
5. **Gather Data to Test Predictions:** Relevant data can come from the literature, new observations or formal experiments. Thorough testing requires replication to verify results. (Go to Step 6 or Step 7)
6. **Refine, Alter, Expand or Reject Hypotheses**. (Go to Step 4)
7. **Develop General Theories:** General Theories must be consistent with most or all available data and with other current theories. ***[Return to Figure PS.1]***

Designing Research in Psychology

AMELIA LIANGZI SHI

Researchers have different research designs to choose from when testing their predictions. A **research design** is the specific way a researcher collects, analyzes, and interprets data. Psychologists mainly use three types of research design, and each is crucial for scientific investigation. **Descriptive research** aims to give a snapshot of the present situation. It includes case studies, surveys and tests, naturalistic observation, and laboratory observation. It helps researchers understand what is happening at a given time. **Correlational research**, on the other hand, aims to find relationships between and among two or more variables. It helps researchers see how variables might be related to each other. **Experimental research**, the third type, is focused on assessing cause and effect. By conducting experiments, researchers can determine if one variable directly influences another.

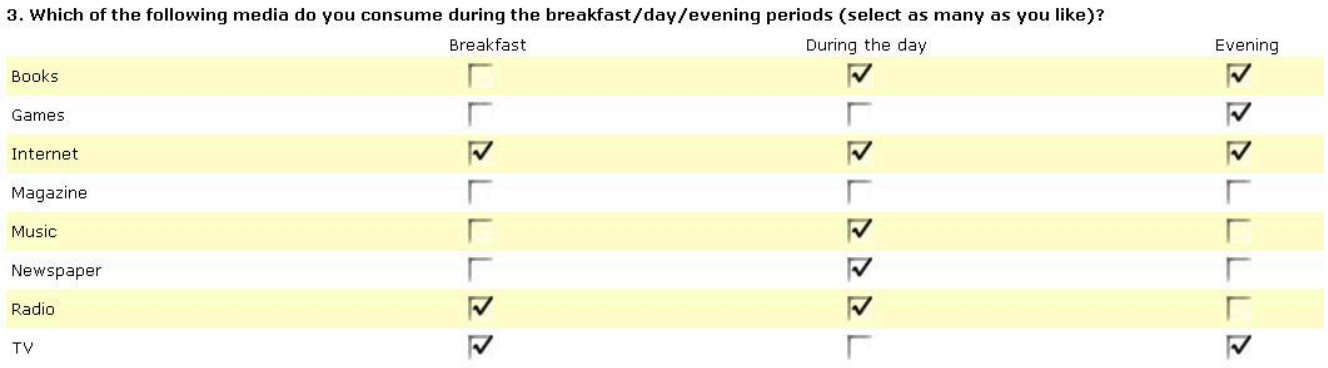
Descriptive Research

In 2011, the New York Times published a feature story on Krista and Tatiana Hogan, Canadian twins. These particular twins are unique because Krista and Tatiana are conjoined twins, connected at the head. There is evidence that the two girls are connected in a part of the brain called the thalamus, which is a major sensory relay centre. Most incoming sensory information is sent through the thalamus before reaching higher regions of the cerebral cortex for processing. The potential connection in their brains suggests that one twin might feel the sensations of the other (Egnor, 2017). For example, if Krista finds something funny on TV, Tatiana might smile or laugh, even if she isn't watching the show. This has caught the attention of neuroscientists who want to understand how the brain handles sensory information. Since their condition is very rare, it is likely that as long as their family agrees, scientists will follow these girls very closely throughout their lives to gain as much information as possible (Dominus, 2011). Watch this **CBC video** to learn more about Krista and Tatiana's lives.

In descriptive research, researchers are conducting a **case study** when they focus on one person or just a few individuals, to gain an in-depth understanding of the individuals and the particular phenomenon being studied. Case studies allow researchers to describe what could happen. Sometimes a single case may challenge the validity of an existing theory. However, case studies bring some challenges when it comes to interpreting the data. This

method is often used to study individuals with rare characteristics. Therefore, the individuals who serve as the focus of case studies are not like most other people. If scientists ultimately want to explain all behaviour, focusing attention on such a special group of people can make it difficult to generalise any observations to the larger population as a whole. **Generalisation** refers to the ability to apply the findings of a particular research project to larger segments of society. Again, case studies provide enormous amounts of information, but since the cases are so specific, the potential to apply what's learned to the average person may be very limited.

The data from descriptive research projects can also come in the form of a survey. **Surveys** are lists of questions to be answered by research participants and can be delivered as paper-and-pencil questionnaires, administered electronically, or conducted verbally in forms of interviews.



3. Which of the following media do you consume during the breakfast/day/evening periods (select as many as you like)?

	Breakfast	During the day	Evening
Books	☐	☑	☑
Games	☐	☐	☑
Internet	☑	☑	☑
Magazine	☐	☐	☐
Music	☐	☑	☐
Newspaper	☐	☑	☐
Radio	☑	☑	☐
TV	☑	☐	☑

Figure PS.3. Electronic survey. *Surveys can be administered in a number of ways, including electronically administered research shown here.* ***Alt. text:*** *A survey asking the question "Which of the following media do you consume during the breakfast/day/evening periods (select as manyas you like)?". The media mentioned are books, games, internet, magazine, music, newspaper, radio, and TV.* ***Source:*** *"Gizmodo Survey – Media" by avlxyz is licensed under a CC BY-SA 2.0 Licence.*

Surveys help researchers collect information from a larger group of people than other research methods. The people chosen to participate in the research, known as the **sample**, are selected to be representative of all the people that the researcher wishes to know about, known as the **population**. Researchers study the sample to make generalisations about the population. The **representativeness** of samples is enormously important. For example, a representative sample of Canadians must reflect Canada's demographic make-up in terms of age, sex, gender orientation, socioeconomic status, ethnicity and cultural backgrounds, and so on. Research based on unrepresentative samples is limited in **generalisability**, meaning it will not apply well to anyone who was not represented in the sample.

Historically, psychological researchers have been publishing results collected entirely from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) samples, probably with an assumption that there is little variation across human populations. However, the majority of the world's population is not WEIRD. Henrich and colleagues (2010) reviewed the databases across behavioural sciences and concluded that WEIRD samples are not representative for making generalisations about humans, particularly on some basic psychological processes, such as visual perception, reasoning, moral development, self-concepts, social abilities, and intelligence. Psychological researchers should strive to include more diverse groups of people in their studies, beyond just WEIRD samples, to ensure that their findings are more representative and generalisable to the entire spectrum of human experiences.

There are both strengths and weaknesses in using a survey when compared to case studies. Psychologists use surveys to measure a wide variety of behaviours, attitudes, opinions, and facts. By using surveys, we can collect information from a larger sample of people, more quickly. A larger sample is better able to reflect the actual diversity of the population, thus allowing better generalisability. These days, many surveys are available online, and they tend to be aimed at a wide audience. **Statistics Canada** is a rich source of surveys of Canadians on a diverse array of topics. Their databases are searchable and downloadable, and many deal with topics of interest to psychologists, such as mental health, wellness, and so on. Psychologists may use these existing databases, rather than conducting their own surveys, for their research. This is called **archival research**. Explore the **Statistics Canada website** and look for profiles of the marginalised populations in Canada, such as **Indigenous People** and **non-permanent residents**.

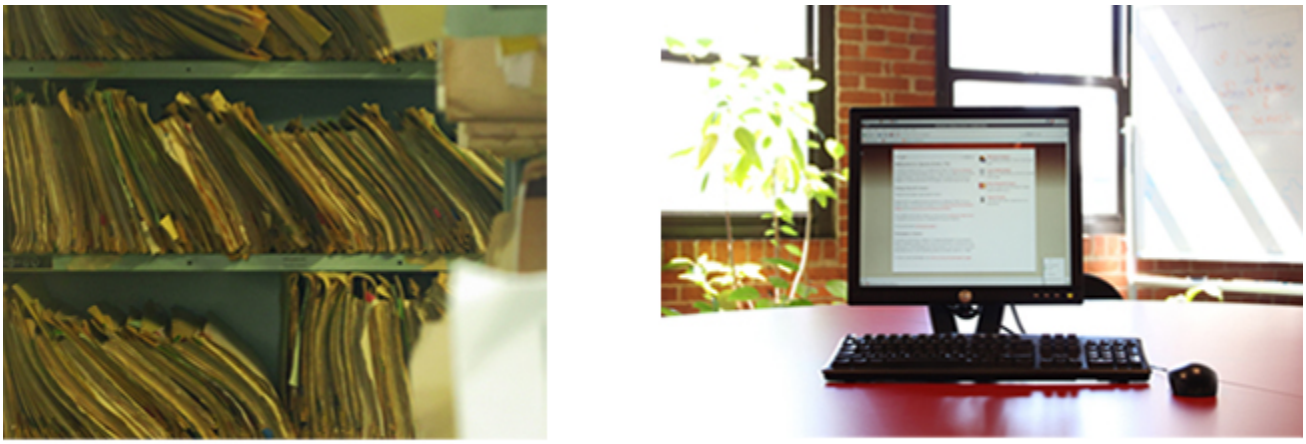


Figure PS.4. Archival data. *Researchers can gain access to large amounts of data without interacting with a single research participant. Archival research is based on data archived (a) as hardcopy or (b) electronically.* ***Alt. text:*** *(a) A photograph shows stacks of paper files on shelves. (b) A photograph shows a computer on a desk.* ***Source:*** *"paper files": modification of work by "Newtown graffiti"/Flickr licensed under a CC BY 2.0 Licence; "computer": modification of work by INPIVIC Family/Flickr licensed under a CC BY 2.0 Licence.*

Even though survey data can be generalised to a large population more confidently than information from case studies, we cannot get as much detailed information about each person. There is another potential weakness of surveys – people might not always tell the truth or remember things correctly. They could answer questions in a way that they think makes them look good. For example, a study found that people's answers in a tourism survey were affected by the nationality of the interviewer asking the questions (Dahlgren & Hansen, 2015).

Surveys are only useful if they are valid and reliable. **Validity** means a survey actually measures what you think it measures (e.g., participants' results from a self-reported anxiety scale indeed indicate their level of anxiety). **Reliability** means a survey gives similar answers over time or in different situations. For example, if you take a test to measure your intelligence three times and get different scores each time, the test is not reliable. *Psychometrics* is a branch of psychology devoted to understanding not only how to demonstrate that tests and surveys are valid and reliable, but also how to improve them.

If you want to understand how behaviour occurs, one of the best ways to gain information is simply to observe the behaviour in its natural context. However, people might change their behaviour in unexpected ways if they know they are being observed. How do researchers obtain accurate information when people tend to hide their natural behaviour? For example, imagine your teacher asks the class who always donates money to charity when asked. Many might raise their hands, but do all of them actually do it? To find out, we have another option. We could place a charity donation box at the cashier and send a classmate to secretly watch if everyone donates money. But our observer should blend in, perhaps by standing at the cashier and pretending to do something while secretly taking notes. This type of research design is called **naturalistic observation**: observing behaviour in its natural setting.

It is critical that the observer be as **unobtrusive** as possible: when people know they are being watched, they are less likely to behave naturally. To better understand "peer exclusion," Fanger and colleagues (2012) observed the behaviour of preschool children on a playground. How did the observers remain unobtrusive over the duration of the study? They equipped a few of the children with wireless microphones (which the children quickly forgot about) and observed while taking notes from a distance. Also, the children in that particular preschool (a "laboratory preschool") were accustomed to having observers on the playground.

It should be pointed out that naturalistic observation is not limited to research involving humans. Scientists have used this technique to study social hierarchies and interactions among animals ranging from ground squirrels to gorillas. The information provided by these studies is invaluable in understanding how those animals organise socially and communicate with one another. The anthropologist Jane Goodall, for example, spent nearly five decades observing the behaviour of chimpanzees in Africa.



Figure PS.5. Jane Goodall. *Jane Goodall made a career of conducting naturalistic observations of chimpanzee behaviour.* ***Alt. text:*** *Jane Goodall with a chimpanzee.* ***Source:*** *From Jane Goodall, by M. Neugebauer, n.d. (https://denstoredanske.lex.dk/Jane_Goodall by Michael Neugebauer, courtesy of The Jane Goodall Institute). Public Domain image.*

The greatest benefit of naturalistic observation is the validity of information collected unobtrusively in a natural setting. Having individuals behave as they normally would in a given situation creates a higher degree of ecological validity, or realism, than we might achieve with other research approaches. Therefore, our ability to generalise the findings of the research to real-world situations is enhanced. If we conduct the observation correctly, we need not worry about people or animals modifying their behaviour simply because they are being observed.

The major downside of naturalistic observation, however, is that they are often difficult to set up and control. In our charity donation study, what if you stood by the charity box all day, ready to record people's donation behaviour, and no one came in? Or, what if you have been closely observing a troop of gorillas for weeks only to find that they migrated to a new place while you were sleeping in your tent? As a researcher you have no control of whether and when you have behaviour to observe.

Sometimes, researchers conducting observational research move out of the natural world and into a laboratory. In these cases, people are observed while engaging in set, specific tasks. **Laboratory observation** (also called *structured* or *controlled observation*) allows much more control over the situation and setting in which the participants will be observed. An excellent example of laboratory observation comes from the Strange Situation experiment by Mary Ainsworth. The Strange Situation experiment evaluates attachment styles that exist between an infant and caregiver. In this scenario, caregivers bring their infants into a room filled with toys. The Strange Situation experiment involves a number of phases,

including a stranger coming into the room, the caregiver leaving the room, and the caregiver's return to the room. The infant's behaviour is closely monitored at each phase, but it is the behaviour of the infant upon being reunited with the caregiver that is most telling in terms of characterising the infant's attachment style with the caregiver. Moving observation into a laboratory potentially reduces ecological validity – participants are less likely to behave naturally in the laboratory settings, so controlled observations may fail to capture the real-world behaviour.

Another potential problem in observational research is **observer bias**. Generally, people who act as observers are closely involved in the research project and may unconsciously skew their observations to fit their research goals or hypotheses. To protect against this type of bias, researchers should set clear criteria before collecting data, specifying the behaviours to be recorded and how those behaviours should be classified. In addition, researchers often compare observations of the same event by multiple observers, in order to test **inter-rater reliability**: a measure of reliability that assesses the consistency of observations by different observers.

Correlational Research

Correlation means that there is a relationship between two or more variables (such as height, weight, shoe size, and hours of sleep), but this relationship does not necessarily imply cause and effect. When two variables are correlated, it simply means that as one variable changes, so does the other. We can measure correlation by calculating a statistic known as a correlation coefficient. A **correlation coefficient** is a number from -1 to +1 that indicates the strength and direction of the relationship between variables. The correlation coefficient is usually denoted by the letter *r*.

The number portion of the correlation coefficient indicates the strength of the relationship. The closer the number is to 1, the more strongly related the variables are, and the more predictable changes in one variable will be as the other variable changes. The closer the number is to zero, the weaker the relationship, and the less predictable the relationships between the variables. For instance, a correlation coefficient of 0.9 indicates a far stronger relationship than a correlation coefficient of 0.3, and a correlation coefficient of +0.9 is as strong as a correlation coefficient of -0.9. If the variables are not related to one another at all, the correlation coefficient is 0.

The sign—positive or negative—of the correlation coefficient indicates the direction of the relationship. A **positive correlation** means that the variables move in the same direction. Put another way, it means that as one variable increases so does the other, and conversely,

when one variable decreases so does the other. A **negative correlation** means that the variables move in opposite directions. If two variables are negatively correlated, a decrease in one variable is associated with an increase in the other and vice versa.

As an illustration, we might expect a positive correlation between a person's height and weight, and conversely, we might predict a negative correlation between tiredness during the day and the hours of sleep from the night before – when tiredness ratings are high, sleep time from the night before is low. Remember, a negative correlation does not mean there is no connection at all. Manipulate **this interactive scatterplot** to practice your understanding of positive and negative correlation.

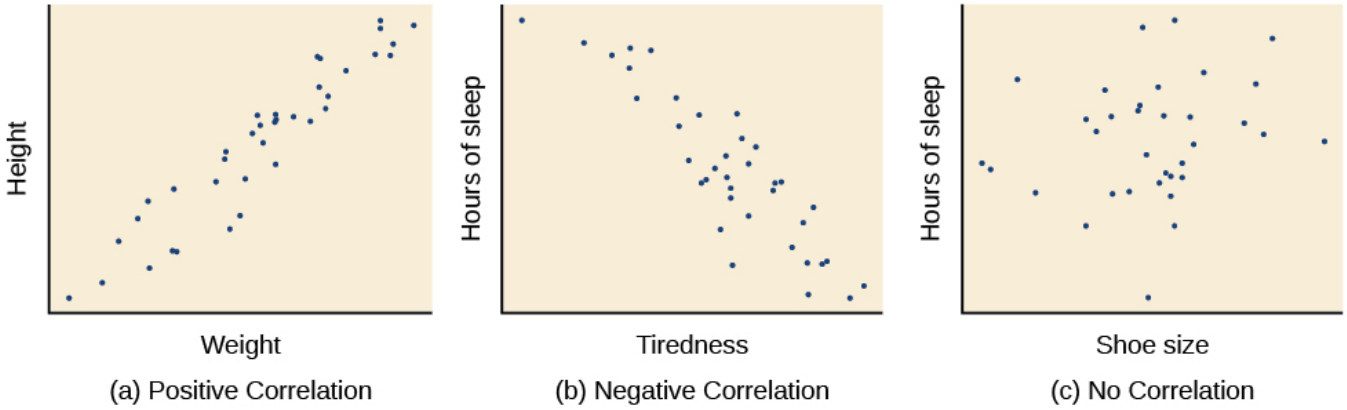


Figure PS.6. Scatterplots. *Scatterplots are graphical views of the strength and direction of correlations. The stronger the correlation, the closer the data points are to a straight line. In these examples, we see that there is (a) a positive correlation between weight and height, (b) a negative correlation between tiredness and hours of sleep, and (c) no correlation between shoe size and hours of sleep. Figure 2.12 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Correlational research designs are often used by psychological researchers as they are affordable, time-efficient, and usually can be conducted without much equipment. Online survey platforms have made data collection easier than ever. Correlational research does not even necessitate collecting data if researchers have access to archival databases. We can also use correlational designs to make predictions. For example, if you're on a team that decides who gets into a graduate program, and there are lots of applications but only a few spots, you could use correlations between current students' GPA and their scores on standardized tests like the GRE or GMAT to predict which applicants might succeed in the graduate program.

Correlational results can suggest new directions for further research, but such information tells us little about cause and effect; in other words, we cannot know what causes what in correlational research. Consider a researcher who hypothesizes violent TV causes more aggressive play in children. They collect data from Grade 4 children on Variable 1: the hours of violent TV shows watched by each child weekly and Variable 2: how aggressively each

child plays on the school playground. A positive correlation between Variable 1 and Variable 2 appears to support the researcher's hypothesis, but it cannot be taken to indicate that viewing violent television *causes* aggressive behaviour, as other explanations exist: aggression at school might lead to violent TV preference, or a third variable, such as parenting style, could influence both variables. For example, permissive parents might permit violent TV and be less strict about children's aggressive actions.

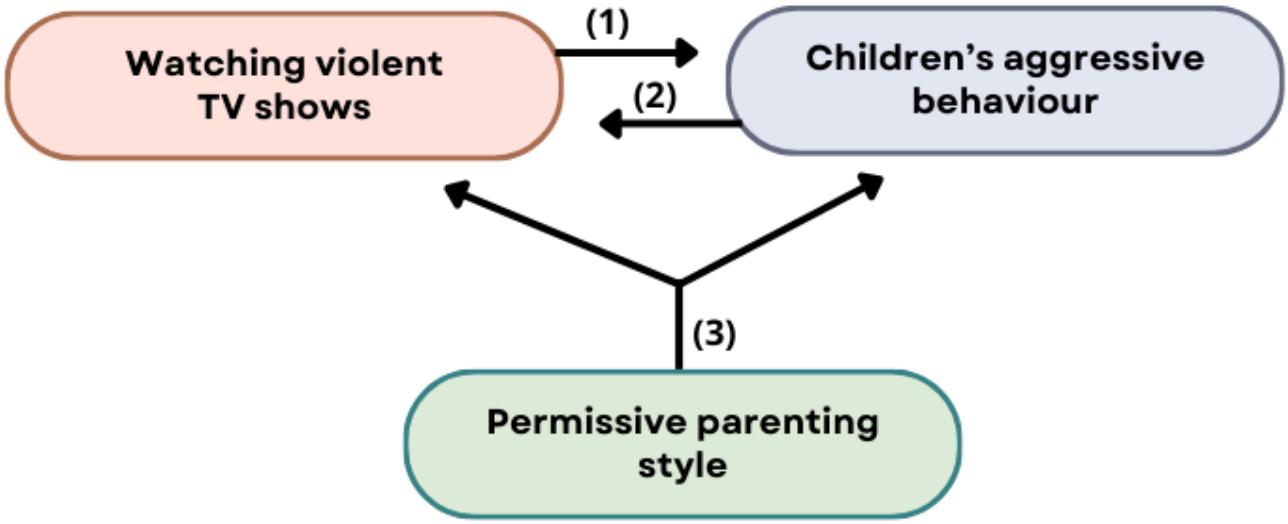


Figure PS.7. Violent TV watching and aggression. *A positive correlation between violent TV watching and aggression can be interpreted in three ways: (1) Watching violent TV shows causes children to act aggressively. (2) Children who act aggressively also like to watch violent TV shows. (3) Other factors, such as permissive parenting style, cause more violent TV-watching and more aggressive behaviour in children.* ***Alt. text:*** *A diagram showing the relationship between "Watching violent TV shows", "Children's aggressive behaviour", and "Permissive parenting style".* ***Source:*** *Original image created for this text and is under a CC BY-NC-SA Licence.*

To recap, whenever we find a correlation between two variables, X and Y, that is not zero, there are three possible ways of explaining this result: (1) X might cause Y; (2) Y might cause X; (3) some uninvestigated third variables (e.g., Z) might cause both X and Y. For the below examples, can you provide three different interpretations? In each case, identify variables X, Y, and Z:

- A positive correlation between dark chocolate consumption and health.
- A negative correlation between sleep and smartphone use.
- A positive correlation between self confidence and test scores.

A negative association between time spent exercising and consumption of junk food.Unfortunately, people mistakenly make causal conclusions from correlational findings all the time. For example, recent research found that people who eat cereal on a regular basis achieve healthier weights than those who rarely eat cereal (De La Hunty & Ashwell, 2007; Frantzen et al., 2013). Guess how the cereal companies report this finding. Does eating cereal really cause an individual to maintain a healthy weight, or are there other possible explanations, such as, someone at a healthy weight is more likely to regularly eat a healthy breakfast than someone who avoids meals in an attempt to diet? Again, *correlation does not mean causation*. The only way to establish that there is a cause-and-effect relationship between two variables is to conduct a scientific experiment.

Experimental Research

The goal of experimental research design is to provide potential explanations about the causal relationships among the variables. The most basic experimental design involves two groups: the experimental group and the control group. The two groups are designed to be the same except for one difference — experimental manipulation: the **experimental group** gets the treatment being tested and the **control group** does not. Since experimental manipulation is the only difference between the experimental and control groups, we can be sure that any differences between the two are due to experimental manipulation rather than by chance.

To investigate the relationship between observed aggression and imitated aggressive behaviour in children, our experimental manipulation will be to allow children to observe an adult modeling aggressive behaviour. We might have the children in our experimental group play in a room where they are able to observe adults playing aggressively with toys, hitting, pushing and yelling at them. The study we are describing here is actually a simplified version of Bandura and colleagues' (1961) famous Bobo doll study.

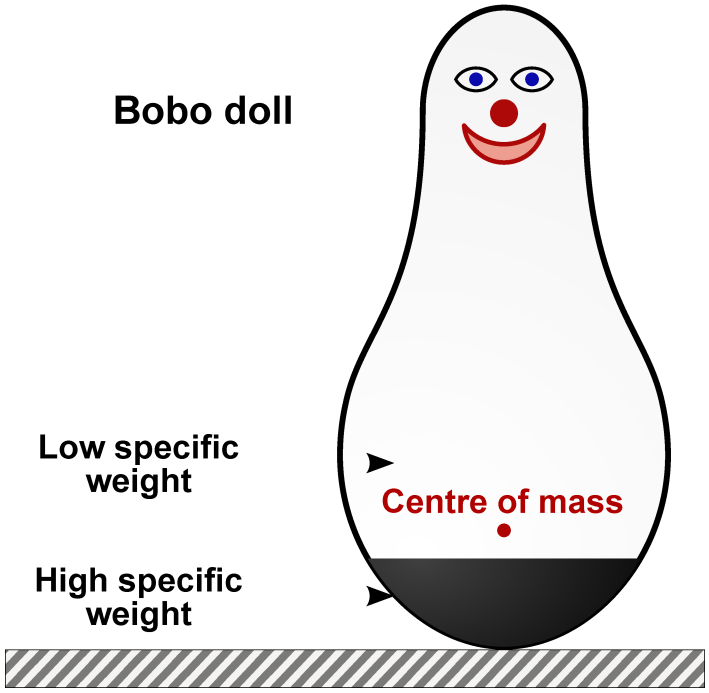


Figure PS.8. The Bobo doll. *The Bobo doll, a bowling pin shaped inflatable toy with a clown printed on it. The toy is heavier at the base than it is at the top, so it rocks back and forth without falling over when pushed or struck.* ***Alt. text:*** *Graphic of a Bobo doll. Near the base, it indicates that there is a Low specific weight. Below that is the centre of mass of the Bobo doll. And below that is a High specific weight.* ***Source:*** *"Bobo doll" by Sémhur, TilmannR is licensed under a CC BY-SA 4.0 Licence.*

In our experimental condition, children will observe an adult playing with the Bobo doll in an aggressive way, whereas children assigned to our control condition will see the adult playing with the doll in a non-aggressive way. The two conditions will be the same in all other ways, such as children's gender ratio, the adult model's gender, the location of the Bobo doll in the room, and the length of time for observation. At the beginning of our experiment, we must *randomly assign* the participants into these two conditions. This is called manipulation of the **independent variable**. With the current design, we only have one independent variable – the type of behaviour observed by the children, which varies across two conditions: experimental (aggressive) and control (non-aggressive). We may also include a second independent variable – the match between the adult model's gender and the child observer's gender. However, since researchers cannot use random assignment to manipulate many variables, such as gender, age, cultural background, and educational level, we don't use the word "*manipulate*" for these participant variables. Instead, we "*compare*" the condition when the model's gender matches the child' gender (e.g., assigning a female model to a

female observer) and the condition when their genders are unmatched (e.g., assigning a male model to a female observer). We also need to identify and measure our dependent variables. The **dependent variable** is the outcome on the measure of interest that is dependent on the actions of the independent variable. In our example, the dependent variable is the number of modelled aggressive behaviours our participants imitate.

One of the most important parts of a scientific study is having a clear description of how each variable is measured. Researchers often create different operational definitions of the same variable. In our Bobo doll study, we need to decide how we can measure aggression, which could be described in a variety of ways. For example, one might define aggression as a destructive tendency caused by frustration. Then we could measure aggression by asking how frustrated participants feel. **Self-report** is often used when the variable is not externally observable. Alternatively, we may operationally define aggression with **physiological measures**; we can test participants' physiological arousal (such as heart rate or blood pressure) in response to a frustrating situation. For the purposes of our current experiment, we could define aggressive behaviour as overt actions that have the potential to cause harm to the Bobo doll, including kicking the doll, throwing it, or saying things like "stupid doll," which imitate our adult models' aggressive behaviour observed earlier. In this case, we are using **behavioural measures**.

Manipulating the independent variable causes the change of the dependent variable. In other words, the dependent variable depends on the independent variable. In our Bobo doll study, the children observing aggressive behaviour will act aggressively and the children observing non-aggressive behaviour will not act aggressively.



Figure PS.9. The Bobo doll – aggressive behaviour. *Manipulations of the independent variable are expected to result in changes in the dependent variable. In the Bobo doll study, after observing an adult interacting with the doll in an aggressive way, the children also played with the doll aggressively. Bobo Doll Deneyi by Okhanm from Wikimedia Commons, licensed under a CC BY-SA 4.0 Licence.*

As we know, we can only say that observing an adult's aggressive behaviour is the cause of children's aggression if it is the only difference between the experimental and control groups. This means we must control all the **confounding variables** that may also influence the study's results.

Now, let's explore some examples of confounding variables. To begin with, participants must be randomly assigned to the conditions so that there are no differences between the groups. This should also be a **single-blind procedure** – participants are unaware as to which group they are in (experiment or control group) while the researcher who developed the experiment knows which participants are in each group.

Ideally, the people who count imitated behaviours are unaware of who was assigned to the experimental or control group, in order to control for experimenter bias. **Experimenter bias** refers to the tendency that a researcher might interpret the results in favour of their hypotheses. If the observers know which child is in which group, it will influence how they interpret ambiguous responses, such as squeezing the doll. With the **double-blind procedure**, both the researchers and the participants are blind to group assignments, which allows us to control for both experimenter and participant expectations.

A well-known example of the power of expectations is the placebo effect. The **placebo effect** occurs when people's expectations or beliefs influence their experience in a given situation. In other words, simply expecting something to happen can actually make it happen. As a result, we might use a **placebo control**, where the only difference between the experimental condition and the control condition is the critical treatment. In medical research, a placebo is a type of medication that looks like the real drug but is actually chemically inert, sometimes referred to as a "sugar pill." The placebo control is necessarily followed by a single/double-blind procedure. If participants know whether they have received the drug, we will not be able to tell whether the effects were due to expectations about drug efficacy or to the actual drug. Similarly, if the researchers know which participants are receiving the drug, they may treat participants differently, which will alter the way participants respond.



Figure PS.10. Placebo effect. *Providing the control group with a placebo treatment protects against bias caused by expectancy, or a "placebo effect."* ***Alt. text:*** *Three pill bottles are displayed. The labels on the bottles read 'Cebocap No. 1 placebo', 'Cebocap No. 2 placebo', and 'Cebocap No. 3 Placebo' respectively.* ***Source:*** *"Cebocap" from the National Institute of Health, donated by Elaine and Arthur Shapiro, is in the Public Domain.*

Researchers may manipulate independent variables between subjects or within subjects. In a **between-subject design**, participants are randomly assigned to one of the conditions. This way, we can assume the experimental group and the control group are equivalent prior to experimental manipulation. Alternatively, we may ask each participant to fulfill all the conditions. This is called a **within-subject design**. For example, suppose that you are preparing for an exam and want to find out which method leads to a better recall: A, reading the material aloud by yourself or B, listening to someone read it to you. To compare these two methods, you can memorise a short essay using Method A and take a test on it; then, memorise another short essay using Method B, and test it. Within-subject designs are less affected by individual differences among participants because the participants are compared to themselves. In addition, fewer participants are required because each participant will provide data for all the conditions. However, if researchers use within-subject design, they must control the possible confounding variables by counterbalancing the sequence of conditions. For example, half of participants first experience Treatment A and then Treatment B, while the other half experience Treatment B first and then Treatment A. In many cases, within-subject design is not feasible. Take our Bobo doll study for instance. Once the children learn how to play with the doll aggressively, can they unlearn the behaviour?

In contrast to correlational research, experimental designs have two very nice features. For one, they guarantee that the independent variable occurs prior to the measurement of the dependent variable. This eliminates the possibility of reverse causation. Second, the influence of confounding variables is controlled, and thus eliminates the possibility that the confound caused the results, not the independent variable.

Despite the advantage of determining causation, experiments do have limitations. One is that they are often conducted in laboratory situations rather than in the everyday lives of people. Therefore, we do not know whether results that we find in a laboratory setting will necessarily hold up in everyday life. Often researchers are forced to balance the need for experimental control with the use of laboratory conditions that can somewhat mimic real life. Additionally, it is very important to understand that a large proportion of psychology research is not experimental for a variety of practical and ethical reasons. For example, examining the effect of eating on development can't be tested in a lab as it would be unethical to have one group eat while another group doesn't, and then see the difference present.

Summary

The Table PS.1 summarises the strengths and weaknesses for each type of research.

Table PS.1. Advantages and disadvantages of three major research designs

Research Design	Advantages	Disadvantages
Descriptive	Provides a relatively complete picture of what is occurring at a given time. Allows the development of questions for further study.	Does not assess relationships among variables. Cannot be used to draw inferences about cause and effect.
Correlational	Allows testing of expected relationships between and among variables and the making of predictions. Can assess these relationships in everyday life events.	Cannot be used to draw inferences about cause and effect.
Experimental	Allows conclusions to be drawn about the causal relationships among variables.	Cannot experimentally manipulate many important variables. May be unethical or time-consuming.

Table adapted from Stangor (2011).

Watch this video: **Psychological Research: Crash Course Psychology #2 (11 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=722#oembed-1***

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Conducting Ethical Research

AMELIA LIANGZI SHI

Research Involving Humans

Any experiment involving the participation of human subjects is governed by extensive, strict guidelines designed to ensure that the experiment does not result in harm. In Canada, there are two bodies that provide guidelines for ethical human research that must be adhered to. The *Canadian Psychological Association* has a code of ethics that members must follow (Canadian Psychological Association, 2017). The *Tri-Council Policy Statement 2 (TCPS 2)* is the most recent set of guidelines for ethical standards in research adhered to by those doing research with human subjects (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2022). The TCPS 2 is based on three core principles: respect for persons, concern for welfare, and justice. Details on these core principles are found in TCP2 Article 1.1.

Any research institution that receives federal support for research involving human participants must have access to an **institutional review board (IRB)**. The IRB is a committee of individuals often made up of members of the institution's administration, scientists, and community members. The purpose of the IRB is to review proposals for research that involves human participants. The IRB reviews these proposals with the principles mentioned above in mind, and generally, approval from the IRB is required in order for the experiment to proceed.



Figure PS.11. Institutional review board meeting. *An institution's IRB meets regularly to review experimental proposals that involve human participants.* ***Alt. text:*** *A group of people seated around tables in a meeting room.* ***Source:*** *"IHA Board Meeting 56" by International Hydropower Association is licensed under a CC BY 2.0 Licence.*

An institution's IRB requires several components in any experiment it approves. For one, each participant must provide an informed consent before they can participate in the experiment. In cases where research participants are under the age of 18, the parents or legal guardians are required to sign the informed consent form. An **informed consent** form contains a written description of what participants can expect during the experiment, like potential risks and implications of the research. It also lets participants know that their involvement is completely **voluntary** and can be discontinued without penalty at any time. Students in psychology classes may be allowed, or even required, to participate in research, but they are also always given an option to perform other activities instead. Additionally, once an experiment begins, the research participant is always free to leave the experiment if they wish. Concerns with free choice also occur in institutional settings such as schools, hospitals, corporations and prisons, when individuals are required by the institutions to take certain tests or when employees are told to participate in research.

Furthermore, the informed consent guarantees that any data collected in the experiment will remain completely **confidential**. In some cases, data can be kept anonymous by not having the respondents put any identifying information on their questionnaires. In other cases, the data cannot be anonymous because the researcher needs to keep track of which respondent contributed the data. In this case, one technique is to have each participant use a unique code number to identify their data, such as the last four digits of the student ID

number. In this way, the researcher can keep track of which person completed which questionnaire, but no one will be able to connect the data with the individual who contributed them.

While the informed consent form should be as honest as possible in describing exactly what participants will be doing, sometimes deception is necessary to prevent participants' knowledge of the exact research question from influencing the results of the study. **Deception** involves purposely misleading experiment participants in order to maintain the integrity of the experiment, but not to the point where the deception could be considered harmful. For example, if we are interested in how our opinion of someone is affected by their attire, we might use deception in describing the experiment to prevent that knowledge from affecting participants' responses. Researchers must balance the use of deception, like not disclosing the true purpose of the study, with potential harm to the participants. The use of deception must be justified. In cases where deception is involved, participants must receive a full **debriefing** upon conclusion of the study: complete, honest information about the purpose of the experiment, the ways in which the data collected will be used, the reasons why deception was necessary, and the process to obtain additional information about the study.

Today, scientists agree that good research is ethical in nature and guided by a basic respect for human dignity and safety. Unfortunately, the ethical guidelines that exist for research today were not always applied in the past. In 1932 poor, rural, Black, male sharecroppers from Tuskegee, Alabama, were recruited to participate in an experiment conducted by the US Public Health Service, with the aim of studying syphilis in Black men. In exchange for free medical care, meals, and burial insurance, 600 men agreed to participate in the study – 399 who tested positive for syphilis and 201 who did not have the disease. However, those individuals that tested positive were never informed that they had the disease. While there was no treatment for syphilis when the study began, by 1947 penicillin was recognised as an effective treatment for the disease. Despite this, no penicillin was administered to the participants in this study, and the participants were not allowed to seek treatment at any other facilities if they continued in the study. Over the course of 40 years, many of the participants unknowingly spread syphilis to their wives (and subsequently their children born from their wives) and eventually died because they never received treatment for the disease. This study was discontinued in 1972 when the experiment was discovered by the *National Press* (Tuskegee University, n.d.). The resulting outrage over the experiment led directly to the National Research Act of 1974 and the strict ethical guidelines for research on humans. Visit the CDC's **Tuskegee Timeline** to learn more.



Figure PS.12. Untreated syphilis study at Tuskegee. *For 40 years starting in 1932, medical workers in the segregated South withheld treatment for unsuspecting men infected with syphilis, simply so doctors could track the effects of the illness and examine their bodies after death.* ***Alt. text:*** *Five older black men standing next to each other. They all have hats, button-up shirts, and either overalls or pants with suspenders.* ***Source:*** *"Photograph of Participants in the Tuskegee Syphilis Study" by the Department of Health, Education, and Welfare, n.d., in the National Archives Catalogue is in the Public Domain.*

Research Involving Animals

Many psychologists conduct research involving animal subjects. Because many basic processes in animals are sufficiently similar to those in humans, these animals are acceptable substitutes for research that would be considered unethical in human participants. However, this does not mean that animal researchers are exempt from ethical concerns. The following are the Canadian Psychological Association's (2017) guidelines on research with animals.

Research involving animals must:

- Treat animals humanely and not expose them to unnecessary discomfort, pain, or disruption.
- Not use animals in their research unless there is a reasonable expectation that the research will increase understanding of the structures and processes underlying behaviour, or increase understanding of the particular animal species used in the study, or result in benefits to the health and welfare of humans or other animals.
- Keep themselves up to date with animal care legislation, guidelines, and best practices,

if using animals in direct service, research, teaching, or supervision.

- Use a procedure subjecting animals to pain, stress, or privation only if an alternative procedure is unavailable and the goal is justified by its prospective scientific, educational, or applied value.
- Submit any research that includes procedures that subject animals to pain, stress, or privation to an appropriate review panel or committee for review.
- Make every effort to minimise the discomfort, illness, and pain of animals. This would include using appropriate anaesthesia, analgesia, tranquilization and/or adjunctive relief measures sufficient to prevent or alleviate animal discomfort, pain, or distress, when using a procedure or condition likely to cause more than short-term, low-intensity suffering. It also would include, if killing animals at the termination of a research study, doing so as compassionately and painlessly as possible.
- Use animals in classroom demonstrations only if the instructional objectives cannot be achieved through the use of electronic recordings, films, computer simulations or other methods, and if the type of demonstration is warranted by the anticipated instructional gain." (p. 24)

Animal experimental proposals are reviewed by an Institutional Animal Care and Use Committee (IACUC). An IACUC consists of institutional administrators, scientists, veterinarians, and community members. No animal research project can proceed without the committee's approval. This committee also conducts semi-annual inspections of all animal facilities to ensure that the research protocols are being followed.



Figure PS.13. Research on animals. *Psychologists may use animals in their research, but they make reasonable efforts to minimise the discomfort the animals experience.* ***Alt. text:*** *A white rat, being held by human hands.* ***Source:*** *"Wistar rat" by Janet Stephens is in the Public Domain.*

Opinions about using animals in research vary from wanting to completely stop using animals for research to strongly supporting it (Ormandy & Schuppli, 2014). Some people argue that it is morally unacceptable to experiment on animals, while others recognise the importance of animal research. For instance, drugs that can reduce the incidence of cancer or AIDS may be tested on animals first, and surgical procedures that can save human lives may be practiced on animals first. Furthermore, research on animals has contributed to a better understanding of the physiological reasons behind depression, phobias, stress, and various other illnesses. Considering the benefits that animal research brings, many scientists believe that this kind of research can and should continue, as long as we ensure the humane treatment of the animals involved.

Chapter Resources

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CHAPTER 2. BIOLOGICAL BASIS OF BEHAVIOUR

Vanessa Raspa

Within all of us lies a three-pound organ responsible for coordinating the symphony of our human experience. From the automatic blink to the strategic planning behind your last chess move, the brain shapes every aspect of our behaviour -our thoughts, feelings and emotions. Understanding human behavior has always been at the heart of psychology, driving an endless quest to decode the mysteries of how we act, think, and feel. This chapter will cover essential topics that underpin our understanding of human behaviour.We will begin by covering the various regions and functions of the brain, understanding how different brain regions contribute to various functions. Next, we will explore the nervous system, the body's intricate communication network comprising neurons, neurotransmitters, and supportive cells. Through this, we will uncover how the nervous system transmits vital information, regulates bodily functions, and interacts with external stimuli to drive behavior.We will also delve into the nature-nurture question, exploring the dynamic interplay between our biology and environment in shaping us. Additionally, we will explore the profound influence of the endocrine system on behavior through the regulation of hormones. This chemical system, composed of glands that secrete hormones into the bloodstream, plays a pivotal role in modulating various physiological processes and behaviours.

Cells of the Nervous System

TAREQ YOUSEF

The Neuron Doctrine: A Turning Point in Brain Science

Today, psychologists and neuroscientists can study the brain with advanced tools such as brain imaging and electrophysiology, allowing them to observe neurons in action. But this modern knowledge is built on earlier discoveries that first revealed what neurons are.

In the late 19th century, scientists were still debating what the brain was made of. Many believed it was a continuous network of tissue, like a giant web. This view began to change when Camillo Golgi developed a special silver staining technique that revealed the detailed structure of individual cells in the nervous system. Building on this method, Santiago Ramón y Cajal demonstrated that the brain is not a continuous mass, but is instead made up of distinct cells, what we now call neurons. Cajal's work laid the foundation for the neuron doctrine, the idea that neurons are the basic units of the nervous system. This discovery transformed neuroscience and provided the starting point for understanding how thought, behavior, and experience arise from neural activity.

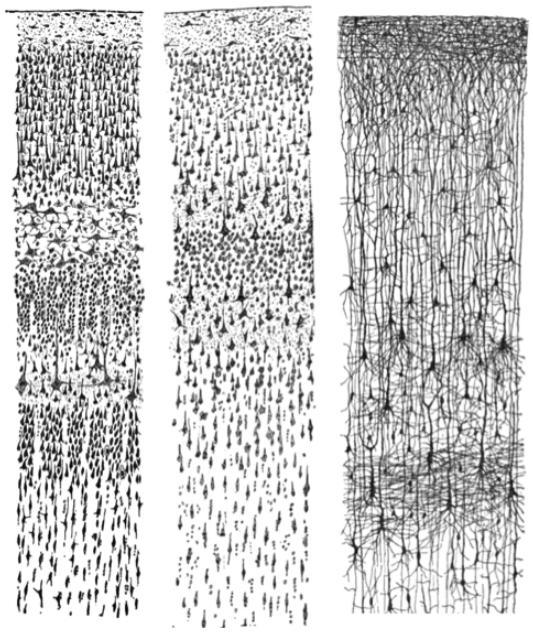

Figure BB.1. Cajal's drawings of neurons in the cerebral cortex . *Left: Nissl-stained visual cortex of a human adult. Middle: Nissl-stained motor cortex of a human adult. Right: Golgi-stained cortex of a 1 1/2 month old infant.* ***Alt. text:*** *: Three black-and-white drawings of cortical neurons in vertical columns, showing dense layers of cell bodies with branching dendrites above and axons extending below.* ***Source:*** *Created by Santiago Ramon as found in Wikipedia, is in the Public Domain.*

Modern Understanding of the Human Brain

Psychologists striving to understand the human mind may study the nervous system. Learning how the body's cells and organs function can help us understand the biological basis of human psychology. The nervous system is composed of two basic cell types: **glia** and neurons. Glia (a single one is a glial cell) are traditionally thought to play a supportive role to neurons, both physically and metabolically (i.e., supplying nutrients and maintaining their function). Glia provide scaffolding on which the nervous system is built, help neurons line up closely with each other to allow neuronal communication, provide insulation to neurons, transport nutrients and waste products, and mediate immune responses.

For years, researchers believed that there were many more glia than neurons; however, more recent work from Suzanna Herculano-Houzel's laboratory has called this long-standing assumption into question and has provided important evidence that there may be a nearly 1:1 ratio of glia to neurons. This is important because it suggests that human brains are more similar to other primate brains than previously thought (Azevedo et al, 2009; Hercaulano-Houzel, 2012; Herculano-Houzel, 2009). **Neurons**, on the other hand, serve as interconnected information processors that are essential for all of the tasks of the nervous

system. This means that these cells can act as different parts of a machine (the entire nervous system) to carry out a function (like moving your leg, or retrieving a memory). This section briefly describes the structure and function of neurons.

Neuron Structure

Neurons are the central building blocks of the nervous system, 100 billion strong at birth. Like all cells, neurons consist of several different parts, each serving a specialised function (Figure BB.2). A neuron's outer surface is made up of a **semipermeable membrane**. The semipermeable nature of the membrane allows smaller molecules and molecules without an electrical charge to pass through it, while stopping larger or highly charged molecules.

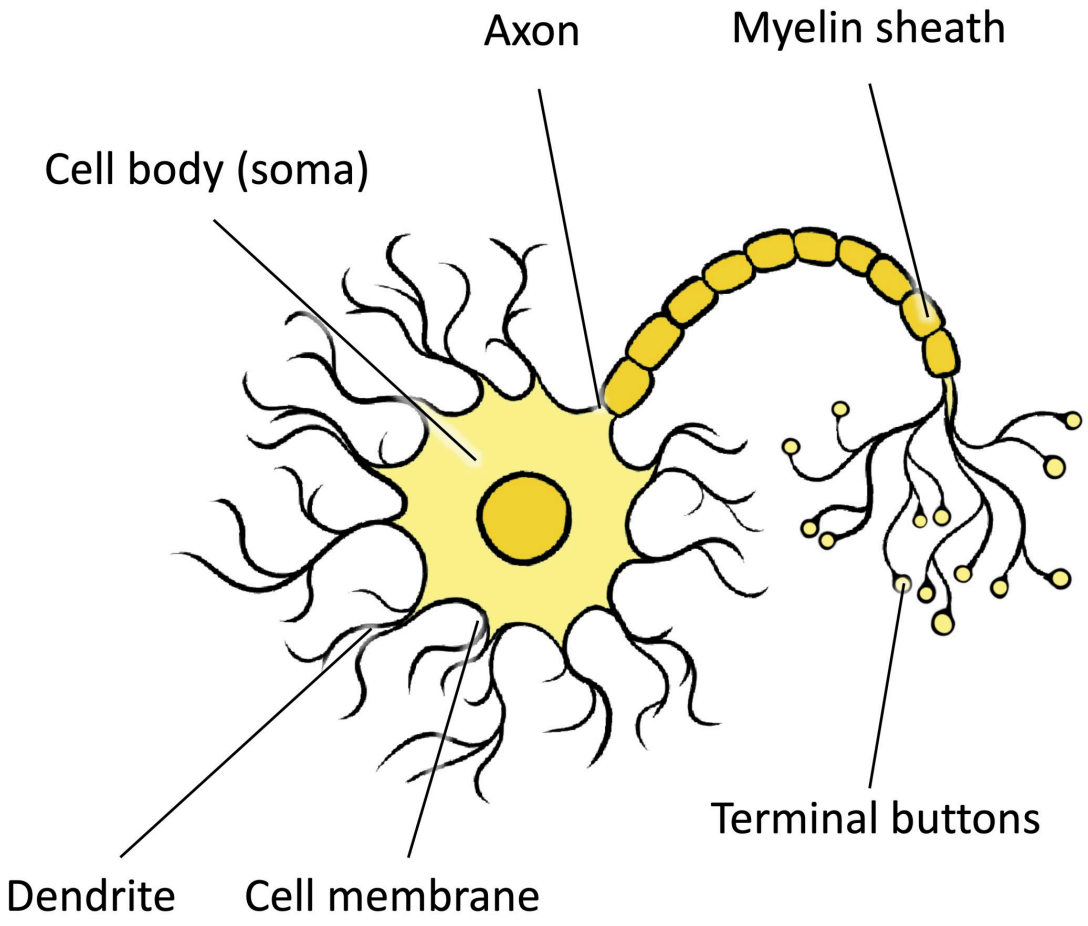

Figure BB.2. Prototypical neuron. *This illustration shows a prototypical neuron, which is being myelinated by glia.* ***Alt. text****: A neuron labeled with the cell membrane, dendrite, cell body (soma), axon, and terminal buttons. A myelin sheath covers part of the neuron.* ***Source:*** *Created by Molly Wells Art as found in Introduction to Psychology & Neuroscience (2nd Edition) is licensed under a CC BY 4.0 Licence.*

The nucleus of the neuron is located in the **soma**, or cell body. The soma has branching extensions known as **dendrites**. The neuron is a small information processor, and dendrites serve as input sites where signals are received from other neurons. These signals are transmitted electrically across the soma and down a major extension from the soma known as the **axon**, which ends at multiple terminal buttons (also commonly referred to as boutons–the French word for buttons). The terminal buttons contain **synaptic vesicles** that house **neurotransmitters**, the chemical messengers of the nervous system.

Axons range in length from a fraction of an inch to several feet. In some axons, glia form a fatty substance known as the **myelin sheath**, which coats the axon and acts as an insulator, increasing the speed at which the signal travels. The myelin sheath is not continuous and there are small gaps that occur down the length of the axon. These gaps in the myelin sheath are known as the **Nodes of Ranvier**. The myelin sheath is crucial for the normal operation of the neurons within the nervous system; the loss of the insulation it provides can be detrimental to normal function.

To understand how this works, let's consider an example. Phenylketonuria (fen-ul-key-toe-NU-ree-uh), also called PKU, causes a reduction in myelin and abnormalities in white matter cortical and subcortical structures (regions of the brain below the surface). This disorder is associated with a variety of issues including severe cognitive deficits (i.e., difficulties with everyday functioning or learning), exaggerated reflexes, and seizures (Anderson & Leuzzi, 2010; Huttenlocher, 2000). Another disorder, multiple sclerosis (MS), an autoimmune disorder, involves a large-scale loss of the myelin sheath on axons throughout the nervous system. The resulting interference in the electrical signal prevents the quick transmission of information by neurons and can lead to a number of symptoms, such as dizziness, fatigue, loss of motor control, and sexual dysfunction. While some treatments may help to modify the course of the disease and manage certain symptoms, there is currently no known cure for multiple sclerosis.

Watch this video: **Tricky Topics: Neuronal Structure (17.5 minutes)**



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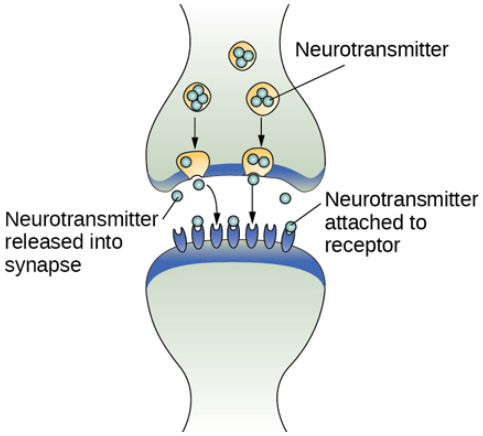
Here is the **Tricky Topics: Neuronal Structure transcript**.

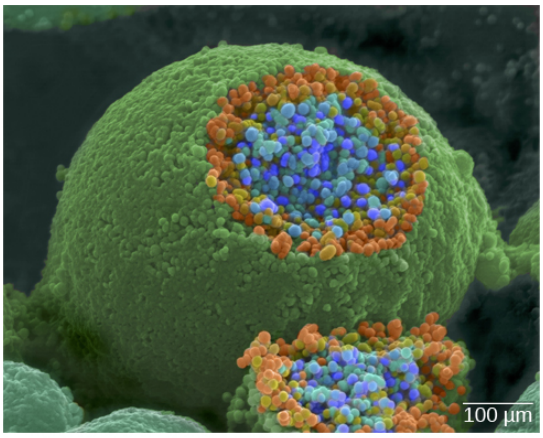
In typically functioning nervous systems, the neuronal signal moves rapidly down the axon to the terminal buttons, where synaptic vesicles release neurotransmitters into the **synaptic cleft** (Figure BB.3). The synaptic cleft is a very small space between two neurons and is an important site where communication between neurons occurs. Once neurotrans-

mitters are released into the synaptic cleft, they travel across it and bind with corresponding receptors on the dendrite of an adjacent neuron. Receptors, proteins on the cell surface where neurotransmitters attach, vary in shape, with different shapes matching different neurotransmitters.

How does a neurotransmitter know which receptor to bind to? The neurotransmitter and the receptor have what is referred to as a lock-and-key relationship — specific neurotransmitters fit specific receptors similar to how a key fits a lock. The neurotransmitter binds to any receptor that it fits.



(a)



(b)

Figure BB.3. Neurotransmitter *. The synaptic cleft is the space between the terminal button of one neuron and the dendrite of another neuron. (b) In this pseudo-coloured image from a scanning electron microscope, a terminal button (green) has been opened to reveal the synaptic vesicles (orange and blue) inside. Each vesicle contains about 10,000 neurotransmitter molecules.* ***Alt. text:*** *Image (a) shows neurotransmitters released into the synaptic space and binding to receptors. Image (b) is a micrograph of a spherical terminal button with its exterior cut away, revealing small round structures inside.* ***Source:*** *Figure 3.9 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modifications of the following works: a) Neurotransmitter activity by OpenStax is licensed under a CC BY-NC-SA 4.0 Licence. b) modification of*

work by Tina Carvalho, NIH-NIGMS; scale-bar data from Matt Russell. Image is in the Public Domain.

Watch this video: **Tricky Topics: Synaptic Transmission (9 minutes)**

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Neuronal Communication

Now that we have learned about the basic structures of the neuron and the role that these structures play in neuronal communication, let's take a closer look at the signal itself — how it moves through the neuron and then jumps to the next neuron, where the process is repeated.

We start our journey at the neuronal membrane. The neuron exists in a fluid environment; it is surrounded by fluid outside the cell, called extracellular fluid, and contains fluid inside the cell, known as intracellular fluid or cytoplasm. The neuronal membrane acts as a barrier, keeping these two fluids separate. This role is crucial because the electrical signal passing through the neuron relies on the electrical difference between the intra- and extracellular fluids. This charge difference, called the **membrane potential**, supplies the energy for the signal.

The electrical charge of the fluids is caused by charged molecules (ions) dissolved in the fluid. The semipermeable nature of the neuronal membrane somewhat restricts the movement of these charged molecules, and, as a result, some of the charged particles tend to become more concentrated either inside or outside the cell.

Between signals, the neuron membrane's potential is held in a state of readiness , called the **resting potential**. The typical resting potential of a neuron is -70 millivolts (mV). Like a rubber band stretched out and waiting to spring into action, ions line up on either side of the cell membrane, ready to rush across the membrane when the neuron goes active and the membrane opens its gates (i.e., a sodium-potassium pump that allows movement of ions across the membrane). Ions in high-concentration areas are ready to move to low-concentration areas in a process called osmosis (you may have come across the term before), and positive ions are ready to move to areas with a negative charge. This is a fundamental process, where negatively charged particles are attracted to positive charges, just like the interaction of two magnets.

In the resting state, sodium (Na+) is at higher concentrations outside the cell, so it will tend to move into the cell. Potassium (K+), on the other hand, is more concentrated inside the cell, and will tend to move out of the cell (Figure BB.4). In addition, the inside of the cell is slightly negatively charged compared to the outside. This difference in charge, known as the electrochemical gradient, acts on sodium, causing it to move into the cell.

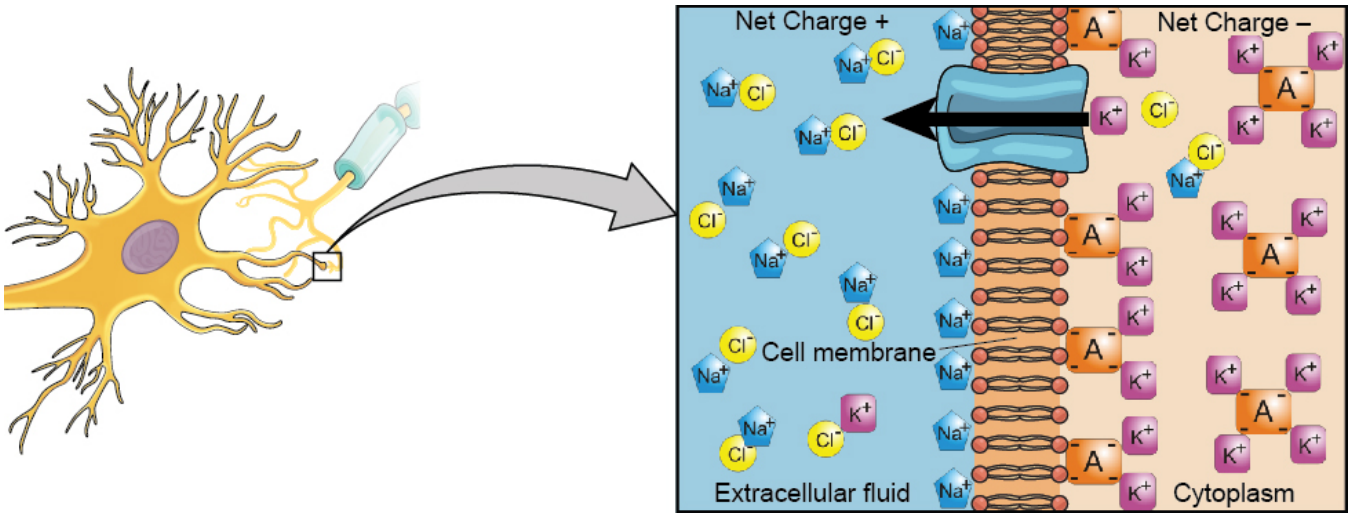

Figure BB.4. Electrochemical gradient. *At resting potential, Na+ (blue pentagons) is more highly concentrated outside the cell in the extracellular fluid (shown in blue), whereas K+ (purple squares) is more highly concentrated near the membrane in the cytoplasm or intracellular fluid. Other molecules, such as chloride ions (yellow circles) and negatively charged proteins (brown squares), help contribute to a positive net charge in the extracellular fluid and a negative net charge in the intracellular fluid.* ***Alt. text:*** *A close-up illustration depicts the difference in charges across the cell membrane, and shows how Na+ and K+ cells concentrate more closely near the membrane.* ***Source:*** *Figure 3.10 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

From this resting potential state, the neuron receives a signal and its state changes abruptly (Figure BB.5). When a neuron receives signals at the dendrites — due to neurotransmitters from an adjacent neuron binding to its receptors — small pores, or gates, open on the neuronal membrane, allowing Na+ ions, propelled by both charge and concentration differ-

ences, to move into the cell. With this influx of positive ions, the internal charge of the cell becomes more positive. If that charge reaches a certain level, called the **threshold of excitation**, usually around the neuron becomes active and the **action potential** begins.

Several additional pores open, leading to a massive influx of positively charged sodium ions creating a significant spike in the membrane potential, the peak of the action potential. At this peak, the sodium gates close, and the potassium gates open. Positively charged potassium ions start to exit the cell rapidly, initiating the process of repolarization. Initially, the cell becomes more negative than its resting potential, known as hyperpolarization, and then it stabilises, returning to its resting potential.

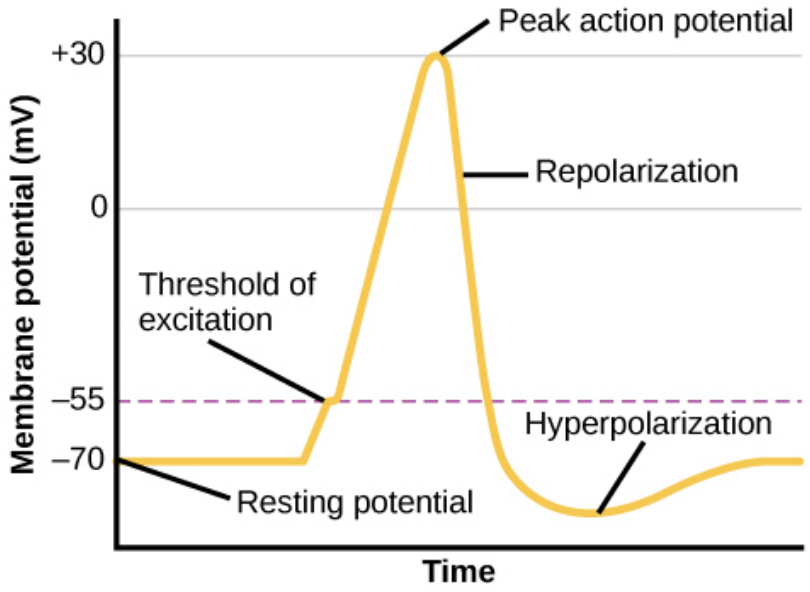

Figure BB.5. Membrane potential graph. *During the action potential, the electrical charge across the membrane changes dramatically.* ***Alt. text:*** *A graph of membrane potential showing resting potential at -70mV, threshold at -55mV, peak action potential at 30mV, repolarization near 5mV, and hyperpolarization at -80mV.* ***Source:*** *Figure 3.11 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

This positive spike represents the action potential: the electrical signal that typically moves from the cell body down the axon to the axon terminals. The electrical signal moves down the axon with the impulses jumping in a leapfrog fashion between the Nodes of Ranvier. The Nodes of Ranvier are natural gaps in the myelin sheath. At each point, some of the sodium ions that enter the cell diffuse to the next section of the axon, raising the charge past the threshold of excitation and triggering a new influx of sodium ions. The action potential moves all the way down the axon in this way until reaching the terminal buttons.

The action potential is an **all-or-none** phenomenon. In simple terms, this means that an incoming signal from another neuron is either sufficient or insufficient to reach the threshold of excitation. There is no in-between, and there is no turning off an action potential once

it starts. Think of it like sending an email or a text message. You can think about sending it all you want, but the message is not sent until you hit the send button. Furthermore, once you send the message, there is no stopping it.

Since it's an all-or-none response, the action potential is reproduced, or propagated, at its full strength along every point of the axon. Imagine it like a lit fuse on a firecracker — it doesn't lose intensity as it travels down the axon. This all-or-none property explains why your brain perceives an injury to a distant body part, such as your toe, as equally painful as one to your nose (which is closer to your brain).

As noted earlier, when the action potential arrives at the terminal button, the synaptic vesicles release their neurotransmitters into the synaptic cleft. The neurotransmitters travel across the synapse and bind to receptors on the dendrites of the adjacent neuron, and the process repeats itself in the new neuron (assuming the signal is sufficiently strong to trigger an action potential). Once the signal is delivered, excess neurotransmitters in the synaptic cleft drift away, break down into inactive fragments (degradation), or are reabsorbed in a process known as reuptake.

Reuptake involves the neurotransmitter being pumped back into the neuron that released it, in order to clear the synapse (Figure BB.6). Clearing the synapse serves both to provide a clear "on" and "off" state between signals and to regulate the production of neurotransmitter (full synaptic vesicles signal that no additional neurotransmitters need to be produced). The synapse can also be cleared via **degradation** of the neurotransmitter, which typically involves an enzyme breaking the neurotransmitter down into its components, so that it can no longer interact with the receptors on the postsynaptic neuron.

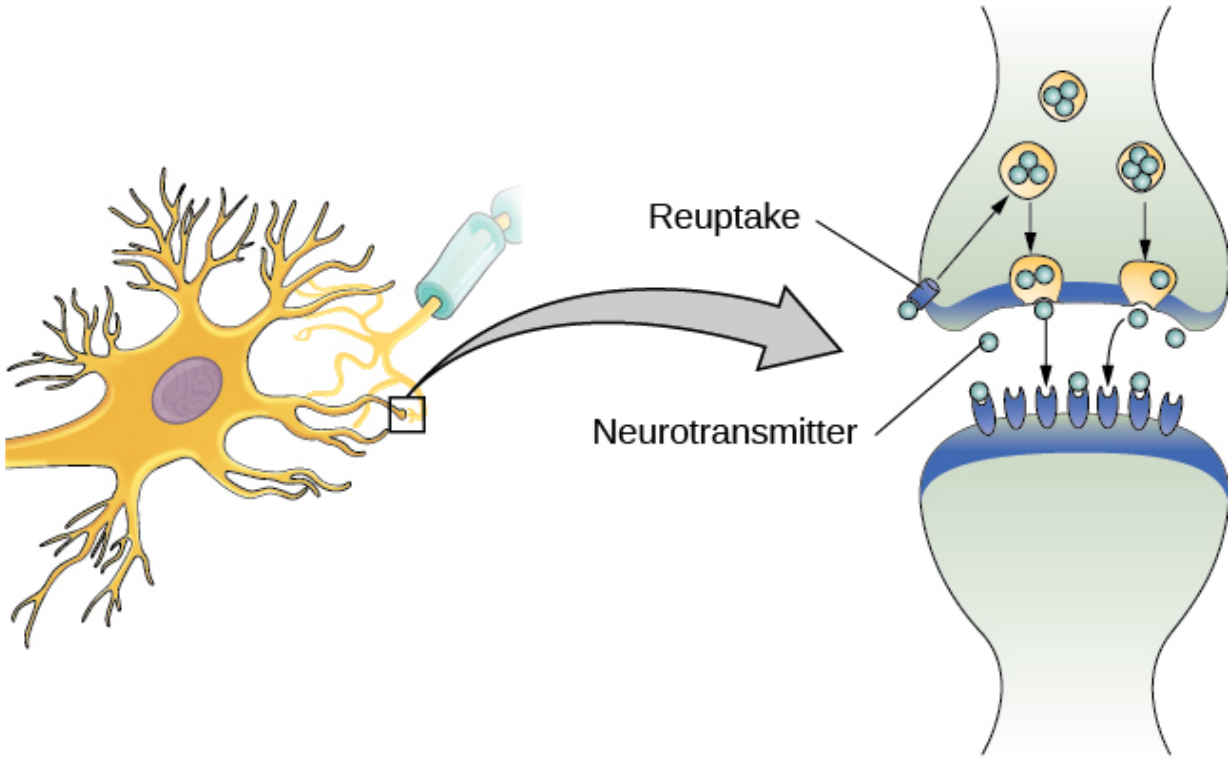

Figure BB.6. Reuptake. *Reuptake involves moving a neurotransmitter from the synapse back into the axon terminal from which it was released.* ***Alt. text:*** *The synaptic space between two neurons is shown. Some neurotransmitters that have been released into the synapse are attaching to receptors while others undergo reuptake into the axon terminal.* ***Source:*** *Figure 3.12 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Neuronal communication is often referred to as an electrochemical event. The movement of the action potential down the length of the axon is an electrical event, and movement of the neurotransmitter across the synaptic space represents the chemical portion of the process. However, there are some specialised connections between neurons that are entirely electrical. In such cases, the neurons are said to communicate via an electrical synapse. In these cases, two neurons physically connect to one another via gap junctions that allow the current from one cell to pass into the next. There are far fewer electrical synapses in the brain, but those that do exist are much faster than the chemical synapses that have been described above (Connors & Long, 2004).

Watch this video: **Tricky Topics: Action Potentials (18 minutes)**

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Here is the **Tricky Topics: Action Potentials transcript**.

Neurotransmitters

Neurons communicate with one another by releasing chemical messengers called neurotransmitters. Different neurotransmitters are linked to different functions in the brain and body (see Table BB.1). For example, acetylcholine plays an important role in muscle movement, learning, memory, and arousal(Picciotto et al., 2012). Dopamine is associated with reward, motivation, and motor control. Serotonin influences mood, sleep, and appetite (Ko & Strafella, 2012), while gamma-aminobutyric acid (GABA) acts as the brain's main inhibitory neurotransmitter, helping to calm neural activity (Bowery & Smart, 2006). In contrast, glutamate is the primary excitatory neurotransmitter and is essential for learning and memory (Zhou & Danbolt, 2014). By working together in complex systems, these neurotransmitters regulate a wide range of psychological and physiological processes, from movement and arousal to emotion and cognition.

Table BB.1 Major neurotransmitters and how they affect behaviour

Neurotransmitter	Involved in	Potential effect on behaviour
Acetylcholine	Muscle activity, memory	Increased arousal, enhanced cognition
Beta-endorphin	Pain, pleasure	Decreased anxiety, decreased tension
Dopamine	Mood, sleep, learning	Increased pleasure, suppressed appetite
Gamma-aminobutyric acid (GABA)	Inhibitory control, sleep	Decreased anxiety, decreased tension
Glutamate	Memory, learning	Increased learning, enhanced memory
Norepinephrine	Heart function, intestinal function, alertness	Increased arousal, suppressed appetite
Serotonin	Mood, sleep	Modulated mood, suppressed appetite

Parts of the Nervous System

TAREQ YOUSEF

The nervous system can be divided into two major subdivisions: the **central nervous system (CNS)** and the **peripheral nervous system (PNS)**, shown in Figure BB.7. The CNS comprises the brain and spinal cord; the PNS connects the CNS to the rest of the body. In this section, we focus on the peripheral nervous system; later, we look at the brain and spinal cord.

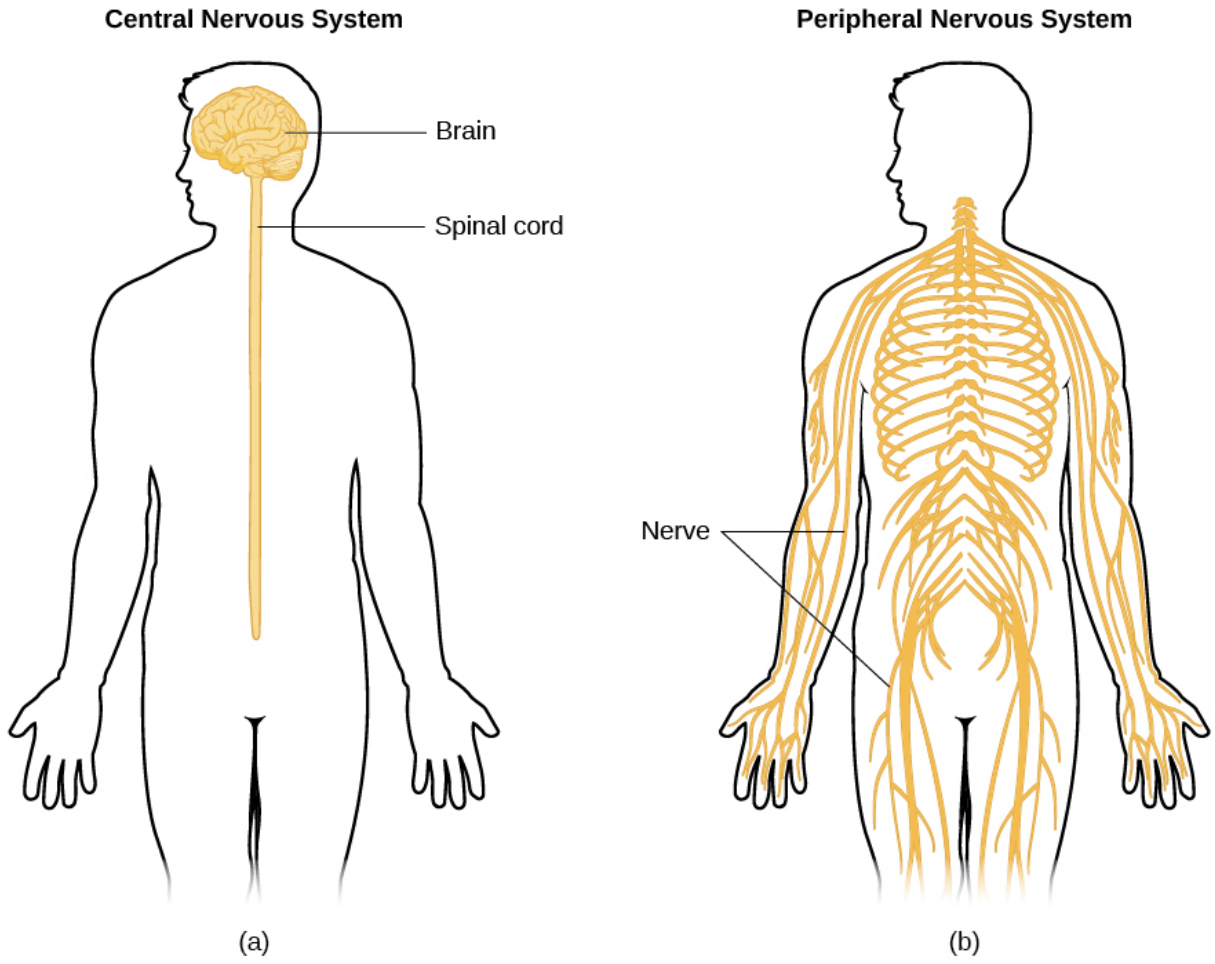

Figure BB.7. The nervous system. *The nervous system is divided into two major parts: (a) the Central Nervous System and (b) the Peripheral Nervous System.* ***Alt. text:*** *Image (a) shows an outline of a human body with the brain and spinal cord illustrated. Image (b) shows an outline of a human body with a network of nerves depicted.* ***Source:*** *Figure 3.13 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Peripheral Nervous System

The peripheral nervous system is made up of thick bundles of axons, called nerves, carrying messages back and forth between the CNS and the muscles, organs, and senses in the periphery of the body (i.e., everything outside the CNS). The PNS has two major subdivisions: the somatic nervous system and the autonomic nervous system.

The **somatic nervous system** is associated with activities thought of as conscious or voluntary. It is involved in the relay of sensory and motor information to and from the CNS; therefore, it consists of motor neurons and sensory neurons. Motor neurons, carrying instructions from the CNS to the muscles, are efferent fibres (efferent means "moving away from"). Sensory neurons, carrying sensory information to the CNS, are afferent fibres (afferent means "moving toward"). A helpful way to remember this is that efferent = exit and afferent = arrive. Each nerve is basically a bundle of neurons forming a two-way superhighway, containing thousands of axons, both efferent and afferent.

There is another type of neuron, called an interneuron, which is by far the most common type of neuron, located primarily within the CNS responsible for communicating among the neurons. Interneurons allow the brain to combine the multiple sources of available information to create a coherent picture of the sensory information being conveyed.

The **autonomic nervous system** controls our internal organs and glands and is generally considered to be outside of our voluntary control. It can be further subdivided into the sympathetic and parasympathetic divisions (Figure [below]).

The Divisions of the Autonomic Nervous System

The **sympathetic nervous system** is involved in preparing the body for stress-related activities; the **parasympathetic nervous system** is associated with returning the body to routine, day-to-day operations. The two systems have complementary functions, operating in tandem to maintain the body's homeostasis and respond to the body's needs. **Homeostasis** is a state of equilibrium, or balance, in which biological conditions (such as body temperature) are maintained at optimal levels.

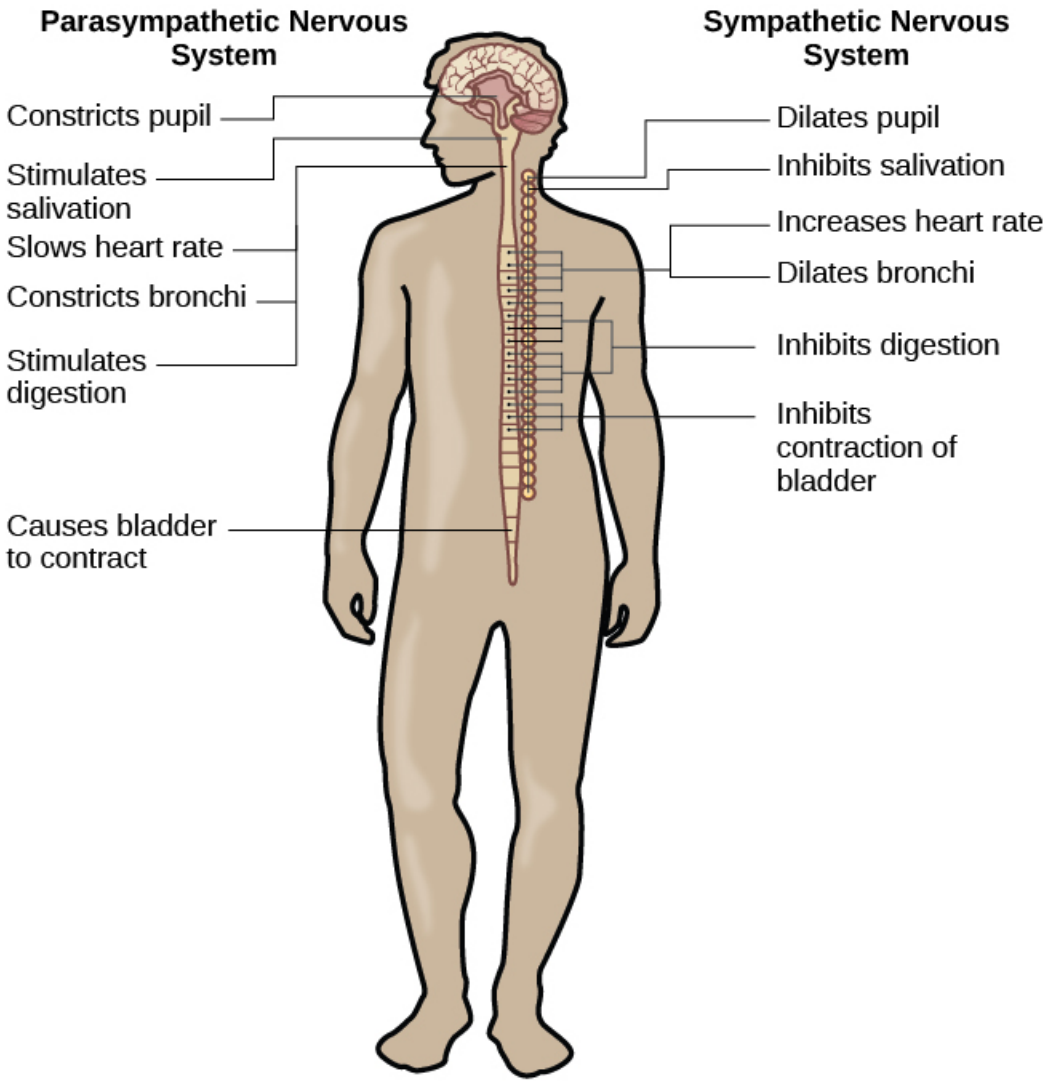

Figure BB.8. Sympathetic and parasympathetic nervous system. *The sympathetic and parasympathetic divisions of the autonomic nervous system have the opposite effects on various systems.* ***Alt. text:*** *Diagram of the human body listing parasympathetic functions—such as constricting pupils, slowing heart rate, and stimulating digestion—and sympathetic functions—such as dilating pupils, increasing heart rate, and inhibiting digestion.* ***Source:*** *Figure 3.14 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

The sympathetic nervous system is activated when we are faced with stressful or high-arousal situations. The activity of this system was adaptive for our ancestors, increasing their chances of survival. Imagine, for example, that one of our early ancestors suddenly disturbs a large bear with cubs. At that moment, our ancestor's body undergoes a series of changes — a direct function of sympathetic activation — preparing the hunter to face the threat. The hunter's pupils dilate (expand), their heart rate and blood pressure increase, their bladder relaxes (to reduce the chance of needing a bathroom break!), their liver releases glucose (a sugar readily used by the body for energy), and adrenaline surges into the hunter's blood-

stream. This constellation of physiological changes, known as the **fight or flight response**, allows the body access to energy reserves and heightened sensory capacity so that it might fight off a threat or run away to safety.

While it is clear that such a response would be critical for survival for our ancestors, who lived in a world full of real physical threats, many of the high-arousal situations we face in the modern world are more psychological in nature. For example, think about how you feel when you have to stand up and give a presentation in front of a roomful of people, or right before taking a big test. You are in no real physical danger in those situations, and yet you have evolved to respond to a perceived threat with the fight or flight response.

This kind of response is not nearly as adaptive in the modern world; in fact, we suffer negative health consequences when faced constantly with psychological threats that we can neither fight nor flee. Recent research suggests that an increase in susceptibility to heart disease (Chandola, Brunner, & Marmot, 2006) and impaired function of the immune system (Glaser & Kiecolt- Glaser, 2005) are among the many negative consequences of persistent and repeated exposure to stressful situations. Some of this tendency for stress reactivity can be wired by early experiences of trauma.

After the threat has been resolved, the parasympathetic nervous system takes charge and restores bodily functions to a relaxed state. Our ancestor's heart rate and blood pressure return to normal, their pupils constrict (become small), they regain control of their bladder, and the liver starts storing glucose as glycogen (a modified form of glucose that is easier to store) for future use. These restorative processes happen due to the activation of the parasympathetic nervous system.

The autonomic nervous system does not act alone in regulating the body's internal environment. It works closely with the endocrine system, a network of glands that release hormones into the bloodstream. Whereas the nervous system communicates quickly through electrical and chemical signals in neurons, the endocrine system communicates more slowly through hormones, but its effects are longer-lasting. The interaction between these two systems is especially important in the stress response: when the sympathetic nervous system is activated, it triggers the adrenal glands to release hormones such as adrenaline and cortisol, which help the body cope with challenge and threat. In this way, the nervous and endocrine systems operate together to maintain homeostasis and adapt to changing demands

The Brain and Spinal Cord

TAREQ YOUSEF

The brain is a complex organ with billions of interconnected neurons and glia. These cells are the basis of communication in the nervous system, which is organised into specialised structures that provide the foundation for thought, emotion, and behaviour. In this section, we discuss the overall organisation of the nervous system and the functions associated with different areas, beginning with the spinal cord.

The Spinal Cord

The spinal cord connects the brain to the outside world. It works like a relay station to direct messages to and from the brain, and also has its own system of automatic processes, called reflexes.

The top of the spinal cord is a bundle of nerves that merges with the brain stem, where many basic life processes, like breathing and digestion, are controlled. The spinal cord itself ends just below the ribs while its nerves extend all the way to the base of the spine. It's functionally organised into 31 segments, each connected to a specific part of the body through the peripheral nervous system. Nerves branch out from the spine at each vertebra: sensory nerves bring messages in; motor nerves send messages out to the muscles and organs.

The spinal cord is set up to make simple decisions about incoming sensory messages without requiring input from the brain. This is the basis of several types of reflexes, such as knee jerk and pain withdrawal reflexes. When a sensory message meets certain parameters, its signal passes from the sensory nerve to a spinal interneuron, which then activates a motor neuron to initiate movement. This happens before the brain receives information about the painful stimulus, so this automatic spinal reflex allows the body to react very quickly (and minimise injury!).

The spinal cord is protected by bony vertebrae and cushioned in cerebrospinal fluid, but injuries can still occur. When the spinal cord is damaged in a particular segment, all lower segments are cut off from the brain, usually causing paralysis and loss of sensation. Therefore, someone with a severe spinal injury at the level of the hips will keep motor control and sensation in more body parts than someone with a spinal injury at the level of the shoulders. The higher the damage occurs, the greater the loss of function and sensation. Below we will discuss the hindbrain, midbrain, and forebrain, as well as some important functional regions of the brain.

Hindbrain Structure

The **hindbrain** is located at the back of the head and looks like an extension of the spinal cord. It contains the medulla, pons, and **cerebellum** (Figure BB.9). The **medulla** controls the automatic processes of the autonomic nervous system, such as breathing, blood pressure, and heart rate. The word pons literally means "bridge," and as the name suggests, the pons connects the hindbrain to the rest of the brain. Acting as a bridge, the **pons** contains several "highways" that send information about body sensations to the brain and brings directions for body movement down to the spinal cord. The pons is also involved in regulating sleep and pain signals. The medulla and pons are part of the brain stem, which extends to the thalamus in the forebrain.

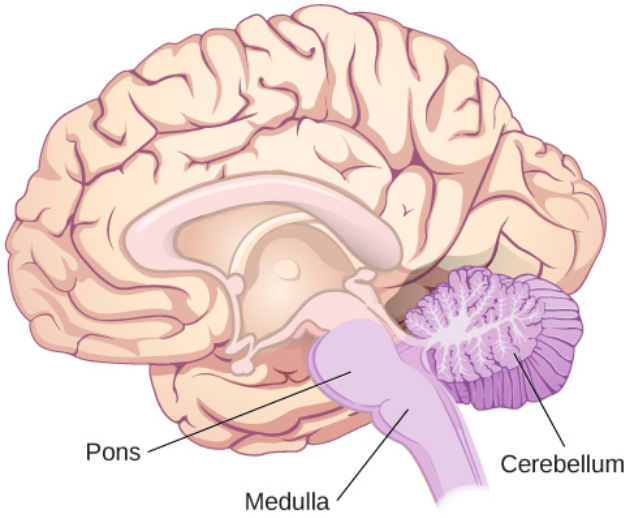

Figure BB.9. The hindbrain. *The pons, medulla, and cerebellum make up the hindbrain.* ***Alt. text:*** *A side section of the brain with the pons, medulla, and cerebellum labelled. The cerebellum looks like a separate structure attached to the bottom of the back of the brain.* ***Source:*** *Figure 3.25 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Midbrain Structures

The **midbrain**, located between the forebrain and the hindbrain, is home to a curious collection of structures involved in diverse functions. The superior colliculus is important in directing eye movements towards important aspects of a visual scene, while the inferior colliculus

is involved in sound localization. Both structures direct behaviours to parts of the environment that are relevant to an individual at that moment in time. The midbrain also contains structures that are involved in the sleep/wake cycle, arousal, and motor activity.

These structures include the **substantia nigra** (Latin for "black substance") and the **ventral tegmental area** (VTA) (Figure BB.10), which both contain cell bodies that produce the neurotransmitter dopamine and project to areas of the forebrain.The substantia nigra is important for planning and control of voluntary movement, and degeneration of these dopaminergic ("-ergic" means that those neurons contain and can release the neurotransmitter, here, dopamine) neurons is thought to be the main cause of the neurological disorder, Parkinson's disease (Parent & Parent, 2010). In terms of the VTA, it sends parallel projections to the forebrain and is involved in reward and motivation. Alterations in the neuronal signalling in this pathway is linked to addictive behaviours, such as substance misuse and gambling (George & Le Moal, 2012).

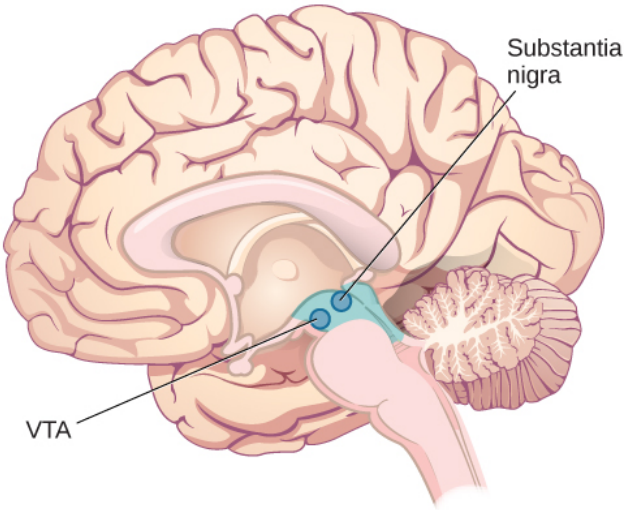

Figure BB.10. The midbrain. *The substantia nigra and ventral tegmental area (VTA) are located in the midbrain.* ***Alt. text:*** *Diagram of the brain highlighting the substantia nigra in the midbrain and the nearby ventral tegmental area* ***Source:*** *Figure 3.24 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Forebrain Structures

The surface of the forebrain is dominated by the **cerebral cortex**, with its distinctive pattern of folds or bumps, known as **gyri** (singular: gyrus), and grooves, known as **sulci** (singular: sulcus), shown in Figure BB.11. These gyri and sulci allow us to separate the brain into functional centres. The most prominent sulcus, known as the **longitudinal fissure**, is the deep groove that separates the brain into two halves or **hemispheres**: the left and the right.

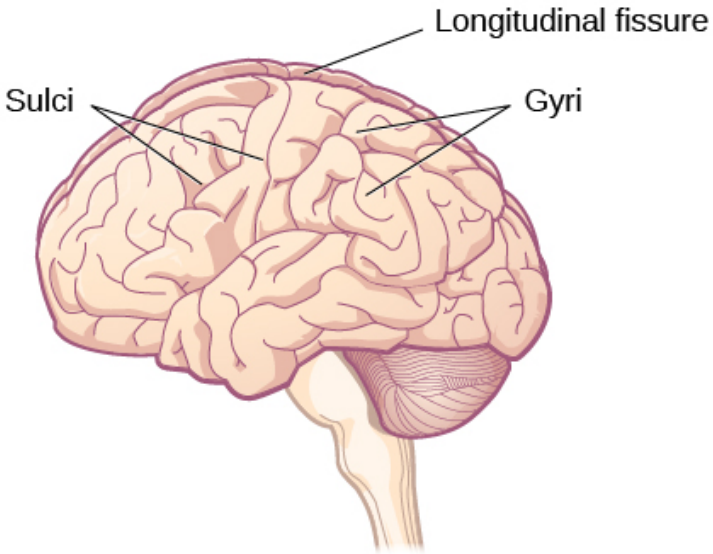

Figure BB.11. The Forebrain. *The surface of the brain is covered with gyri and sulci. A deep sulcus is called a fissure, such as the longitudinal fissure that divides the brain into left and right hemispheres.* ***Alt. text:*** *Illustration of the brain's exterior surface showing the ridges labeled as gyri, the depressions labeled as sulci, and the deep central groove labeled as the longitudinal fissure.* ***Source:*** *Figure 3.15 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modification of work by Bruce Blaus.*

The cerebral cortex makes up the majority of the **forebrain** (Figure BB.12), the largest part of the brain. In addition to the cortex the forebrain contains a number of other subcortical structures including the thalamus, hypothalamus, **pituitary gland**, and a collection of areas called the **limbic system**. We will elaborate on these terms below, but first we will map out the lobes of the cerebral cortex.

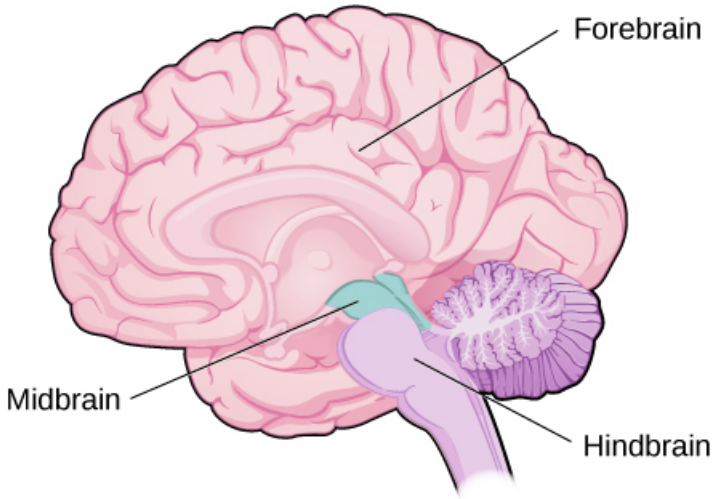

Figure BB.12. The Brain's Three Main Categories. *The brain and its parts can be divided into three main categories: the forebrain, midbrain, and hindbrain.* ***Alt. text:*** *An illustration shows the position and size of the forebrain (the largest portion), midbrain (a small central portion), and hindbrain (a portion in the lower back part of the brain).* ***Source:*** *Figure 3.17 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Watch this video: **Tricky Topics: Cortical Anatomy (11 minutes)**

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Lobes of the Cerebral Cortex

There are four lobes on each side of the cerebral cortex: frontal, parietal, temporal, and occipital (Figure BB.13). As its name suggests, the **frontal lobe** is located at the front and extends back to a fissure called the **central sulcus**, which separates it from the **parietal lobe** just behind. The **temporal lobe** begins below the lateral sulcus and extends backward towards

the **occipital lobe**, which makes up most of the back part of the brain. The cortex can be described anatomically in terms of these lobes and sulci; size, shape, and location are all anatomical features that help us further map out different regions. Different areas of the cortex can also be described functionally, in terms of what they do. By the end of this section, you should be able to describe and compare different areas of the cortex both functionally and anatomically.

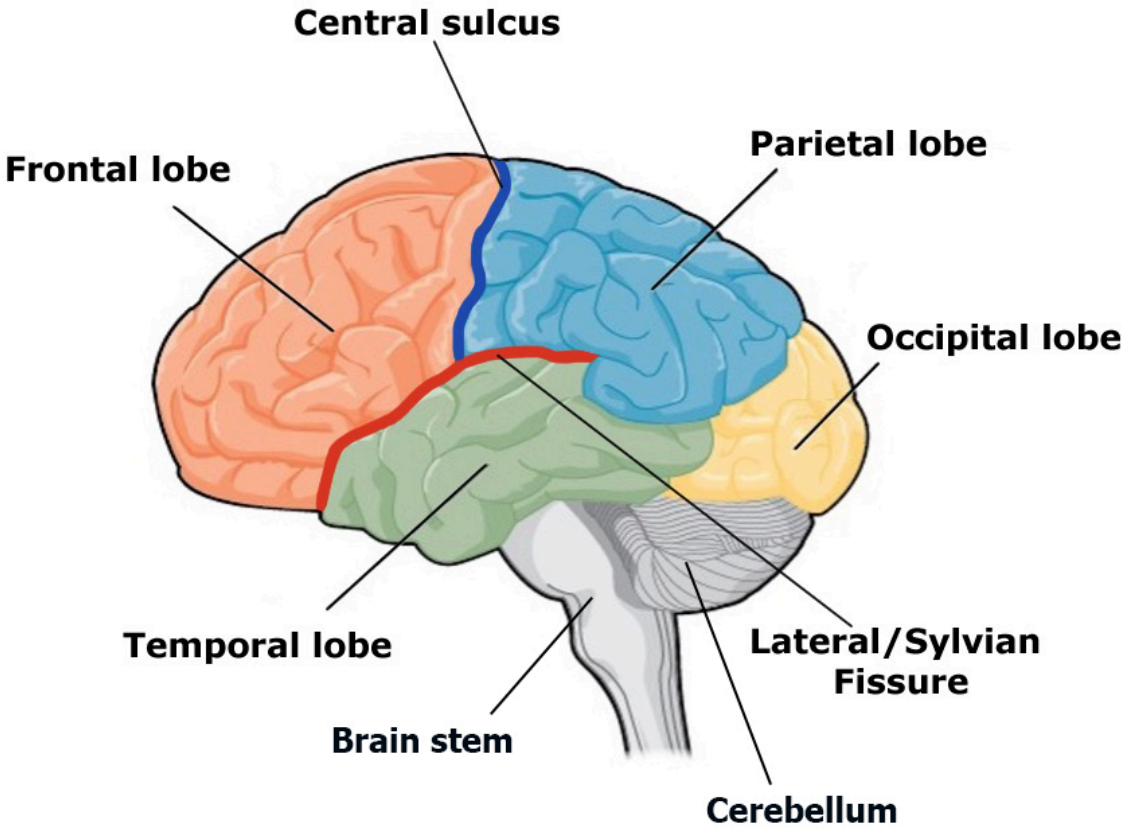

Figure BB.13. Lateral view of the human brain. Alt. Text: *Side view of brain showing frontal lobe at top front, central sulcus between frontal lobe and parietal lobe, parietal lobe on top in the middle, occipital lobe on top at back, cerebellum and brainstem at bottom, temporal lobe under frontal and parietal, and lateral fissure separating frontal and temporal lobes.* ***Source:*** *Figure 3.18 as found in Introduction to Psychology & Neuroscience (2nd Edition) is licensed under a CC BY 4.0 Licence and was adapted for this book by adding the cerebellum label.*

The size and location of the cerebral cortex makes it vulnerable to damage from injury and disease, however this is not usually fatal. In fact, most of what we've learned about the human cortex comes from observations of people living with damage to specific areas. If someone loses function after a brain injury, the damaged area was probably involved in that function.

Potentially the most famous case of brain damage is Phineas Gage: On September 13, 1848, 25-year old Gage was working as a railroad foreman. He and his crew were using an iron rod to tamp explosives into a blasting hole to remove rock along the railway's path. Unfortunately, this created a spark and the rod exploded out of the hole, into Gage's face, and through his skull (Figure BB.14). It passed through the left frontal lobe and exited between the parietal and frontal bones of the skull.

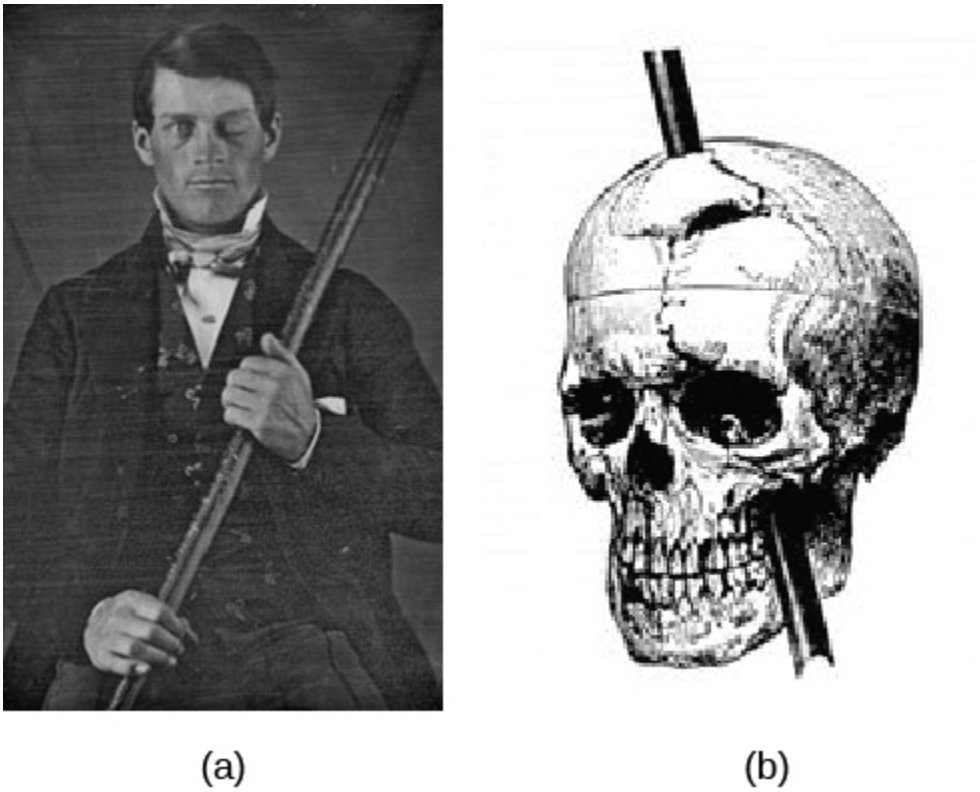

Figure BB.14. Phineas Gage. *(a) Phineas Gage holds the iron rod that penetrated his skull in an 1848 railroad construction accident. (b) Gage's prefrontal cortex was severely damaged in the left hemisphere. The rod entered Gage's face on the left side, passed behind his eye, and exited through the top of his skull, before landing about 80 feet away.* ***Alt. text:*** *Two images. Image A is a photograph of Phineas Gage holding a long, metal rod. He is a young white man and his left eye is closed. Image B is an illustration of a skull with a metal rod passing through the cheek area, behind the left eye socket and through the top of the skull.* ***Source:*** *Figure 3.19 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modification of work by Jack and Beverly Wilgus.*

Remarkably, Gage was conscious and capable of moving and talking within minutes. In the following months he had a severe fungal infection of the brain (that could have resulted in more damage) and was cared for by doctor John Martyn Harlow (Harlow, 1848). Harlow's notes provide the most direct information on Gage's recovery.

In the months following the injury, Harlow wrote that Gage was improving, but he had trouble with self control. His friends also noted this with reports of overspending and inappropriate social behaviour, like swearing (Harlow, 1968). Within three months Gage was healthy enough to move home, but hadn't recovered enough to resume his duties as a foreman. However, just four years later he moved to Chile to establish a line of stage coaches. The job involved scheduling, managing finances, and interacting with passengers during long journeys — requiring a lot of patience and perseverance! It seems unlikely that this would have been possible for the rude, unpredictable man often described in this case (Macmillan & Lena, 2010).

Harlow didn't have access to imaging technology so we aren't sure what structures were affected by Gage's injury, or which structures adapted so he could recover. Luckily, we can use modern techniques to make an educated guess about what happened to Gage's brain. A study from 2012 (Van Horn et al., 2012) used Gage's skull along with imaging data from similar living subjects to model the damage based on the rod's trajectory (Figure BB.15). This model suggested that the left orbitofrontal cortex in the frontal lobe was severely damaged. The majority of connective pathways from the left frontal lobe to other areas, including the limbic system, were also affected. Further inspection of Gage's skull indicates that there may have also been some direct damage to the amygdala (Szczepanski & Knight, 2014).

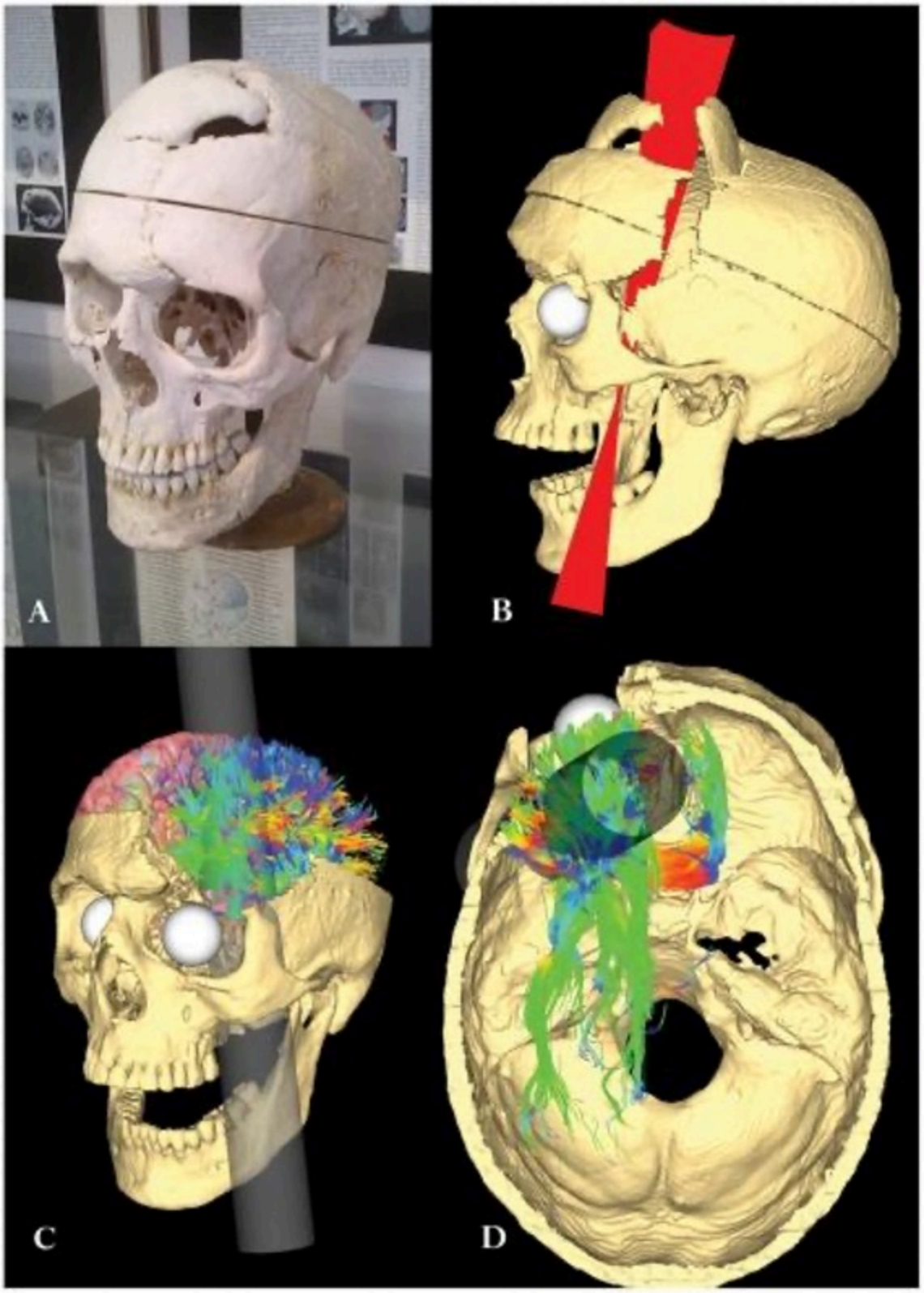

Figure BB.15. Model of Phineas Gage. *(a) Phineas Gage's skull, displayed at Harvard Medical School. b) CT images of the skull and the dimensions of the rod used to model the path it may have taken through Gage's skull. c) Gage's skull with the most likely rod path and example fibre pathways damaged by the rod in the left hemisphere. d) A view of the inside of the skull with pathways intersected by the rod, also showing the movement of Gage's left eye.* ***Source:*** *"Simulated Connectivity Damage of Phineas*

Gage" by Van Horn JD, Irimia A, Torgerson CM, Chambers MC, Kikinis R, et al., 2012, is licensed under a CC BY 2.5 Licence.

So what kind of impairments do we commonly see after damage to these areas? Patients with damage to similar areas of the **prefrontal cortex** show higher scores on tests of impulsivity, taking less time to consider tasks and plan action, and making more errors. These patients are also less likely to change their behaviour in response to consequences, report more inappropriate social behaviours, and more feelings of anger (Berlin et al., 2004, Szepanski & Knight, 2015), similar to what Gage experienced. In fact, Harlow's research with Gage prompted him to coin the term **Frontal Lobe Syndrome**, a term describing deficits in motivation, planning, social behaviour, and language production that can appear after damage to the prefrontal cortex (Pirau & Lui, 2021). Gage's case provides a memorable demonstration of frontal lobe function, but it also shows the brain's remarkable ability to adapt and regain function after injury.

This recovery illustrates neuroplasticity—the brain's capacity to reorganize itself by forming new connections after damage or experience. When one region is injured, other areas can sometimes adapt to take over its functions, especially with practice and environmental support. Although plasticity is strongest in childhood, it continues throughout life, enabling people to recover skills, adapt behavior, and acquire new abilities (Kolb & Gibb, 2011). Gage's partial recovery suggests that plasticity helped compensate for damaged frontal circuits, allowing him to regain social and occupational functioning. Beyond injury, plasticity underlies everyday learning: practicing a musical instrument rewires sensory and motor regions (Pascual-leone, 2001), learning a second language increases gray matter in memory and language areas (Mechelli et al., 2004), and even learning to juggle alters brain structure and connectivity (Draganski et al., 2004).

Brain damage studies provide important information about the cortex but advancements in medicine and technology have since given us more precise methods for investigating the brain. A foundational example comes from neurosurgeon Wilder Penfield, who systematically studied the effects of electrical stimulation on different parts of the cortex. At the very back end of the frontal lobe, just before the central sulcus, is a strip of cortex called the precentral gyrus and is home to the primary **motor cortex**, an area that activates movements after we decide to make them. Most of what we know about this part of the brain comes from classic research in epilepsy patients done by Penfield and associates Theodore Rassmussen and Edwin Boldrey.

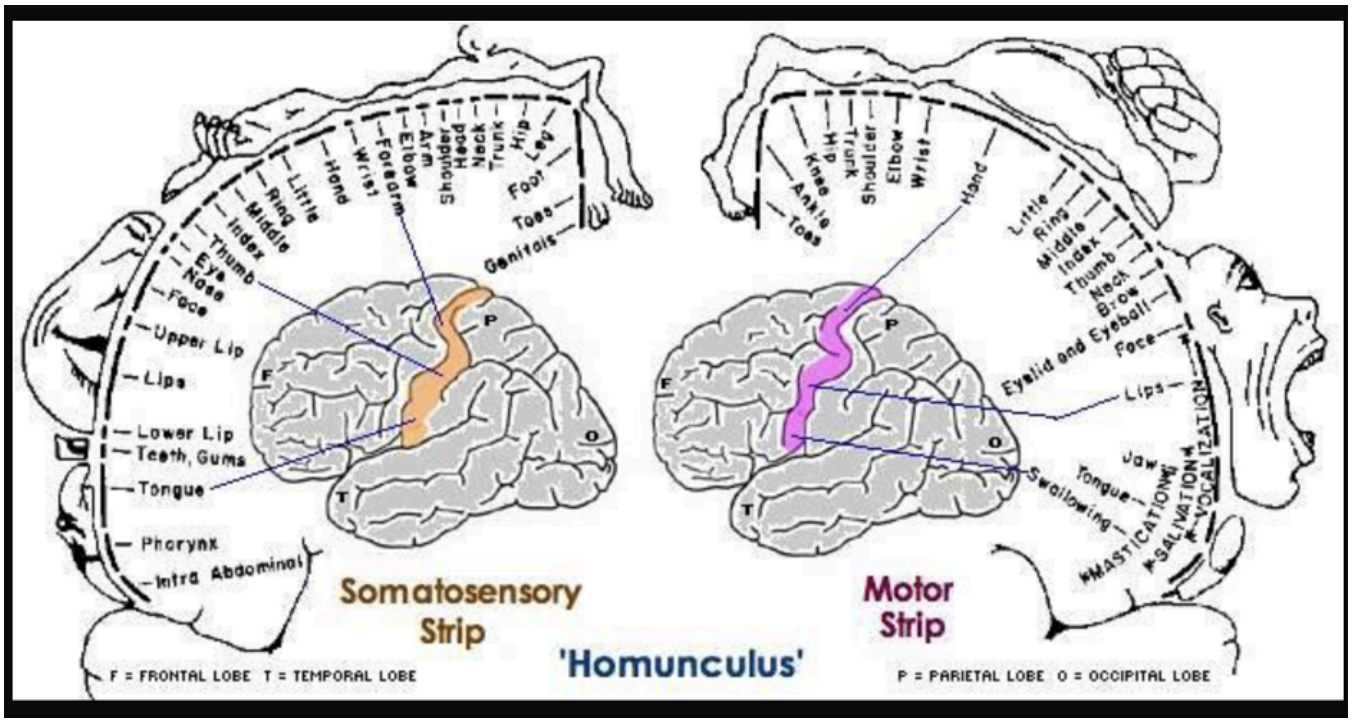

Figure BB.16. Somatotopy. *(a) A 2D illustration of Penfield's somatosensory and (b) motor homunculi adapted from Penfield & Boldrey (1937).* ***Alt. text:*** *Illustration of a homunculus divided into sensory and motor parts with labeled body regions. Below, two side views of the brain show the somatosensory strip (linked to the forearm, thumb, and tongue) and the motor strip (linked to the hand, lips, and swallowing).* ***Source:*** *The original illustrations were created by an artist named H.P Cantile (Griggs, 1988). As found in Introduction to Psychology & Neuroscience (2nd Edition) is licensed under a CC BY 4.0 Licence.*



Figure BB.17. 3D model of the H.P. Cantiles somatosensory homunculus. *This sculpture depicts the homunculus as an anatomically distorted 'little man', with the sizes of body parts corresponding to the amount of representation they have in the somatosensory cortex.* ***Alt. text:*** *A figurine of a homunculus. It is naked with beige skin, large hands that are open, bulbous chin and mouth with a tongue sticking out, and a thin body.* ***Source:*** *An adaptation of the following works: Sensory Homunculus Figure by Mpj29 is licensed under a CC BY-SA 4.0 Licence; Front of Sensory Homunculus Figure by Mpj29 is licensed under a CC BY-SA 4.0 Licence; Rear of Sensory Homunculus Figure by Mpj29 is licensed under a CC BY-SA 4.0 Licence.*

Just behind the motor cortex on the other side of the central sulcus is the primary somatosensory (involved in sensation of the body) cortex. This strip of cortex is at the beginning of the **parietal lobe**, and it plays an essential role in the perception of touch, temperature, and pain. Penfield discovered that electrical stimulation of this area produces tactile sensations in different regions of the body on the contralateral side. Like in the primary motor cortex, neurons in the primary **somatosensory cortex** are also grouped by body part, so that the arrangement in the body is maintained on the surface of the cortex (Figure BB.16).

Note that the size of body parts on both these motor and touch maps is distorted, with huge amounts of cortical space devoted to the fingers, hands, and mouth compared to the arms, legs, and torso (Penfield & Boldery, 1937; Penfield & Rasmussen, 1950). The areas of the body that we have more control over or which are more sensitive have the most cortical space. For example, the fingers have more cortical space than the chin, which is much less sensitive and can't carry out coordinated movement.

Penfield's representation of the brain's somatosensory "touch map" as a two-dimensional **homunculus** or 'little man' is one of the most recognisable images in neuroscience. Every introductory Psychology textbook has some version of it, along with its twin, the "motor map", located next door in the frontal lobe. These images demonstrate that 1) the map of the body is retained in the brain and 2) the size of a body part's representation is related to its function rather than its physical size. These features are key to understanding the way movement and somatosensation are coded in the brain.

Other Areas of the Forebrain

Other areas of the forebrain, located beneath the cerebral cortex, include the **thalamus** and the limbic system. The thalamus is a sensory relay for the brain. All of our senses, with the exception of smell, are routed through the thalamus before being directed to other areas of the brain for processing (Figure BB.18).

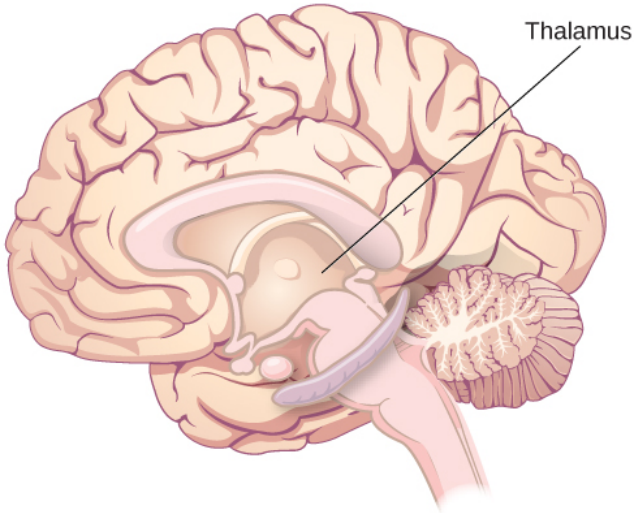

Figure BB.18. Thamalus. *The thalamus serves as the relay centre of the brain where most senses are routed for processing.* ***At. text:*** *An illustration shows the location of the thalamus in the brain.* ***Source:*** *Figure 3.22 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

The limbic system is involved in processing both emotion and memory. The limbic system is made up of a number of different structures, but three of the most important are the hippocampus, the amygdala, and the hypothalamus (Figure BB.19). The **hippocampus** is an essential structure for learning and memory. The **amygdala** is involved in our experience of emotion and in tying emotional meaning to our memories. The **hypothalamus** regulates a number of homeostatic processes, including the regulation of body temperature, appetite, and blood pressure. The hypothalamus also serves as an interface between the nervous system and the endocrine system and in the regulation of sexual motivation and behaviour, all things that can also influence our emotion and learned behaviours (i.e., creation of new memories). You will read more about how learning happens shortly, and later on in this book!

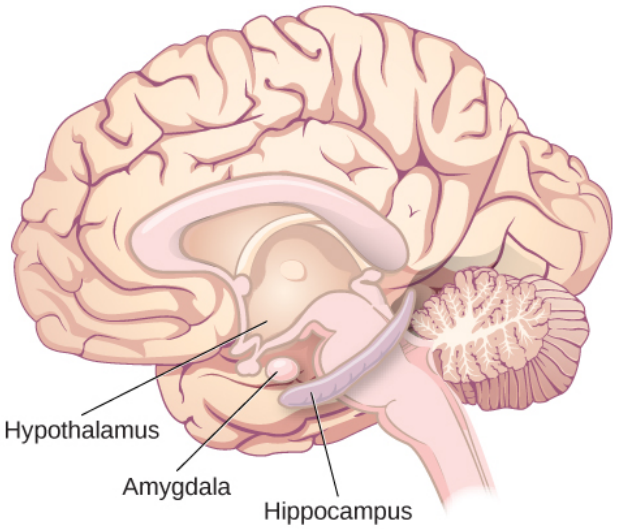

Figure BB.19. The limbic system. *The limbic system is involved in mediating emotional response and memory.* ***Alt text:*** *An illustration shows the locations of parts of the brain involved in the limbic system: the hypothalamus, amygdala, and hippocampus.* ***Source:*** *Figure 3.23 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Lateralization

You may be familiar with the idea that the right and left hemispheres have different abilities or specialised functions, referred to as **lateralization**. Some of the earliest evidence of lateralization comes from Paul Broca. Broca identified a structure in the frontal lobe now known as **Broca's area**, which typically appears on the left hemisphere (Figure BB.21). This discovery came from work with patients with a particular set of language impairments after damage in the Broca's area, called Broca's aphasia.

Consider Louis Leborgne or 'Tan', Broca's first patient with damage in this area. Leborgne was described as intelligent, and understood language but wasn't able to reply with anything other than "tan" or a single swear word if he was angry. Leborgne's primary communication was a combination of gestures and "tan", spoken in a variety of tones depending on context (Devinsky & Samuels, 2016). This is why Broca's aphasia is also called expressive aphasia, because people affected by it cannot produce communicative language in a verbal or written form, though they have no problems with comprehension.

Wernicke's area, important for speech comprehension, is also located in the left hemisphere, close to the primary auditory cortex. Whereas individuals with damage to Broca's area have difficulty producing language, those with damage to Wernicke's area can produce

words, but they aren't able to understand language or combine words in sensible ways (Figure BB.21). In most people, both Broca's area and Wernicke's area are located in the left hemisphere.

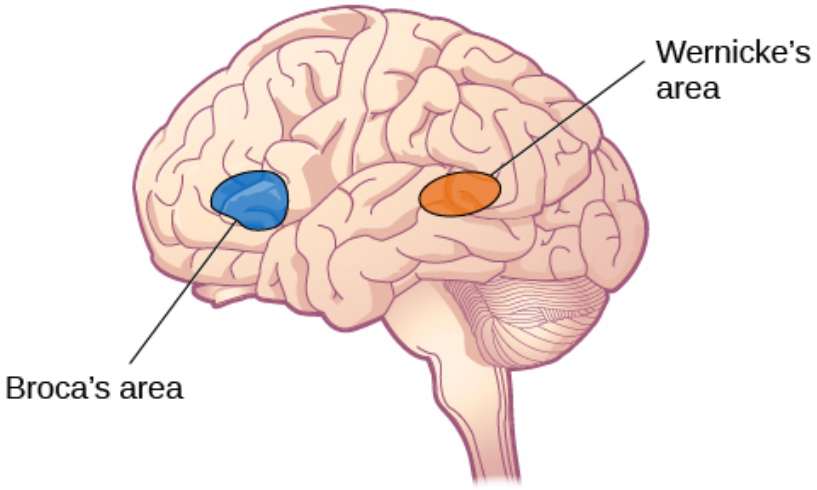

Figure BB.20. Broca's area and Wernicke's area. *Damage to either Broca's area or Wernicke's area can result in language deficits. The types of deficits are very different, however, depending on which area is affected.* ***Alt. text:*** *An illustration shows the locations of Broca's and Wernicke's areas.* ***Source:*** *Figure 3.21 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

These kinds of cases indicate that the left hemisphere may have some specialised control of verbal language. For most people, the left hemisphere is needed for verbal language, while the right hemisphere may be better at some kinds of comprehension and symbol recognition (Taylor & Regard, 2003). It's likely that both hemispheres need to interact to produce a full range of language functions.

More evidence for lateralization comes from Michael Gazzaniga and his colleagues, who studied the function of each hemisphere independently in patients who had undergone 'split-brain' surgery. This surgery is used to stop the spread of seizures from one hemisphere to the other in some cases of severe epilepsy. To accomplish this the surgeon must cut the **corpus callosum**, a band of about 200 million axons that allows for communication between the two hemispheres (Figure BB.22). Because the two sides normally share the information they have processed, we aren't aware of the different roles they play in day-to-day function.

This is not the case for split-brain patients. For instance, if you show a picture to the patient's left visual field only, they won't be able to name it because the information is only available in the largely nonverbal right hemisphere. However, they can recreate the picture

with their left hand, which is also controlled by the right hemisphere. When the more verbal left hemisphere sees the picture that the hand drew, the patient is able to name it (assuming the left hemisphere can interpret what was drawn by the left hand).

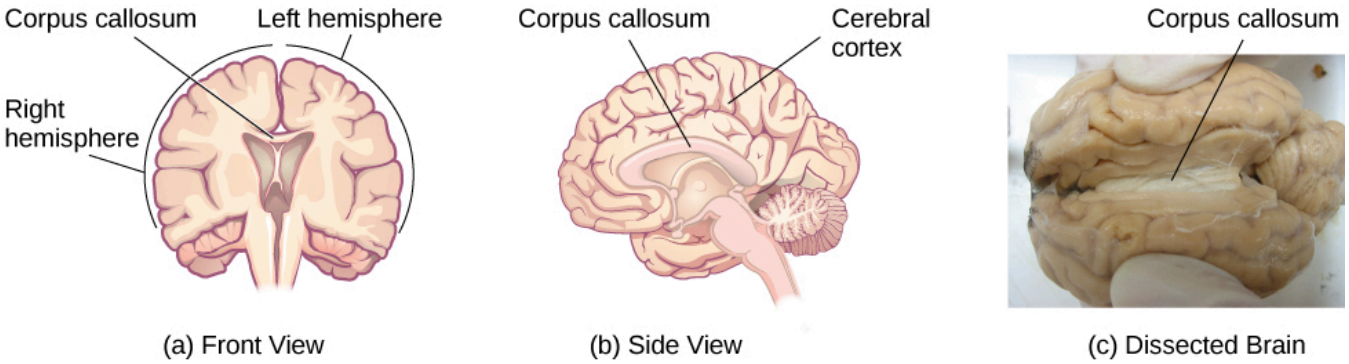

Figure BB.21. Corpus Callosum. *(a, b) The corpus callosum connects the left and right hemispheres of the brain. (c) A scientist spreads this dissected sheep brain apart to show the corpus callosum between the hemispheres.* ***Alt. text:*** *Illustrations (a) and (b) show the corpus callosum's location in the brain in front and side views. Photograph (c) shows the corpus callosum in a dissected brain.* ***Sourc****e: Figure 3.16 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

More data from Gazzinga and associates suggests that a variety of functions show patterns indicating some degree of hemispheric dominance (Gazzaniga, 2005). For example, the left hemisphere may be superior for forming associations in memory, selective attention, and positive emotions. The right hemisphere, on the other hand, may be superior in pitch perception, arousal, and negative emotions (Ehret, 2006). It's tempting to conclude that certain behaviours can be attributed to one hemisphere or the other, but research in this area produces inconsistent results and there's a natural variation of brain organisation in every population of humans (Banich & Heller, 1998).

Watch this video: **Tricky Topic: Hemispheric Lateralization (9 minutes)**

> *One or more interactive elements has been excluded from this version of the text. You can view them online here:* ***https://opentextbooks.concordia.ca/psyc205/?p=774#oembed-2***

"Tricky Topics: Hemispheric Lateralization" video by FirstYearPsych Dalhousie is licensed under the Standard YouTube licence.

Here is the **Tricky Topics: Hemispheric Lateralization transcript**.

By the end of this chapter, you are encouraged to take time to reflect on the physical parts of you that make you who you are. The sum of all of the parts of your nervous system (from the neurotransmitters to the synapses they target, the axons of neurons that carry electrical

signals, and beyond) make up a vastly complex organism that not only responds to its environment, but has thoughts and feelings. How vast and brilliant! Many psychologists aim to understand how this all works, an opportunity you will have if you continue on in this field.

Summary

Cells of the Nervous System

Glia and neurons are the two cell types that make up the nervous system. While glia generally play supporting roles, the communication between neurons is fundamental to all of the functions associated with the nervous system. Neuronal communication is made possible by the neuron's specialised structures. The soma contains the cell nucleus, and the dendrites extend from the soma in tree-like branches. The axon is another major extension of the cell body; axons are often covered by a myelin sheath, which increases the speed of transmission of neural impulses. At the end of the axon are terminal buttons that contain synaptic vesicles filled with neurotransmitters.

Neuronal communication is an electrochemical event. The dendrites contain receptors for neurotransmitters released by nearby neurons. If the signals received from other neurons are sufficiently strong, an action potential will travel down the length of the axon to the terminal buttons, resulting in the release of neurotransmitters into the synaptic cleft. Action potentials operate on the all-or-none principle and involve the movement of sodium (Na^+) and potassium (K^+) across the neuronal membrane.

Different neurotransmitters are associated with different functions. Often, psychological disorders involve imbalances in a given neurotransmitter system. Therefore, psychotropic drugs are prescribed in an attempt to bring the neurotransmitters back into balance. Drugs can act either as agonists or as antagonists for a given neurotransmitter system.

Parts of the Nervous System

The brain and spinal cord make up the central nervous system. The peripheral nervous system comprises the somatic and autonomic nervous systems. The somatic nervous system transmits sensory and motor signals to and from the central nervous system. The autonomic nervous system controls the function of our organs and glands, and can be divided into the

sympathetic and parasympathetic divisions. Sympathetic activation prepares us for fight or flight, while parasympathetic activation is associated with normal functioning under relaxed conditions.

The Brain and Spinal Cord

The brain consists of two hemispheres, each controlling the opposite side of the body. Each hemisphere can be subdivided into different lobes: frontal, parietal, temporal, and occipital. In addition to the lobes of the cerebral cortex, the forebrain includes the thalamus (sensory relay) and limbic system (emotion and memory circuit). The midbrain contains the substantia nigra and ventral tegmental area. These structures are important for movement, reward, and addictive processes. The hindbrain contains the structures of the brainstem (medulla, pons, and midbrain), which control automatic functions like breathing and blood pressure. The hindbrain also contains the cerebellum, which helps coordinate movement and certain types of memories.

Individuals with brain damage have been studied extensively to provide information about the role of different areas of the brain, and recent advances in technology allow us to obtain similar information by imaging brain structure and function. These techniques include CT, PET, MRI, fMRI, and EEG.

The Nature-Nurture Debate

VANESSA RASPA

Humans have long wondered what shapes who we are: our biology, our experiences, or some combination of both. This is the heart of the **nature–nurture debate**, one of psychology's most enduring questions. Unlike traits such as height or eye color, which are mostly genetic, many human characteristics—personality, intelligence, mental health, and behavior—emerge from a complex interplay between genes and environment. For example, a talented musician may owe some abilities to natural gifts like perfect pitch, but their skill is also shaped by years of practice and supportive teachers. Similarly, an athlete's success may reflect both genetic potential and environmental factors such as nutrition or training. Most traits fall somewhere in between, leaving us fascinated by how biology and experience combine to shape who we are.

Studying Nature vs. Nurture

Studying the relative contributions of nature and nurture in humans is challenging. Unlike with animals, we cannot randomly assign children to parents or manipulate their genes for ethical reasons. Nevertheless, psychologists have developed several methods to investigate these influences.

Animal studies provide controlled experiments that would be impossible with humans. For example, researchers can study aggression in dogs by cross-fostering puppies—placing pups from aggressive parents with nonaggressive parents and vice versa. Such experiments reveal the extent to which behavior is inherited versus learned from the environment (Scott & Fuller, 1965).

Adoption studies allow researchers to separate genetic and environmental effects in humans. Children adopted at birth grow up in families that are not genetically related. If a trait, such as height or personality, resembles the biological parents more than the adoptive parents, this suggests a genetic influence. Conversely, resemblance to adoptive parents indicates environmental influence. For instance, a child adopted from a tall biological family into a shorter family will typically reflect the height of the biological parents, whereas language is primarily shaped by the adoptive environment.

Twin studies provide another powerful method. Identical (monozygotic, MZ) twins share 100% of their DNA, while fraternal (dizygotic, DZ) twins share roughly 50%. Comparing trait similarity between these twins helps determine genetic influence. Identical twins are almost

perfectly similar for height, while fraternal twins are more similar than unrelated individuals but not identical. For traits influenced primarily by environment, such as the language spoken at home, fraternal twins raised together are as similar as identical twins, showing little genetic effect. Researchers also study twins separated at birth, though rare, to examine how genes and environments shape traits independently (Bouchard et al., 1990).

These approaches are part of quantitative genetics, which analyzes similarities among individuals based on biological relatedness. Studies extend beyond twins and adoptees to include siblings, half-siblings, cousins, and entire extended families (Reynolds, 2013). Using these methods, scientists estimate the heritability coefficient, a number between 0 and 1 that represents the proportion of variability in a trait due to genetic differences. However, heritability coefficients are not straightforward: they depend on the population studied and do not indicate how fixed or changeable a trait is.

What Have We Learned About Nature-Nurture

Research on nature and nurture has not given us the simple answers many hoped for. There is no clear list of traits that are "genetic" versus "environmental." Instead, decades of work in behavioral genetics has shown a consistent pattern: every human trait is influenced by both genes and environment. The more closely related people are biologically, the more similar they tend to be—not only in physical traits like height and weight, but also in intelligence, personality, mental health, and even behaviors such as political attitudes or television watching (Plomin et al., 1990; McGue & Lykken, 1992).

This finding was surprising because mid–20th century psychology emphasized environmental explanations. Behaviorists argued that behavior was shaped by reinforcement and learning, while psychoanalysts looked to childhood experiences and family dynamics. Although neither perspective fully denied biology, it was common to assume that personality came entirely from parenting or that disorders like schizophrenia were caused by "pathological mothering." Adoption and twin studies overturned this view, showing that adopted children resemble their biological parents more than their adoptive ones, even without contact, and that identical twins are consistently more alike than fraternal twins (Bouchard et al., 1990). These results made it clear: genes cannot be left out of the equation.

At the same time, no trait is entirely genetic. Even highly heritable traits, such as height, depend on environmental conditions like nutrition. This leads to one of the central challenges in behavioral genetics: the heritability coefficient, as heritability is often misunderstood. A heritability of .50 for intelligence, for example, does not mean that half of a person's IQ comes from genes—it means that, in a given population, genetic differences explain about half of the differences in IQ scores. Heritability can also change depending on cir-

cumstances: intelligence is more heritable in wealthier families, where children share access to resources, and less heritable in poorer families, where environmental inequalities play a larger role (Turkheimer, 2000).

Another crucial lesson is that genes and environments do not act separately, but interact. A gene may influence behavior only under certain conditions. For example, Caspi et al. (2002) found that children with a particular variant of the MAOA gene were more likely to develop aggressive or antisocial behavior, but only if they had also experienced childhood maltreatment. In children without maltreatment, the gene had no effect. This kind of gene–environment interaction (G × E) shows why it is misleading to ask whether a trait is "genetic or environmental." Both are always involved.

Genes can also shape environments through what researchers call gene–environment correlation. For instance, a naturally outgoing child may seek out more social opportunities, which in turn strengthen social skills. Similarly, parents often pass down not only genes but also environments that align with their children's predispositions. For example, musically inclined parents may both transmit musical talent genetically and provide a home rich in instruments and lessons.

Taken together, these findings reshape the debate. Traits are not simply products of nature *or* nurture but of their constant interplay. Instead of asking which is more important, psychologists now study how genes and environments work together to shape development. This perspective moves us beyond the old "versus" framing and toward a deeper understanding of the dynamic systems that make us who we are.

Chapter Resources

TAREQ YOUSEF

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Chapter Attribution

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About the Author: Tareq Yousef

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I am an uninvited immigrant settler privileged to live on the unceded land of the Syilx Okanagan Nation, where I work as a lecturer at UBC Okanagan. I grew up on the east coast of Turtle Island on the unceded land of the Mi'kmaq peoples, in K'jipuktuk (Halifax) where I received my Ph.D. in Anatomy and Neurobiology from Dalhousie University for work on retinal neuromodulation and physiology. My positionality encompasses some intersectionality including my identity as a queer person of colour. This informs how I seek to use what-

ever privilege I have as an instructor to benefit others on and off my campus. My aim is to deliver strengths-based educational experiences that centre on anti-oppression and scientific inquiry, in a way that is accessible (including financially), meaningful, and joyful for all.

A note on equity, diversity, and inclusion: Black people, Indigenous people, people of colour and various marginalised communities continue to face obstacles in the scientific world in the form of denial of access to equitable opportunities. Psychology and neuroscience are no exception; they also have a history of misogyny, ableism, and anti-LGBTQIA2S+ discrimination. My academic approach takes these systemic barriers into consideration. I will strive to provide safe and welcoming opportunities to learn about the science behind these issues and discuss equitable ways forward. Let us make the world a better place to live!

CHAPTER 3. MEMORY

Vanessa Raspa

Memory stands as an integral aspect of our human experience. A dynamic process that not only captures our experiences but also defines our identities and guides how we interact with the world. From the recollection of a recent conversation to the enduring impact of childhood memories, our ability to remember shapes our individual and collective narratives.

In this chapter, we'll explore memory's intricate tapestry, understanding it's complexities from both psychological and neurological perspectives. We delve into the cognitive processes that underpin memory formation and retrieval, examining how information is encoded, consolidated, and retrieved over time. Understanding these processes not only illuminates how memories are formed but also reveals the factors influencing their retention and recall.

Throughout the chapter, we'll encounter diverse forms of memory—from declarative memories that store facts and events to procedural memories that guide our motor skills and habits. We explore the mechanisms of forgetting, recognizing that while memory loss can frustrate us in everyday life, it is also an adaptive process that enhances our cognitive efficiency.

Moreover, we confront the complexities of memory disorders such as amnesia, where disruptions in brain function highlight the critical role of specific brain regions like the hippocampus in memory consolidation. By examining these disorders, we gain insights into how memory deficits can profoundly impact daily life.

Ultimately, this chapter aims to deepen your understanding of memory's profound impact on human experience. By unraveling its intricacies, we offer a comprehensive view of the fascinating processes that enable us to remember and forget, shaping who we are and how we navigate the world.

Memory Models and Systems

AMELIA LIANGZI SHI

Memory is an information processing system; therefore, we often compare it to a computer (Figure ME.2). Memory is the set of processes used to encode, store, and retrieve information over different periods of time.

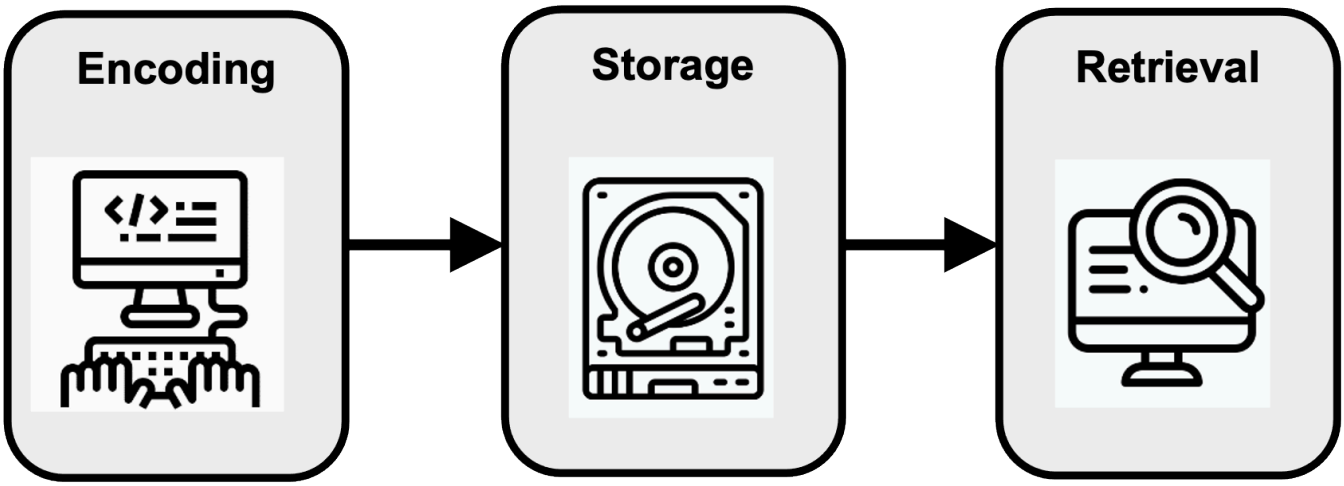

Figure ME.2. Encoding, storage and retrieval. *Encoding involves the input of information into the memory system. Storage is the retention of the encoded information. Retrieval is the process of getting the information out of memory and back into awareness.* ***Alt. text:*** *Three labeled icons illustrate stages of memory: encoding, storage and retrieval.* ***Source:*** *Encoding, Storage and Retrieval is licensed under a CC BY-NC-SA Licence.*

Encoding

We get information into our brains through a process called encoding. **Encoding** is the input of information into the memory system. Once we receive sensory information from the environment, our brains label or code it. We organise the information with other similar information and connect new concepts to existing concepts. Encoding information occurs through automatic processing and effortful processing.

If someone asks you what you ate for lunch today, more than likely you could recall this information quite easily. This is known as automatic processing. **Automatic processing** is usually done without any conscious awareness, like the encoding of details like time, space, frequency, and the source of information. On the other hand, studying the material for a test requires a lot of work and attention on your part. This is known as **effortful processing**.



Figure ME.3. Encoding. *When you first learn new skills such as driving a car, you have to put forth effort and attention to encode information about how to start a car, how to brake, how to handle a turn, and so on. Once you know how to drive, you can encode additional information about this skill automatically.* ***Alt. text:*** *A person driving a car.* ***Source:*** *Photo by JESHOOTS.com is licensed under the Pexels Licence.*

Encoding can take different forms depending on the type of information that is presented. **Visual encoding** is the encoding of images, and **verbal encoding** is the encoding of sounds, words in particular. To see how visual encoding works, read over this list of words: car, level, dog, truth, book, value. If you were asked later to recall the words from this list, which ones do you think you would most likely remember? You would probably have an easier time recalling the words car, dog, and book, and a more difficult time recalling the words level, truth, and value. Why is this? Because you can recall images (mental pictures) more easily than words alone. When you read the words car, dog, and book you created images of these things in your mind. These are concrete, high-imagery words. On the other hand, abstract words like level, truth, and value are low-imagery words. High-imagery words are encoded both visually and verbally (Paivio, 1991), thus building a stronger memory.

Words that had been encoded semantically were better remembered than those encoded visually or phonemically. Semantic encoding involves a deeper level of processing than the shallower visual or verbal encoding. In Craik and Tulving's (1975) classic study, participants were shown words and asked questions that required superficial structural processing of a word (e.g., is the word, *TABLE*, in capital letters?), somewhat deep phonemic processing (e.g., does the word, *CRATE*, rhyme with WEIGHT?, or deep semantic processing (e.g., would the word, *FRIEND*, fit the sentence: He met a ____ in the street?). Deep processing increased later recognition of the words in a long list.

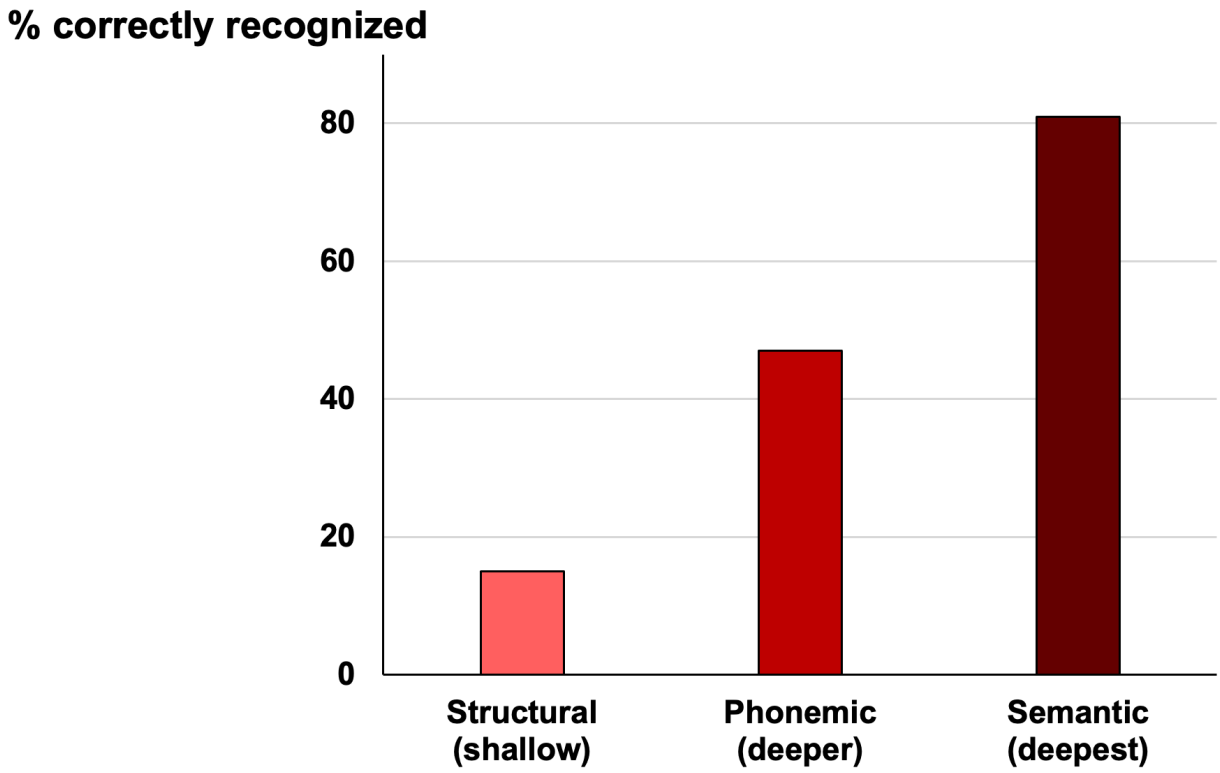

Figure ME.4. Craik and Tulving's (1975) Experiment 2. *Data are adapted from Craik and Tulving's (1975) Experiment 2. In the structural processing condition, participants judged whether the target word was in uppercase or lowercase letters. In the phonemic processing condition, participants were asked whether or not the target word rhymed with another word provided by the researchers. In the semantic processing condition, participants were asked if the target word fitted into a sentence provided by the researchers.* ***Alt. text:*** *A bar graph illustrating the percent of words correctly recognised in different conditions. Structural (shallow) was 15%. Phonemic (deeper) was 47%. Semantic (deepest) was 81%.* ***Source:*** *Craik and Tulving's (1975) Experiment 2 is licensed under a CC BY-NC-SA Licence.*

Craik and Tulving (1975) concluded that we process verbal information best when it is encoded semantically, meaning that we focus on the meaning of the information rather than its sound or appearance. One especially powerful form of semantic encoding is known as the *self-reference effect*. This effect describes the tendency to remember information more effectively when we relate it to ourselves (Rogers et al., 1977). Because self-related information is more meaningful and distinctive, it strengthens encoding and makes later retrieval more likely. As you study psychology, you can take advantage of semantic encoding by focusing on meaning rather than rote repetition. For example, rather than memorizing

the term “classical conditioning,” think about how it applies to your own experiences—like a time you developed a taste aversion to food. Relating new concepts to yourself makes them more memorable, because you are engaging in the self-reference effect.

Storage

One way of understanding memory is to think about it in terms of storage. The model of memory that has dominated this field for the last 50 years is the three-store memory model (Atkinson & Shiffrin, 1968). The **Atkinson-Shiffrin model** of memory, also called the three-store model, describes the active process of how information is encoded and retained. According to this model, information begins in sensory memory, moves to short-term memory, and eventually moves to long-term memory. However, not all information makes it through all three stages; most of it is forgotten. Whether the information moves from shorter-duration memory into longer-duration memory, or whether it is lost from memory entirely, depends on how the information is attended to and rehearsed.

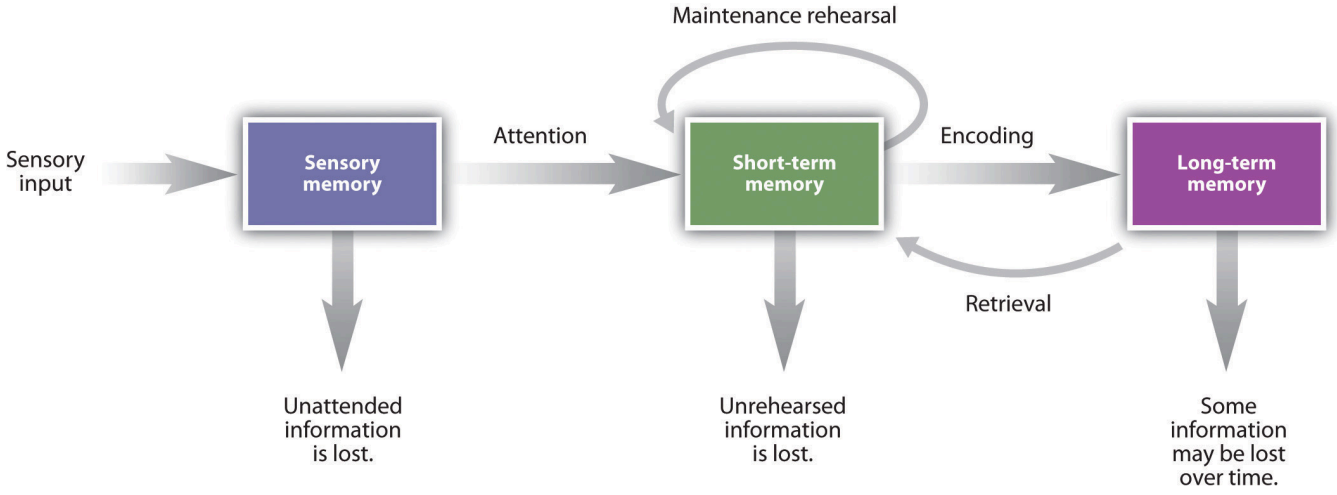

Figure ME.5. Atkinson-Shiffrin Model. *Memory can be characterised in terms of stages — the length of time that information remains available to us (Atkinson & Shiffrin, 1968).* ***Alt. text:*** *Process diagram showing sensory input becoming sensory memory, with unattended information lost. Attended information moves to short-term memory, where unrehearsed material is lost and rehearsed material is retained or encoded into long-term memory. Some long-term memories fade over time.* ***Source:*** *Figure 10.2 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Sensory memory (or *sensory register*) refers to the brief storage of sensory information. Sensory memory is a memory buffer that lasts only very briefly. Unless it is attended to and passed on for more processing, it is forgotten. The purpose of sensory memory is to give the brain some time to process the incoming sensations and perceptions. Visual sensory

memory is known as **iconic memory**. The duration of iconic memory was found to be 250 milliseconds (Sperling, 1960). In other words, people can hold visual information in their sensory memory for only about 1/4th of a second. Auditory sensory memory is known as **echoic memory**. Iconic memories decay very rapidly. In contrast, echoic memories can last as long as four seconds (Cowan et al., 1990). Echoic memory allows you to remember the words that you said at the beginning of a long sentence when you get to the end of it, and to take notes on your psychology professor's most recent statement even after they have finished saying it.

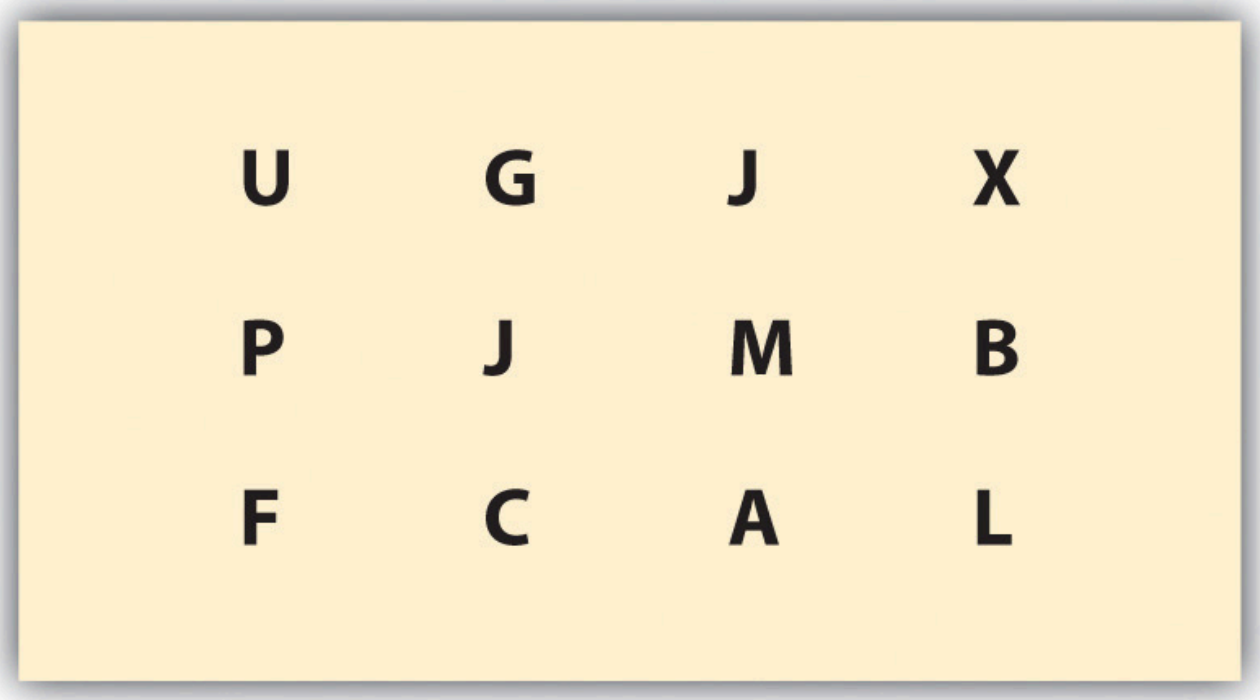

Figure ME.6. Sensory Memory. *Sperling showed his participants displays such as this one for only 1/20th of a second. He found that when he cued the participants to report one of the three rows of letters, they could do it, even if the cue was given shortly after the display had been removed. The research demonstrated the existence of iconic memory (Sperling, 1960).* ***Alt. text:*** *This chart provides 12 random upper case letters in three rows.* ***Source:*** *Figure 10.3 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Most of the information that gets into sensory memory is forgotten. We only process things that we pay attention to into our short-term memory. **Short-term memory (STM)** is the theoretical place where small amounts of information can be temporarily kept for more than a few seconds but usually for less than one minute (Baddeley et al., 1990; Peterson & Peterson, 1959). Information in short-term memory is not stored permanently, but it becomes available for us to process. The processes that we use to make sense of, modify, interpret, and store

information in STM are known as **working memory**. When reading a complex sentence like, "The dog that chased the cat ran into the garden," you must hold the subject, the action, and the object in mind to understand the meaning. Working memory allows you to keep these pieces active long enough to integrate them and make sense of the sentence.

Atkinson and Shiffrin's (1968) model is not the only model of memory. Baddeley and Hitch (1974) proposed a working memory model. In their model, short-term memory has different forms. Storing memories in short-term memory is like opening different files on a computer and adding information. The type of short-term memory (or computer file) depends on the type of information received. There are memories in visual-spatial form, as well as memories of spoken or written material, and they are stored in three short-term systems: a **visuospatial sketchpad**, responsible for processing visual and spatial information; a **phonological loop**, which handles auditory information like speech sounds and verbal information; and the **central executive**, which acts as a supervisory system that coordinates the activities of the phonological loop and visuospatial sketchpad, as well as other cognitive processes.

Watch this video: **Tricky Topics: Atkinson-Shiffrin Model (5 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=793#oembed-1***

"Tricky Topics: Atkinson-Shiffrin Model" video by FirstYearPsych Dalhousie is licensed under the Standard YouTube Licence.

Here is the **Tricky Topics: Atkinson-Shiffrin Model transcript**.

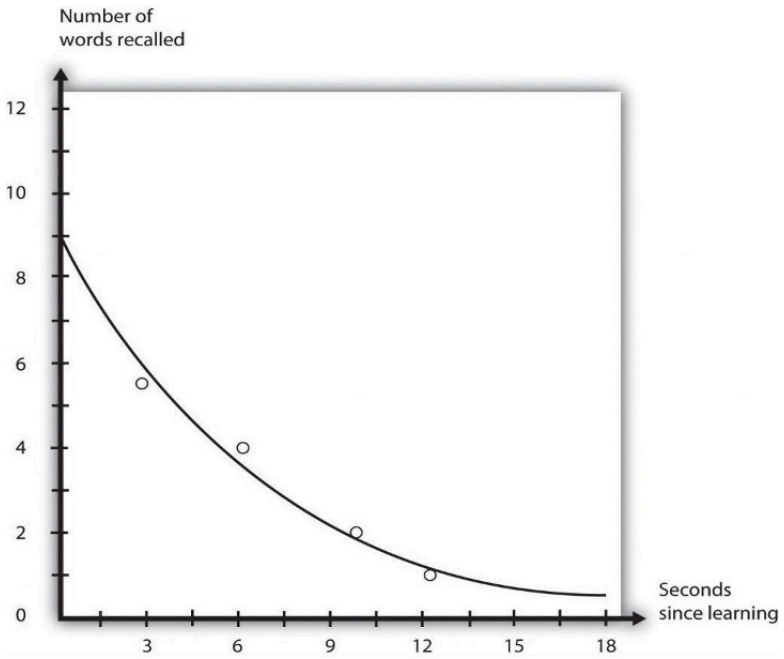

Figure ME.7. Remembering three-letter words. *Peterson and Peterson (1959) found that when people were asked to remember a list of three-letter strings and then were immediately asked to perform a distracting task (e.g., counting backward by threes), the material was quickly forgotten, such that by 18 seconds it was virtually gone.* ***Alt. text:*** *A line graph showing a steady decline in the number of words recalled the longer it had been since the words were learned: 5.5 words recalled at 3 seconds, 4 words recalled at 6 seconds, 2 words recalled at 9.5 seconds, and 1 word recalled at 12 seconds.* ***Source:*** *Figure 10.4 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Watch this video: **Tricky Topics: Baddeley & Hitch Working Memory Model (3.5 minutes)**

> *One or more interactive elements has been excluded from this version of the text. You can view them online here:* ***https://opentextbooks.concordia.ca/psyc205/?p=793#oembed-2***

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Here is the **Tricky Topics: Baddeley & Hitch Working Memory Model transcript**.

Short-term memory is limited in both how long and how much information it can hold. One way to prevent the decay of information from short-term memory is to use working memory to rehearse it. **Maintenance rehearsal** is the process of repeating information mentally or aloud with the goal of keeping it in memory. We engage in maintenance rehearsal to

keep something that we want to remember (e.g., a person's name, email address, or phone number) in mind long enough to write it down, use it, or potentially transfer it to long-term memory (LTM).

If we continue to rehearse information, it will stay in STM until we stop rehearsing it. But there is also a capacity limit to STM. Try reading each of the following rows of numbers, one row at a time, at a rate of about one number each second. Then, when you have finished each row, close your eyes and write down as many of the numbers as you can remember.

> 019
> 3586
> 10295
> 861059
> 1029384
> 75674834
> 657874104
> 6550423897

If you are like the average person, you will have found that on this **digit span test** of short-term memory, you did pretty well up to about the fourth line and then started having trouble. You likely missed some of the numbers in the last three rows and did pretty poorly on the last one.

The digit span of most adults is between five and nine digits, with an average of about seven. Miller (1956) referred to "seven plus or minus two" pieces of information as the magic number in short-term memory. Yet, if we can only hold a maximum of about nine digits in short-term memory, then how can we remember larger amounts of information than this? For instance, how can we ever remember a 10-digit phone number long enough to dial it?

One way we overcome the limits of short-term memory is through chunking. **Chunking** is the process of organising information into larger, meaningful groupings (i.e., chunks), thereby increasing the number of items that can be held in short-term memory. For example, a 10-digit phone number like *5143981234* is easier to recall if we divide it into three chunks: *514–398–1234*. Instead of remembering ten separate digits, we only need to hold three meaningful units in mind

Try to remember this string of 12 letters:

> XOFCBANNCVTM

You probably will not do that well because the number of letters is more than the magic number of seven. Now try again with this one:

CTVCBCTSNHBO

Would it help if you knew that the material in this string could be chunked into four sets of three letters each? It likely would, because instead of remembering 12 letters, you would only have to remember the names of four television stations: CTV, CBC, TSN, and HBO. In this case, chunking changes the number of items you have to remember from 12 to only four.

You could also employ mnemonics like ROYGBIV, which is an anagram containing the letter of the first word of all colours in the visual spectrum, or CANOE, which is another anagram of first letters, but this time for the five personality factors in the "Big Five" model. For more examples, see McCabe's (2011) article ***Integrating Mnemonics into Psychology Instruction***. Students often rely on reading or highlighting the textbook to encode material into long term memory; however, this is a relatively poor strategy because it is passive, and it can "feel" like you have accomplished something when, really, the material has not been meaningfully encoded.

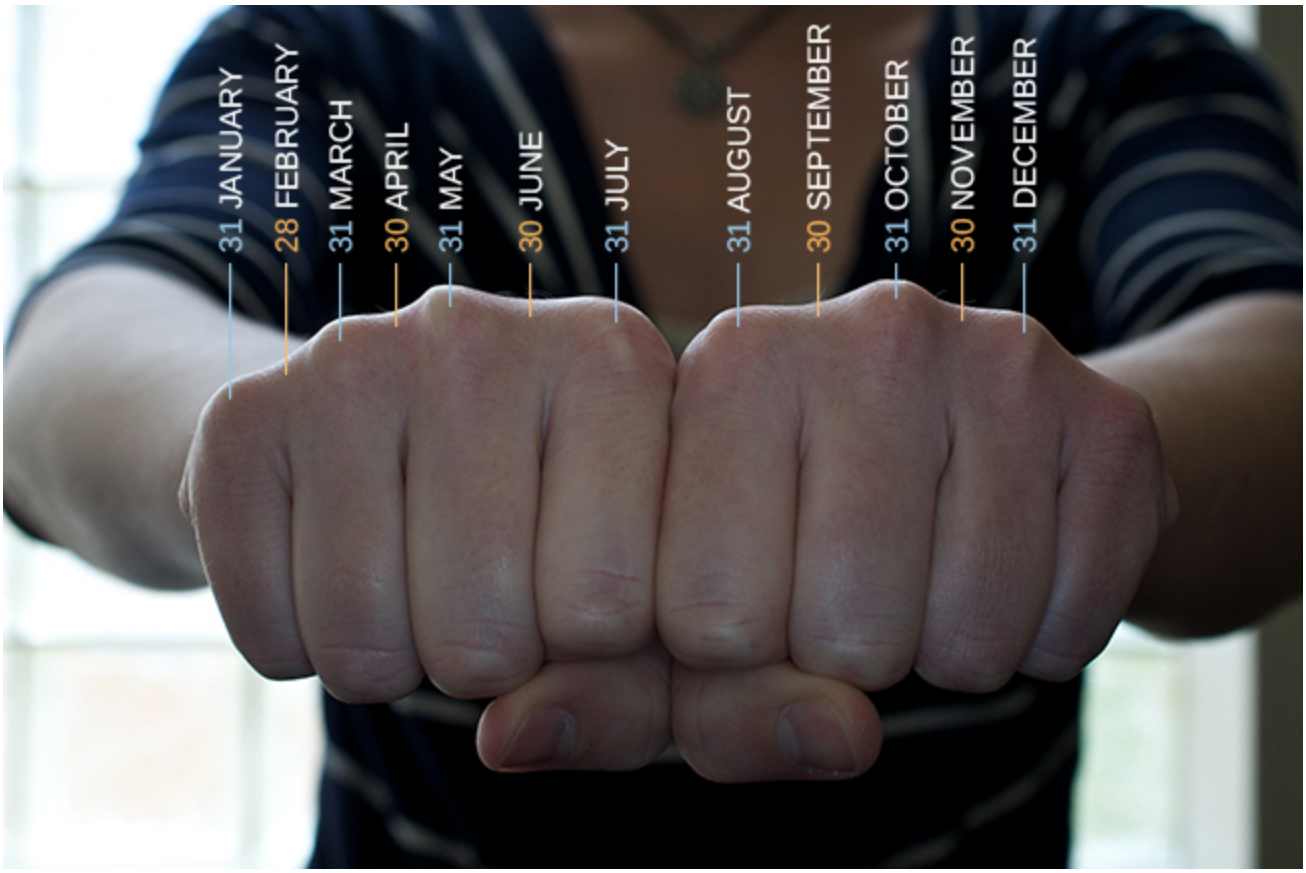


Figure ME.8. Knuckle Mnemonic. *This is a knuckle mnemonic to help you remember the number of days in each month. Months with 31 days are represented by the protruding knuckles and shorter months fall in the spots between knuckles.* ***Alt. text:*** *A person holds their fists together with knuckles aligned, labeled with the months of the year from the pinky knuckle across, with each month on a knuckle or the space between.* ***Source:*** *Figure 8.18 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modifications of work by Cory Zanker.*

If information makes it past short-term memory, it may enter **long-term memory (LTM)**. Information in LTM can be held for days, months, and years. The capacity of LTM is large. There is no known limit to what we can remember (Wang et al., 2003). Although we may forget at least some information after we learn it, other things will stay with us forever. In Section 10.2, we will discuss different types of long-term memory.

Retrieval

Even when information has been adequately encoded and stored, it does not do us any good if we cannot retrieve it. **Retrieval** refers to the process of reactivating information that has been stored in memory. There are two ways you can retrieve information out of your long-term memory storage system: recall and recognition. **Recall** is what we most often think about when we talk about memory retrieval: it means you can access information without cues. For example, you would use recall for an essay test. **Recognition** happens when you identify information that you have previously learned after encountering it again. It involves a process of comparison. When you take a multiple-choice test, you are relying on recognition to help you choose the correct answer.

You may find multiple-choice questions are easier than essay questions because the former typically provide more retrieval cues. A **retrieval cue** is a stimulus that activates information stored in long-term memory. The best retrieval cues come from associations we form at the time we encode a memory. The **encoding specificity principle** helps us understand how cues specific to an event or person will most effectively trigger that memory. It predicts that we are more likely to be able to retrieve items from memory when conditions at retrieval are similar to the conditions under which we encoded them.

Context-dependent memory refers to an increase in retrieval when the *external* situation in which information is learned matches the situation in which it is remembered. Researchers tested the memory of scuba divers to learn and retrieve information in different contexts and found strong evidence for context-dependent memory (Godden & Baddeley, 1975). They asked the divers to learn a list of words either when they were on land or when they were underwater. Then, they tested the divers on their memory, either in the same or the opposite situation. The divers' memory was better when they were tested in the same context in which they had learned the words than when they were tested in the other context. You can see that context-dependent memory might also be important in improving your memory. For instance, you might want to try to study for an exam in an environment that is similar to the one in which you are going to take the exam.

Table ME.1. Context-dependent memory in scuba divers

During Learning	During Recall	Average percent of words recalled
Underwater	Underwater	32%
Underwater	On land	23%
On land	On land	38%
On land	Underwater	24%

Table adapted from Jern (2020).

Whereas context-dependent memory refers to a match in the external situation between learning and remembering, **state-dependent memory** refers to superior retrieval of memories when the individual is in the same *internal* or psychological state as during encoding. Research discovered that fewer mistakes in memory occurred when participants were under the influence of alcohol during both study and test sessions compared to when they were only under the influence during the study session (Goodwin et al., 1969). However, it's important to remember that studying and testing without being intoxicated is always a better choice! Research with humans finds that bilinguals remember better when tested in the same language in which they learned the material (Marian & Neisser, 2000). In particular, research on **mood-congruent memory** indicates that it is easier to recall unpleasant memories than pleasant ones when we are sad, and easier to recall pleasant memories than unpleasant ones when we are happy (Eich & Metcalfe, 1989).

Learning sequence also predicts retrieval. If we show people a list of words one by one, like on flashcards, and then ask them to remember the words, they can remember more words from the beginning and the end of the list compared to the words in the middle of the list. This pattern, known as the **serial position curve**, is caused by two retrieval phenomena: primacy effect and recency effect. The **primacy effect** refers to a tendency to better remember items presented early in a list. The **recency effect** refers to the tendency to better remember items presented at the end of the list.

There are a number of explanations for primacy and recency effects, but one of them is in terms of the effects of rehearsal on short-term and long-term memory (Baddeley et al., 2009). Because we can keep the last words that we learned in the presented list in short-term memory by rehearsing them before the memory test begins, they are relatively easily remembered. So, the recency effect can be explained in terms of maintenance rehearsal in short-term memory. As well, the primacy effect may also be due to rehearsal — when we hear the first word in the list we start to rehearse it, making it more likely that it will be moved from short-term to long-term memory.

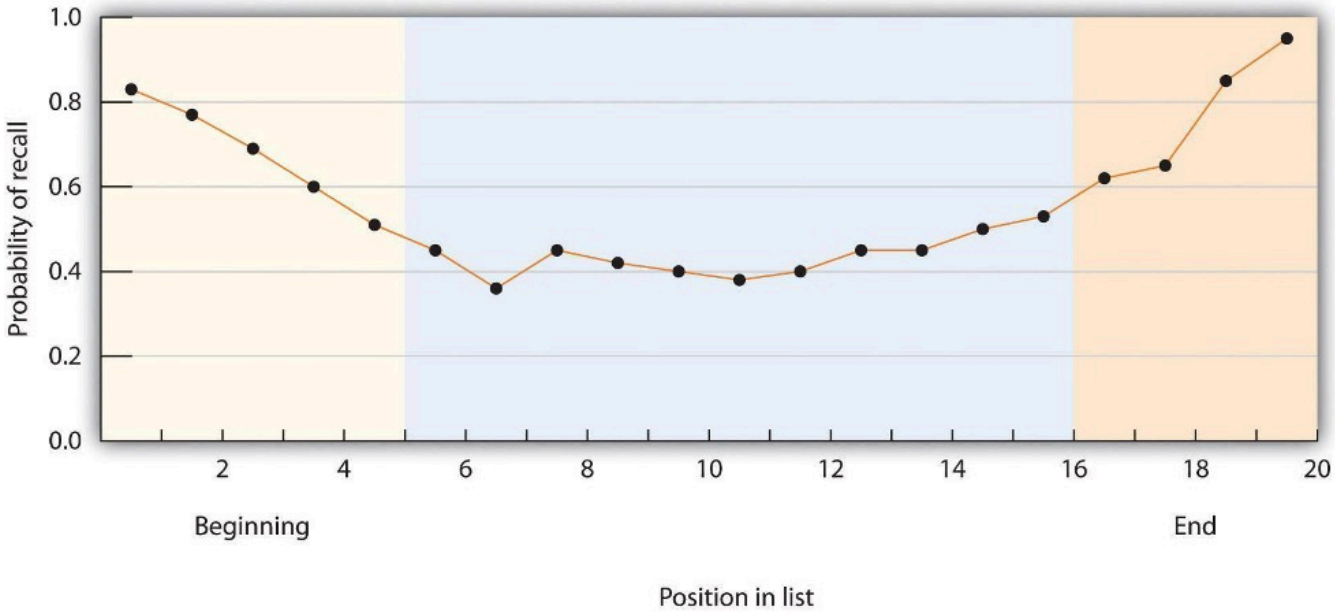


Figure ME.9. Serial position curve. *The serial position curve is the result of both primacy effects and recency effects.* ***Alt. text:*** *This chart contrasts probability of recall by position in list to portray the serial position curve.* ***Source:*** *Serial position curve is licensed under a CC BY-NC-SA Licence.*

The ultimate strategy for enhancing long-term memory is likely practice retrieval, which is supported by the **testing effect** (Roediger & Karpicke, 2006). After the initial learning phase, participants in the "restudy" condition learned the previous materials again, whereas those in the "testing" condition took a quiz on the learned materials. Although "restudy" and "testing" yielded similar performances on the recall tests immediately following the restudy/testing phase, "testing" led to much better recall than "restudy" on the final exams with a two-day or one-week delay. Likewise, with more practice quizzes, participants performed better in the delayed recall tests (but not in the immediate recall tests). Practice retrieval is considered to be a better strategy than restudying the materials over and over again, because in the real world, the exams almost always come with a long delay.

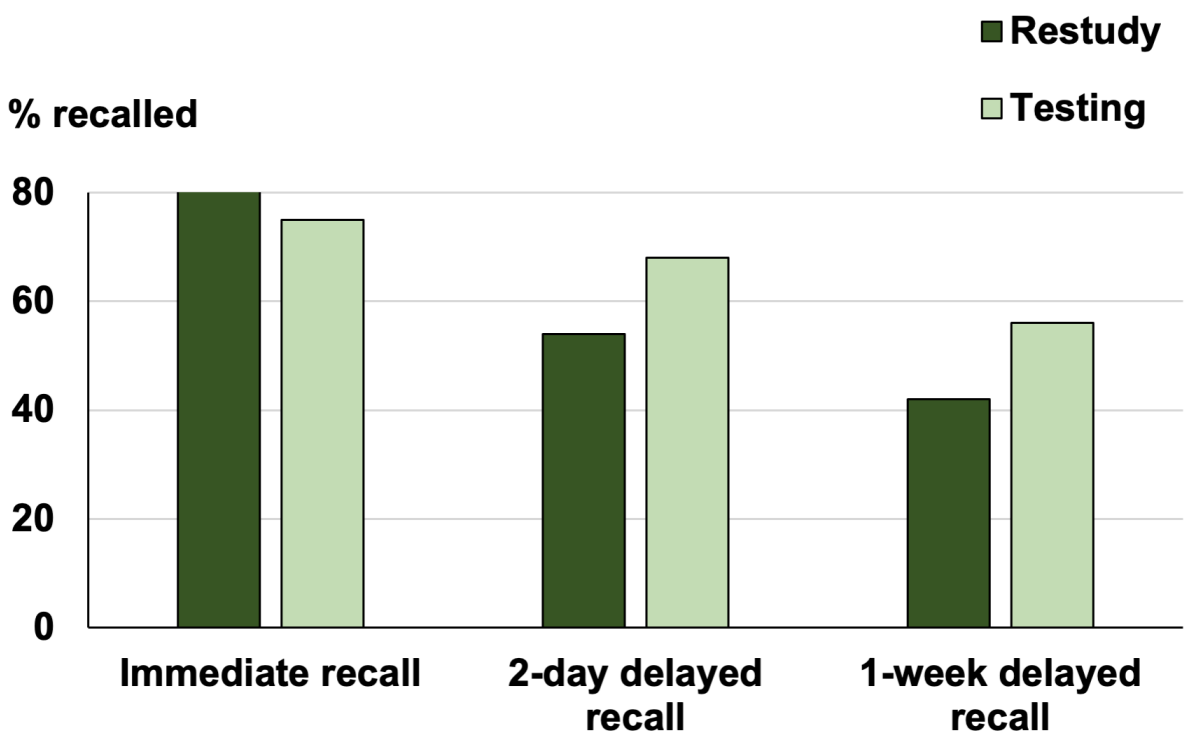


Figure ME.10. Testing Effect. *The testing effect predicts a better long-term retention when using practice retrieval as a rehearsal strategy, in comparison with restudying the materials (Roediger & Karpicke, 2006).* ***Alt. text:*** *A bar graph showing the percentage of content recalled using a restudy or testing strategy. When using the restudy strategy, they had a recall of 81% 5 minutes later, 54% 2 days later, and 42% 1 week later. When using the testing strategy, they had a recall of 75% 5 minutes later, 68% 2 days later, and 56% 1 week later.* ***Source:*** *Testing Effect is licensed under a CC BY-NC-SA Licence.*

To obtain the best outcome of practice testing, you may want to consider the **spacing effect** – learning is better if it is spread out over periods of time than if it occurs closer together or at the same time. This means that you will learn more if you study continually throughout the semester — a little bit every day is best — than if you wait to cram at the last minute before your exam. Another good strategy is to study and wait as long as you can before you forget the material. Then, review the information and again wait as long as you can before you forget it. This will probably be a longer period of time than the first time. Repeat, and repeat again. The spacing effect is usually considered in terms of the difference between **distributed practice** (i.e., practice that is spread out over time) and **massed practice** (i.e., practice that comes in one block), with the former approach producing better memory.

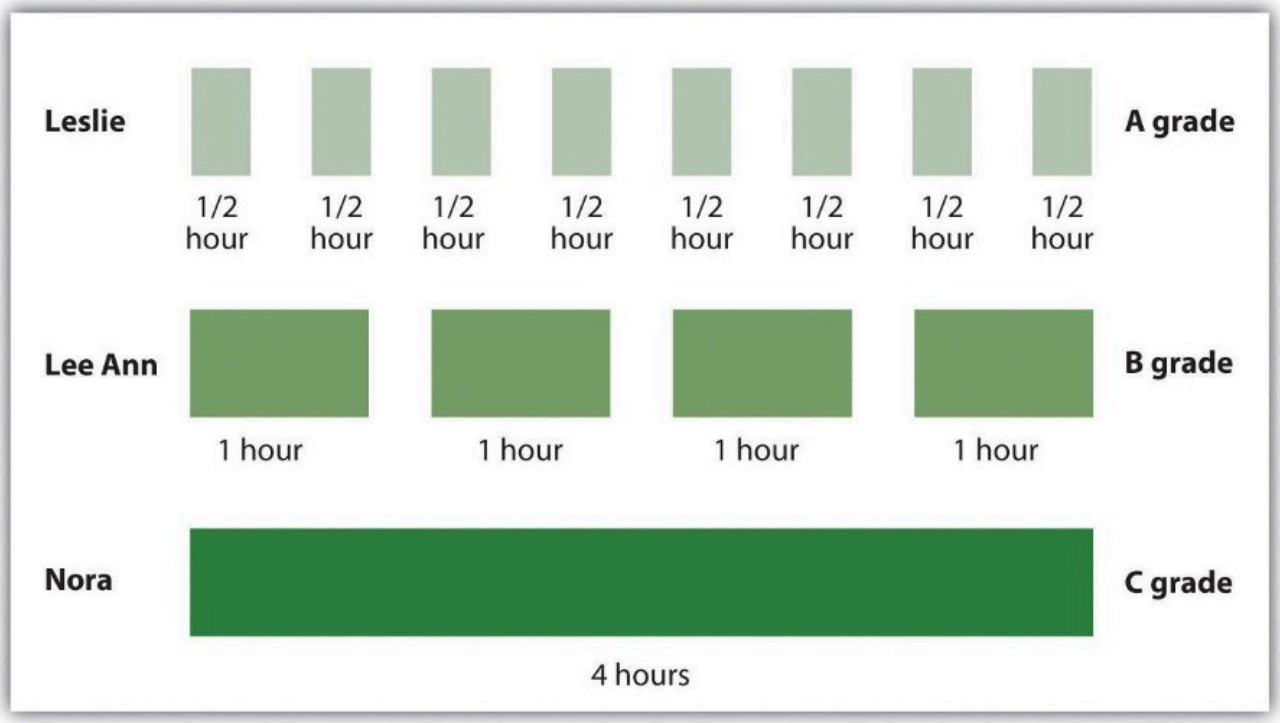


Figure ME.11. The spacing effect. *The spacing effect refers to the fact that memory is better when it is distributed rather than massed. Leslie, Lee Ann, and Nora all studied for four hours total, but the students who spread out their practice into smaller sessions did better on the exam.* ***Alt. text:*** *Leslie studied for 8 half-hour sessions and got an A grade. Lee Ann studied for four 1-hour sessions and got a B grade. Nora studied for one 4-hour session and got a C grade.* ***Source:*** *The spacing effect is licensed under a CC BY-NC-SA Licence.*

Our memory works like a smart information system, doing three main jobs: putting info in (encoding), keeping it for a while (storage), and bringing it back out when we need it (retrieval). In the next part, we'll explore the different types of long-term memory to understand how our brain stores various kinds of information.

Long-Term Memory

AMELIA LIANGZI SHI

Categories of Long-Term Memories

Although it is useful to hold information in sensory and short-term memory, we often rely on our long-term memory (LTM). Long-term memories fall into two broad categories:

Explicit Memory

Explicit memory — also referred to as **declarative memory** — refers to knowledge or experiences that can be consciously remembered. There are two types of explicit memory: episodic and semantic. **Episodic memory** refers to the firsthand experiences that we have had (e.g., recollections of our high school graduation day or of the fantastic dinner we had in Vancouver last year). **Semantic memory** refers to our knowledge of facts and concepts about the world (e.g., that the capital city of Canada is Ottawa and that one definition of the word "affect" is "the experience of feeling or emotion"). Explicit memory is assessed using measures in which the individual being tested must consciously attempt to remember the information. A **recall test** is a measure of explicit memory that involves bringing from memory information that has previously been remembered. We rely on our recall memory when we take an essay exam, because this test requires us to generate previously remembered information. A multiple-choice test is an example of a **recognition test**, a measure of explicit memory that involves determining whether information has been seen or learned before.

Implicit Memory

Implicit memory — also referred to as **non-declarative memory** — refers to things we can remember without awareness of having learned them. Implicit memory is important because it can affect our behaviour without us being aware of how. **Procedural memory** refers to our often knowledge of how to do things. Procedural memory can be implicit, because we are not required to consciously process the procedural steps for engaging in the activity (e.g., brushing your teeth or riding a bike). A second type of implicit memory involves **classical conditioning**. Our brains are amazing at connecting things without us even realis-

ing it. Imagine smelling something and suddenly thinking of a tasty food you love. That's our brain making a link between the smell and the food. It happens without us trying, and it can make us feel happy or make our mouths water. Our brain loves to create these connections, even if we're not paying attention to them.

Implicit memory can also be shown by studies on priming, or changes in behaviour as a result of experiences that have happened frequently or recently. **Priming** refers both to the activation of association (e.g., we can prime the concept of kindness by presenting people with words related to kindness) and to the influence of that activation on behaviour (e.g., people who are primed with the concept of kindness may act more kindly). The key point about implicit priming is that memories we are not consciously aware of can still affect our feelings and behaviour.

One measure of the influence of priming on implicit memory is the word fragment test, in which a person is asked to fill in missing letters to make words. You can try this yourself. First, try to complete the following word fragments, but work on each one for only three or four seconds. Do any words pop into mind quickly?

_ i b _ a _ y
_ h _ s _ _ i _ n
_ o _ k
_ h _ i s _

Now, read the following sentence carefully:

"He got his materials from the shelves, checked them out, and then left the building." Returning to the list above, try again to make words out of the word fragments.

You might find that it is easier to complete fragments 1 and 3 as "library" and "book," respectively, after you read the sentence than it was before you read it. However, reading the sentence did not really help you to complete fragments 2 and 4 as "physician" and "chaise." This difference in implicit memory probably occurred because as you read the sentence, the concept of "library" and perhaps "book" was primed, even though they were never mentioned explicitly. Once a concept is primed, it influences our behaviours. For example, if you are primed by the information you receive in the news, it may, unbeknownst to you, prompt your decision-making later on about buying a product, voting for a candidate, and so on.

Our everyday behaviours are influenced by priming in a wide variety of situations. Seeing an advertisement for cigarettes may make us start smoking, seeing the flag of our home country may arouse our patriotism, and seeing a student from a rival school may arouse our

competitive spirit. These influences on our behaviours may occur without our being aware of them. For example, exposure to food advertisements can increase snacking tendencies (Harris et al., 2009). priming individuals with achievement-related words (e.g., 'strive,' 'succeed') enhances their performance in tasks such as general knowledge quizzes (Bargh et al., 1996). Further, Subliminal exposure to national flags can influence political thought and behavior (Hassin et al., 2007).

Semantic Knowledge and Schemas

Memories that are stored in LTM are not isolated but rather are linked together into categories — networks of associated memories that have features in common with each other. Forming categories, and using categories to guide behaviour, is a fundamental part of human nature. Associated concepts within a category are connected through **spreading activation**, which occurs when activating one element of a category activates other associated elements. For instance, because favourable traits are associated in a category, reminding people of the word "honest" will help them remember the word "kind." In other words, if they have just remembered the word "honest," spreading activation means they are more likely to remember the word "kind" than they are to remember a word in a different category such as "stupid" (Srull & Wyer, 1989). We can take advantage of spreading activation as students: we are able to link new words to previously learned concepts with a larger knowledge base because there is more capacity to activate concepts within a category.

Experts rely on prior knowledge to help them organise complex information. William Simon and Herbert Chase (1973) showed chess experts and chess novices various positions of pieces on a chessboard for a few seconds each. The experts did a lot better than the novices in remembering the positions because they were able to see the "big picture." They did not have to remember the position of each of the pieces individually but chunked the pieces into several larger layouts. However, when the researchers showed both groups random chess positions — positions that would be very unlikely to occur in real games — both groups did equally poorly, because in this situation the experts lost their ability to organise the layouts.

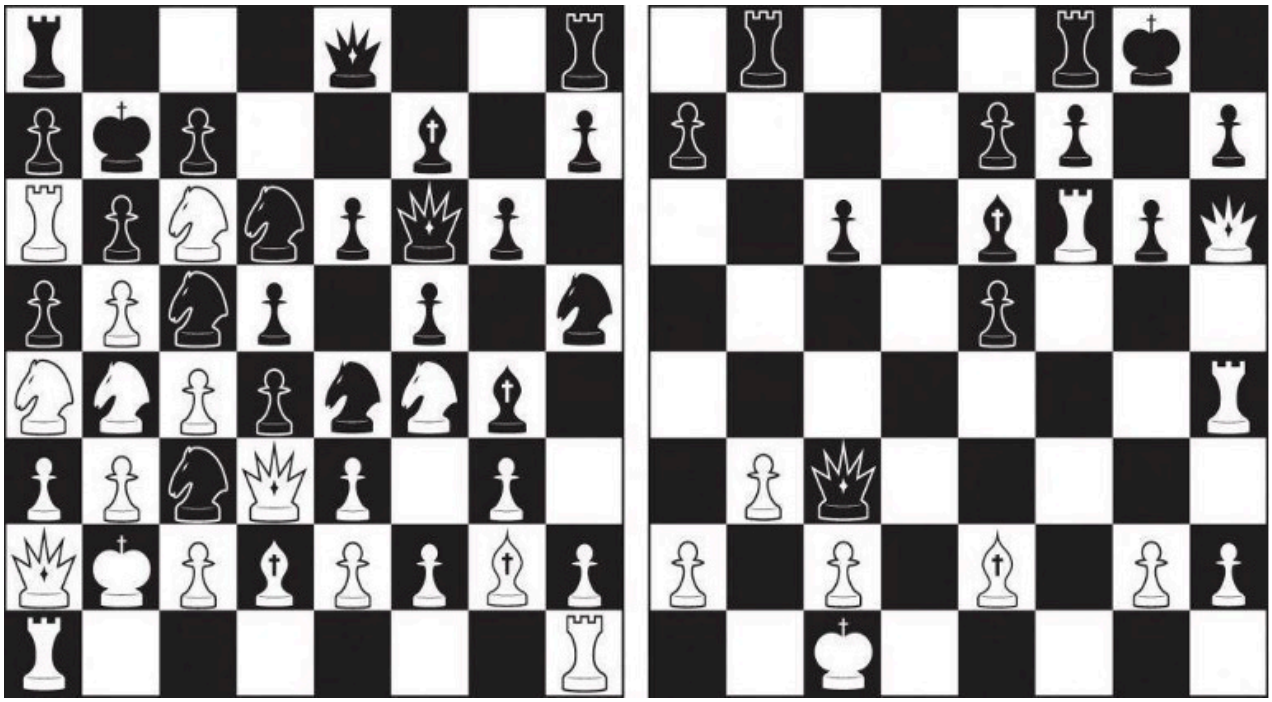


Figure ME.12. Spreading activation – Chess demonstration. *Experienced chess players are able to recall the positions of the game on the right much better than those who are chess novices, but the experts do no better than the novices in remembering the positions on the left, which cannot occur in a real game.* ***Alt. text:*** *Two diagrams of different chess boards. On the left, this diagram illustrates a grouping of chess characters on a chessboard that is not possible according to the rules of the game; on the right, this diagram illustrates a realistic arrangement of chess characters on a chessboard.* ***Source:*** *Figure 10.5 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Semantic knowledge is sometimes referred to as **schemas** — clusters of knowledge in semantic memory that help us organise information. We have schemas about objects (e.g., a triangle has three sides and may take on different angles), about people (e.g., Sam is friendly, likes to golf, and always wears sandals), about events (e.g., the particular steps involved in ordering a meal at a restaurant), and about social groups (i.e., stereotypes). Schemas can be used as mental shortcuts; if seeing someone or something activates a schema, we may think we know more about the thing or person specifically than we actually do.

Schemas are important in part because they help us remember new information by providing an organisational structure for it. Read the following paragraph, and then try to write down everything you can remember:

> "The procedure is actually quite simple. First you arrange things into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities, that is the next step; otherwise you are pretty well set. It is important not to

overdo things. That is, it is better to do too few things at once than too many. In the short run, this may not seem important, but complications can easily arise. A mistake can be expensive as well. At first, the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one never can tell. After the procedure is completed, one arranges the materials into different groups again. Then, they can be put into their appropriate places. Eventually, they will be used once more, and the whole cycle will then have to be repeated. However, that is part of life." (Bransford & Johnson, 1972, p. 722)

It turns out that people's memory for this information is quite poor. However, when they have been told ahead of time that the information describes "doing the laundry," their memory for the material is much better. This demonstration of the role of schemas in memory shows how our existing knowledge can help us organise new information and how this organisation can improve encoding, storage, and retrieval.

Autobiographical Memory

Autobiographical memory refers to one's memory for specific experiences from their daily life. Traditionally, autobiographical memory is considered to be one type of episodic memory. However, in a broad sense, autobiographical memory may also include one's self-knowledge (also called autobiographical knowledge) and memories of generic, non-specific events. Autobiographical memory serves at least three important functions (Williams et al., 2008): It allows us to use our past experiences to solve current problems, to share personal stories and bond with other people, and most importantly, to develop and maintain our self-image.

Qi Wang (2016) points out that young children learn what to remember, how to remember, and why to remember it, primarily through parent-child dialogues. The development of autobiographical memory is affected by not only one's social contexts but also their cultural dynamics.

Indeed, we constantly retain memories of our personal past based on cultural beliefs, learn about our cultural identities, and adapt to the environment shaped by our cultures. For instance, researchers have found robust evidence for the lasting impact of residential schools on Indigenous communities in Canada and how trauma can be transmitted through generations (Wilk, 2017). It is unfortunate that the pain from these schools continues to affect the current generation, leading to a crisis of youth suicides. The experiences of residential schools can go beyond mere recollection of events and become deeply ingrained

in individuals' biology, affecting the health of the next generation (Chief Moon-Riley et al., 2019). It may be a pattern of stress response that affects the adult children of survivors, causing problems in how their bodies handle stress.

Maria Yellow Horse Brave Heart dedicated her career to studying historical trauma and unresolved grief among Indigenous people. Historical trauma response refers to the emotional and psychological wounds from catastrophic events faced by specific groups. This collective trauma has led to social issues like high rates of suicide and alcoholism in Indigenous communities. Historical unresolved grief is closely related, representing unexpressed pain that continues to impact individuals and communities across generations. Brave Heart developed psycho-educational group interventions rooted in Indigenous healing practices to help individuals understand the sources of their distress, connect with their cultural history, express and process their grief, and develop coping strategies to heal and build resilience. Here is a video with Dr. Brave Heart talking about her research.

Watch this video: **Maria Yellow Horse Brave Heart: Historical Trauma in Native American Populations (31 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=798#oembed-1***

"Maria Yellow Horse Brave Heart: Historical Trauma in Native American Populations" video by Smith College School for Social Work is licensed under the Standard YouTube Licence.

Spatial Memory

An important job of our memory system is to keep track of locations where our experiences happen; they act as anchors for our personal memories. Consider this: all of your cherished personal memories happened in a particular place and it is difficult to imagine the event without it. In order to recall a location later, it must be encoded quickly at the time an event is happening, along with many other details you will need in order to recall the experience later. Because we are mobile creatures, the places where memories happen are constantly changing, so our memory systems are designed to create mental maps quickly. Not only is spatial memory encoded quickly, but it is also quite accurate. The image below was drawn from memory by Shanawdithit, an Indigenous woman who was thought to be the last known survivor of the Beothuk people, an Indigenous population who formerly inhabited

territory colonially known as Newfoundland and Labrador (Canada). Although Shanawdithit had no prior experience with pen and paper, she was able to recreate the physical space with detailed accuracy using her memory.

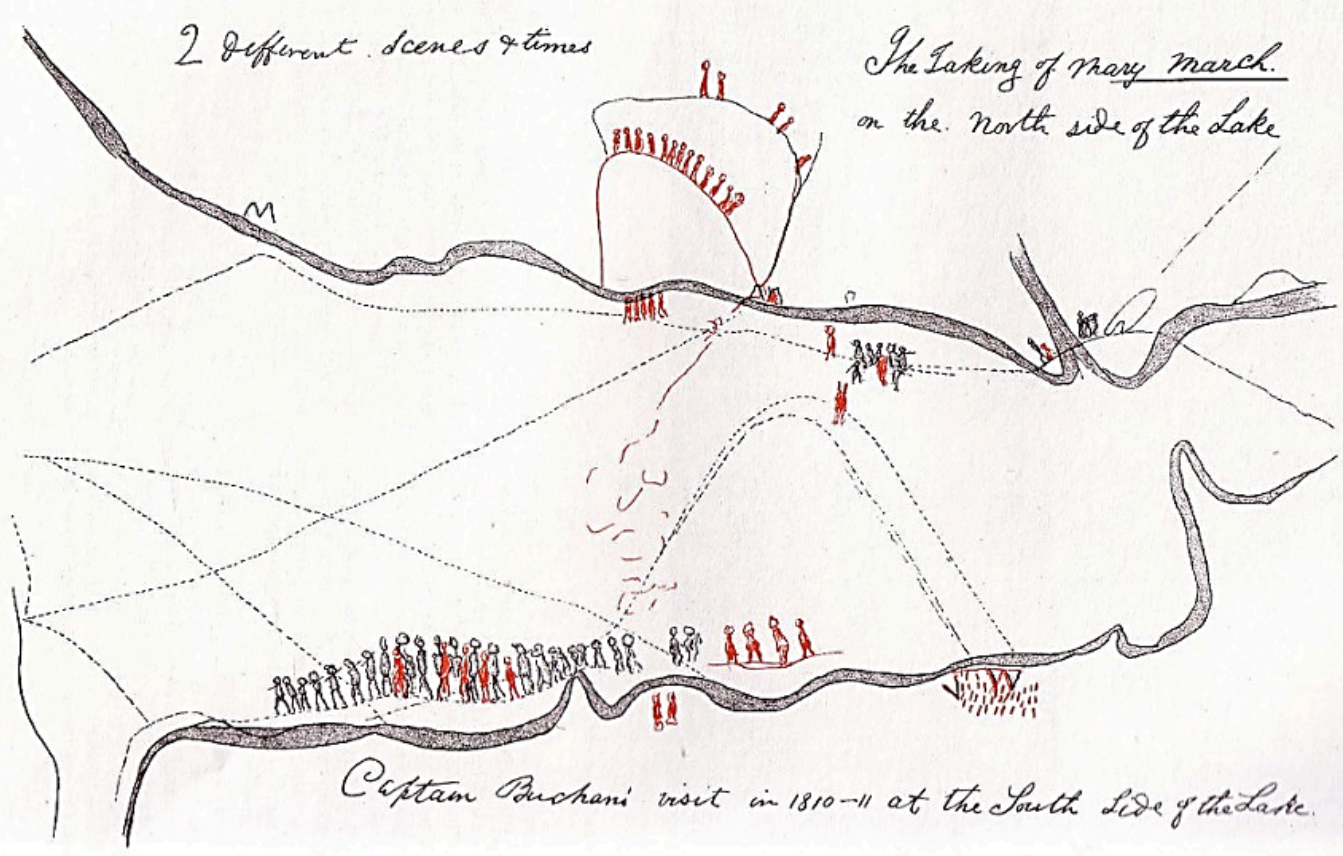


Figure ME.13. Kidnapping of Demasduwit (Mary March). *Depiction of the kidnapping of Indigenous (Beothuk) woman Demasduwit (Mary March) in 1829, drawn by her niece Shanawdithit (Nancy April) in territory now known as Newfoundland and Labrador (Canada).* ***Alt. text:*** *Hand-drawn, grey, white, and red, map, depicting of the kidnapping of Demasduwit.* ***Source:*** *From Vanished Peoples: The Archaic Dorset & Beothuk People of Newfoundland by P. Such, 1978, NC Press. Public Domain image 1829 by Shanawdithit.*

Our cognitive map-making abilities are the basis of some tried and true memory enhancing techniques. The **method of loci** approach, or memory palace, was used by the ancient Greeks and Romans to remember long speeches. To do this, the individual forms mental images of words or objects and places them in specific locations along a familiar route. To retrieve this information, the individual takes a mental stroll through the familiar space. Memory contest champions use this technique, which can be easily mastered with some practice. In fact, after covering the American Memory Championship as a journalist, Joshua Foer practiced this and other memory techniques and returned to win the competition the

following year. Joshua Foer is a science writer who 'accidentally' won the US Memory Championships. Watch his TED Talk, ***Feats of Memory Anyone Can Do***, in which he explains the method of loci approach.

An even older spatial memory technique used by Indigenous populations living in Australia (i.e., Aboriginal peoples living in Australia) involves creating a story in an actual physical space and using elements in the environment as part of the narrative. Among Aboriginal populations living in Australia, these stories tend to remain consistent over decades and centuries. Likely, because the stories are diligently learned, protected and "passed down" by Aboriginal Elders. One study compared this Aboriginal spatial memory technique to the memory palace technique as a way for medical students to learn the cellular reactions of the tricarboxylic acid cycle (Reser et al., 2021). Their findings indicate that the incorporation of spatial memory skills into education could help improve memorisation, because they take advantage of our natural ability for encoding and storing spatial information.

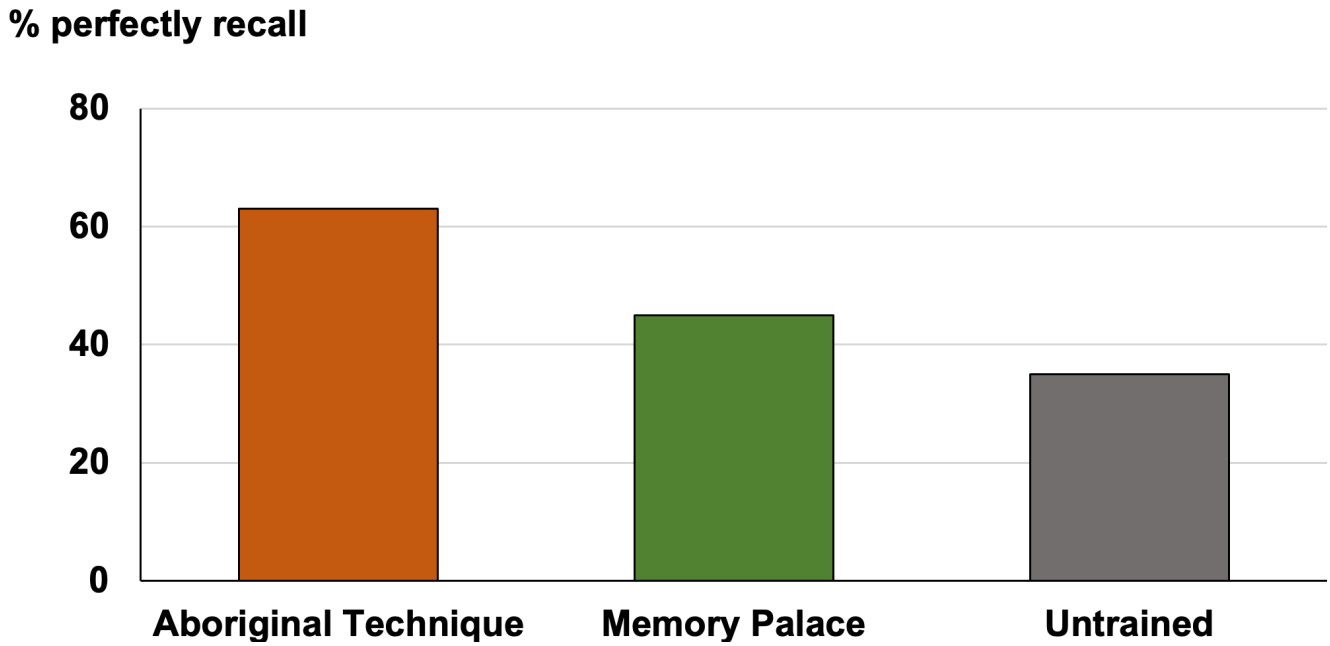


Figure ME.14. Australian Aboriginal memory technique. *In Reser and colleagues' (2021) study, students who were guided by an Indigenous educator through a landscape-based narrative outperformed those who were taught the memory palace technique and untrained controls (Reser et.al., 2021).* ***Alt. text:*** *A bar graph showing the percentage of perfect recall using the Aboriginal Technique (63%), Memory Palace technique (45%), and those untrained (35%).* ***Source:*** *Australian Aboriginal memory technique is licensed under a CC BY-NC-SA Licence.*

Further categorisations have been explored in the study of long-term memory. For instance, in contrast to **retrospective memory,** which involves remembering people, events, or words that have been encountered in the past, **prospective memory** is a form of memory that involves remembering to perform a planned action or recall a planned intention at some

future point in time (Burgess & Shallice, 1997). Older adults usually perform worse than younger individuals in prospective memory tasks (Henry et al., 2004; Uttl, 2008). As individuals age, they may encounter increased challenges in remembering to perform tasks at a future time, such as taking medications at specific designated times, or setting out the garbage cans on the appointed day. In parallel to explicit and implicit memory, researchers also investigate the distinction between involuntary memory (e.g., cues encountered in everyday life evoke recollections of the past without conscious effort; Berntsen, 1996) and voluntary memory (e.g., a deliberate effort to recall what you have learned about spatial memory). In addition to remembering information itself, the ability to accurately recall the source of learned information, referred to as *source memory* or *source monitoring*, is also very important, because the source of information can influence people's judgment of the credibility of information and their decision-making (Kumkale & Albarracín, 2004).

Amnesia and Forgetting

AMELIA LIANGZI SHI

Biology of Memory

Just as information is stored on digital media, the information in long-term memory (LTM) must be stored in the brain. The ability to maintain information in LTM involves a gradual strengthening of the connections among the neurons in the brain. When pathways in these neural networks are frequently and repeatedly activated, the synapses become more efficient in communicating with each other, and these changes create memory. This process, known as **long-term potentiation** (LTP), refers to the strengthening of the synaptic connections between neurons as a result of frequent stimulation (Lynch, 2004). Drugs that block LTP reduce learning, whereas drugs that enhance LTP increase learning (Lynch, 2002). Because the new patterns of activation in the synapses take time to develop, LTP happens gradually. The period of time in which LTP occurs and in which memories are stored is known as the period of **consolidation**.

Long-term potentiation occurs as a result of changes in the synapses, which suggests that chemicals, particularly neurotransmitters and hormones, must be involved in memory. There is quite a bit of evidence that this is true. *Glutamate* is perhaps the most important neurotransmitter in memory (McEntee & Crook, 1993). When animals, including people, are under stress, more glutamate is secreted, and this glutamate can help them remember emotionally salient events (McGaugh, 2003). *Estrogen*, a sex hormone, also seems critical for memory for both sexes (Cheung et al., 2013; Korol & Pisani, 2015; Maki & Resnick, 2000; Sherwin, 2012). Interestingly, women who are experiencing menopause, along with a reduction in estrogen, frequently report memory difficulties (Phillips & Sherwin, 1992). From an evolutionary perspective, emotion plays a highly adaptive role in memory. If you survive a frightening encounter with a bear, for example, you are likely to remember to avoid bears in the future. For this, we can thank the amygdala, as well as stress-related chemicals such as *epinephrine (adrenalin)* and *cortisol*.

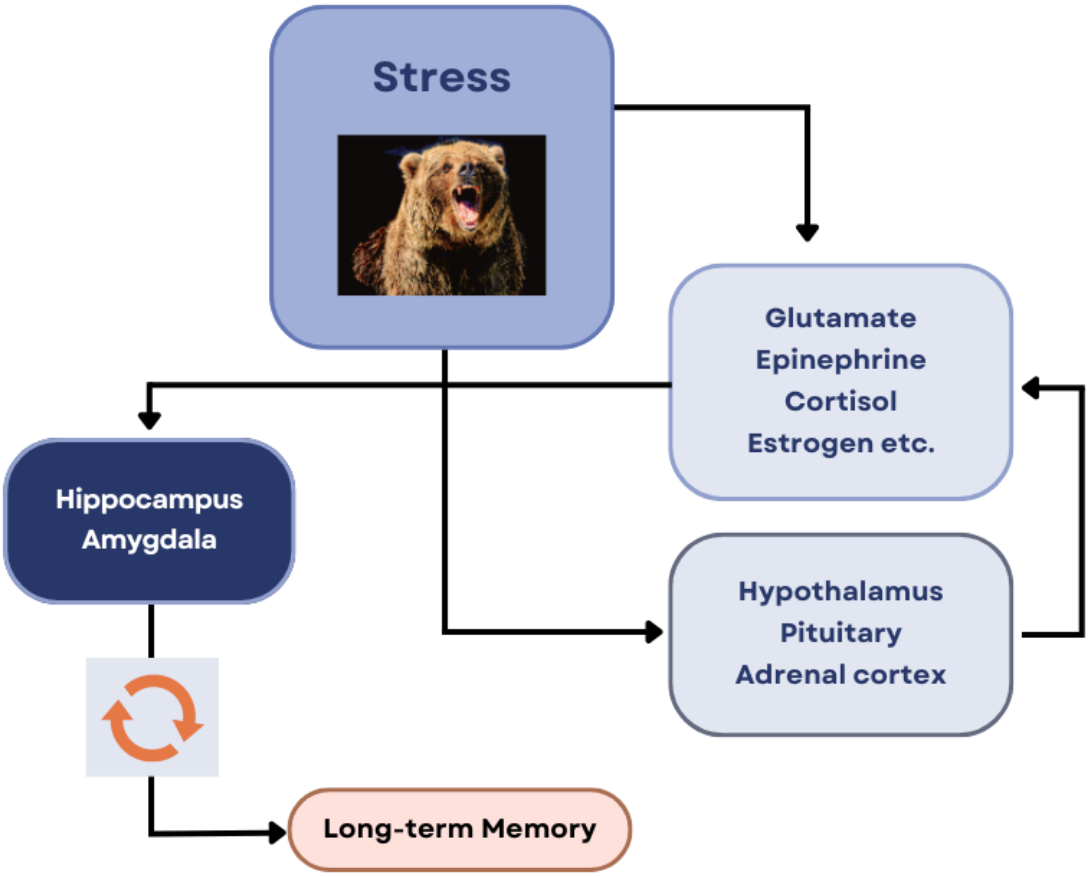


Figure ME.15. Stress and Memory**. Stressful events trigger the release of stress hormones and related neurotransmitters, which act on the amygdala and hippocampus to strengthen memory for emotionally-relevant experiences. Contrary to the myth that we forget or repress memories of stressful events, we are more likely to remember them. [Image Description]* ***Source: *Image created for this textbook, credit of bear Photo by mana5280 on Unsplash.*

Where in the brain are memories made and stored? This is not an easy question to answer. Unlike physical storage devices, the brain cannot add another filing cabinet or hard drive. Instead, the many different neural systems that overlap and influence each other to create and retrieve memories make it complicated to study. As a result, scientists combine techniques that allow the study of areas in isolation with techniques that allow the study of memory systems.

One way to study an isolated region is to intentionally damage or remove it, a technique called ablation or lesioning. If the subject shows impaired performance on a memory task after lesioning, then the damaged area was likely involved in that task. Because it would be unethical to create lesions in healthy human subjects, lesion experiments are performed in non-human animals, often to create a model of human systems. This technique allows

scientists to assess memory before damage occurs, ensuring that changes in performance are a result of the lesion. Experimental lesions are also specific in location, which is not often the case with naturally occurring brain injury. In contrast, studies of brain damage in humans rely on individuals who already have brain damage, or who are having brain regions removed for medical purposes. In these cases, we cannot be sure which effects result from the damage, or which specific regions are responsible.

Amnesia and the Case of H.M.

Still, people with rare brain injuries can provide unique information about the nature of memory systems by examining the abilities that they lost. One famous case study of memory comes from a man named Henry Molaison, known as patient H.M., and his collaboration with researcher, Brenda Milner. H.M. suffered severe seizures from his temporal lobes, which were unresponsive to high-dose anticonvulsants. In 1955, he underwent experimental neurosurgery. Specific portions of his medial temporal lobes, including the anterior hippocampus and amygdala, were removed. Although the surgery controlled his epilepsy, it led to profound memory impairments (Milner, 2005). After the surgery, H.M. was unable to retain new experiences for more than 30 seconds. Every time H.M. met Milner, he introduced himself as if they had never met before. He was only able to remember small chunks of information through maintenance rehearsal (i.e., continuously repeating that information and keeping it alive in his working memory). However, H.M. could gradually form some new information through repeated exposure. For example, it took about five years to navigate the inside of the house he moved to after his operation. He also learned to play tennis, though he could not remember being taught and denied knowing how to play. Similarly, he improved at a motor task where he copied a drawing by viewing his hand only through a mirror; after 30 trials over three days, he showed significant improvement without any conscious awareness of having performed the task before.

H.M.'s case helps to link the medial temporal lobe with explicit memory function and aids in distinguishing different types of memory. The *hippocampus* helps us encode and consolidate information into LTM, especially spatial and temporal relationships, the context in which events were experienced, and the associations among memories. Damage to the hippocampus results in the inability to transfer information from short-term into long-term memory, making it impossible to form new memories. This is known as **anterograde amnesia**.

In contrast, **retrograde amnesia** is a memory disorder that produces an inability to retrieve events that occurred before the trauma. Retrograde amnesia often follows a temporal gradient, meaning that memories formed long before the trauma are usually preserved,

while memories formed shortly before the injury are more likely to be lost. This pattern occurs because older memories have had more time to be consolidated and integrated across multiple brain regions, making them less vulnerable to disruption than newer, less-stabilized memories (Ketonis et al., 2025).



Figure ME.16. Retrograde Amnesia versus Anterograde Amnesia. *Memory problems that extend back in time before the injury and prevent retrieval of information previously stored in long-term memory are known as retrograde amnesia. Conversely, memory problems that extend forward in time from the point of injury and prevent the formation of new memories are called anterograde amnesia.* ***Alt. text:*** *A continuum that starts in the center with an event. Then an arrow extends back in time to the past – which is retrograde amnesia. And a second arrow points forward opposite to the present – which is anterograde amnesia.* ***Source:*** *Figure 8.10 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Imagine that you were in a car accident, suffered a head injury, and now have retrograde amnesia and do not remember anything about your life before waking up in the hospital. There are people surrounding your bed claiming to be your spouse, your children, and your parents but you do not recognise any of them. Hollywood has been fascinated with the amnesia plot for nearly a century, going all the way back to the film Garden of Lies from 1915 to more recent movies such as the Jason Bourne spy thrillers. While these portrayals often exaggerate or simplify memory loss—cases of complete and permanent retrograde amnesia are very rare—they do reflect the genuine mystery and disruption that amnesia can cause. However, for real-life sufferers of retrograde amnesia, like former NFL football player Scott Bolzan, the story is not a Hollywood movie. Bolzan fell, hit his head, and deleted 46 years of his life in an instant. He is now living with one of the most extreme cases of retrograde amnesia on record.

Watch this video: **Scott Bolzan on Pat's Portraits (7 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=804#oembed-1***

"Scott Bolzan on Pat's Portraits" video by KTAR News is licensed under the Standard YouTube Licence.

The hippocampus is important for laying down certain types of explicit memories, but its absence does not affect the ability to create implicit memories, such as procedural memory, motor learning, and classical conditioning. Three brain areas have been identified as critical for implicit procedural learning: *cerebellum*, *basal ganglia*, and *frontal lobe* (Vidoni & Boyd, 2007). Research shows that animals and humans with damage to the cerebellum have more difficulty in classical conditioning studies (Krupa et al., 1993; Woodruff-Pak et al., 2000). The basal ganglia and the frontal lobe are found to be involved in both explicit and implicit learning. For instance, people with basal ganglia stroke have difficulty in using explicit instructions to perform implicit motor tasks (Boyd & Winstein, 2004).

Why are some types of memory easier to remember than others? For example, why are emotionally arousing memories like your first kiss or your pet passing away easier to remember than your breakfast last week? Emotions provide a "boost" to our memory, but how? Neuroimaging studies show that the *amygdala* becomes highly active when viewing emotionally stimulating events. For example, one study had participants watch emotionally negative film clips (e.g., a violent crime), and emotionally neutral ones (e.g., court proceedings). Recall was better for emotional films and was positively correlated with amygdala activation, as measured by PET imaging (Cahill et al., 1996).

Forgetting

In ordinary life, we do not remember everything we experience. As we discussed earlier, we simply do not encode a lot of what we experience, but what about memories that we do encode but later forget? Being able to forget is adaptive; if our consciousness was continually bombarded with memories, it would be difficult to cope with reality. What happens to the information that was encoded, stored, and then forgotten? Is it lost for all time? Many students will have had the experience of learning something thoroughly for a course, but then later on, perhaps only months later, be unable to remember more than a few facts. Let us look at some of the processes that might be responsible for forgetting.

Encoding failure. Much of what we sense we never notice, and what we fail to encode, we will never remember. You probably have seen the Apple computer logo thousands of times. Can you draw it? As Adam Blake and colleagues' (2015) study suggested, only 1 of the 85 undergraduates could do so accurately.

Storage decay. Probably the most intuitive way of understanding forgetting is "use it or lose it": if we do not think about something for a long time, then we tend to forget it. Hermann Ebbinghaus's (1885/1913) **forgetting curve** is evidence in the short term of decay the-

ory — the notion that memories decay over time. He practiced memorising lists of nonsense syllables, such as DIF, LAJ, LEQ, and MUV, and tried to recall them over varying time intervals. He originally wanted to plot how many of the syllables he could remember against the time that had elapsed, but because his recall had failed completely after long delays, he had to invent another method: he measured the number of trials required to fully remember a list in the initial learning, and the number of trials required to relearn the lists. The difference is called "savings." For example, if the initial learning required 10 trials and relearning required 7 trials, the savings was 30%. Then he plotted savings as a function of elapsed time and discovered an important principle of memory: memory decays rapidly at first, but the degree of decay levels off with time.

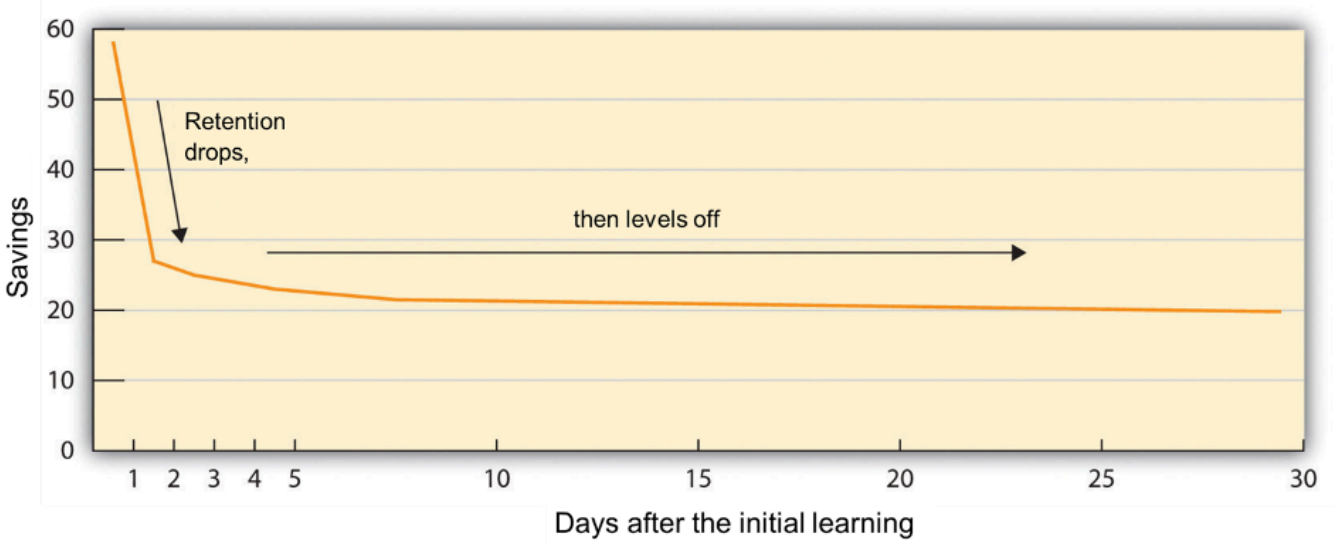


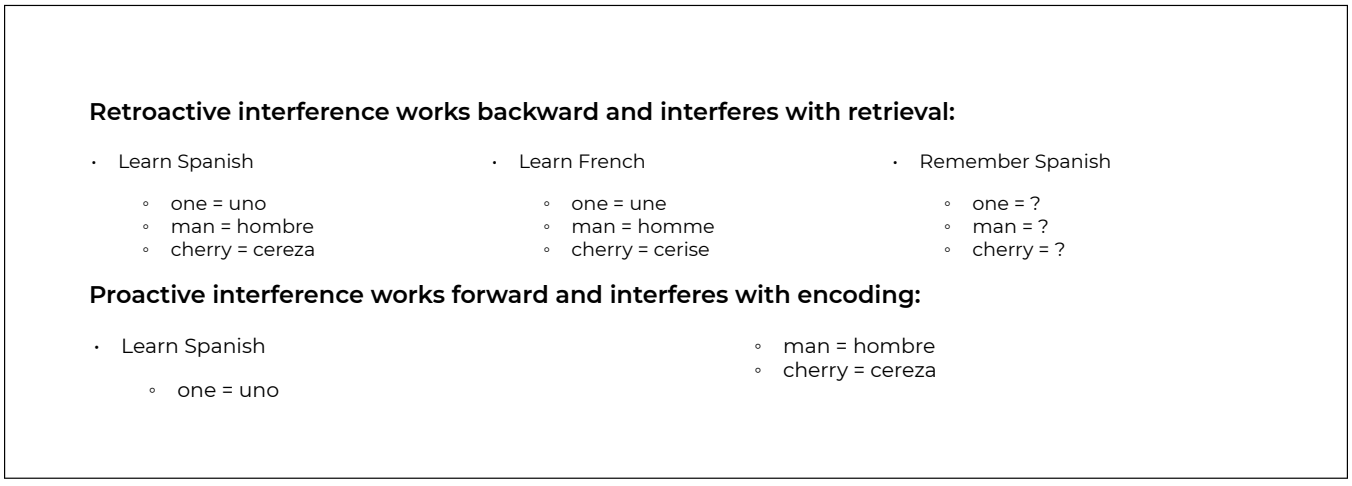
Figure ME.17. Forgetting curve. *Hermann Ebbinghaus (1913) found that memory for information drops off rapidly at first, but then levels off after time.* ***Alt. text:*** *Line graph showing memory savings over 30 days after initial learning. Retention drops steeply in the first few days, then levels off and declines slowly over time.* ***Source:*** *Figure 8.14 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Retrieval failure. In some cases, forgetting is not memories faded, but memories unretrieved. We have all experienced retrieval failure in the form of the frustrating **tip-of-the-tongue phenomenon**, in which we are certain that we know something that we are trying to recall but cannot quite produce it. Forgotten words are particularly prone to the tip-of-the-tongue phenomenon. We might think of words that are similar in sound, have the same number of syllables, or mean the same thing — but we cannot bring the actual word to mind. The tip-of-the-tongue experience is a very good example of the inability to retrieve information that is actually stored in memory, although the word "tip-of-the-tongue" is a bit misleading – people with hearing impairments also experience a parallel "tip-of-the-finger" phenomenon in sign language (Thompson et al., 2005).

Retrieval failures may be caused by a lack of retrieval cues. For instance, we discussed mood-congruent memory earlier, which works for forgetting as well: when we are in a good mood, we tend to forget or ignore memories of things that are incongruent with happiness, and when we are unhappy, we tend to forget happy memories. This interplay of emotion and cognition is complex, but it may help to explain why some things are forgotten by some people but not others, or at certain times but not others. This congruence effect may broaden to other aspects of the situation; the less similar the recall context is to the context in which something was learned, the more we are likely to forget. Locations, times, people, facts, and pictures can all aid as memory cues to elicit memories. Most adults are not able to remember anything before ages three or four. This phenomenon is called **infantile amnesia** (or childhood amnesia). Infantile amnesia likely results from multiple factors, including the immaturity of the hippocampus in early childhood and the later development of language, which provides the scaffolding for autobiographical memory (Bauer, 2008).

Retrieval failures may also stem from interference. As you collect more and more information, one retrieval cue may lead to multiple items in your memory. **Retroactive interference** occurs when learning something new impairs our ability to retrieve information that was learned earlier. For example, if you have learned to program in one computer language, and then you learn to program in another similar one, you may start to make mistakes programming the first language that you never would have made before you learned the new one. In this case, the new memories work backward (i.e., retroactively) to influence retrieval from memory that is already in place. The earlier memories were encoded and used, but then they were "forgotten" as they were interfered with by new information. In contrast, proactive interference works in a forward direction. **Proactive interference** occurs when earlier learning impairs our ability to encode information that we try to learn later. For example, if we have learned French as a second language, this knowledge may make it more difficult, at least in some respects, to learn a third language (e.g., Spanish), which involves similar but not identical vocabulary. In this case, we forget new information because the old memories have interfered.

Retroactive and proactive interference can both cause retrieval failure:



- Learn French
  - one = une? uno?
  - man = homme? hombre?
  - cherry = cerise? cereza?

Memory Distortions

Memory is constructive and reconstructive. Despite a widespread belief that memory is like the replaying of a videotape, the evidence suggests that our memories are active reconstructions. For example, you might think you remember something from childhood, but it might actually have been an event that was experienced by a sibling. The family stories have been unknowingly reconstructed with vividness. The likelihood of such reconstructions increases when a story is told and retold many times — perhaps over several years.

One potential error in memory involves **source misattribution**, which refers to mistakes in differentiating the sources of information. Unintentional plagiarism may occur due to source misattribution, wherein an author mistakenly attributes other people's ideas as their own. For instance, George Harrison of The Beatles claimed that he was unaware that the melody of his song "My Sweet Lord" was almost identical to a song called "He's so Fine" published seven years earlier by Ronnie Mack and popularized by The Chiffons. You can easily find versions of both tunes online and compare them for yourself. The judge in the copyright suit against Harrison ruled that Harrison did not intentionally commit the plagiarism. Harrison's source misattribution is clearly expressed in his memoir:

> "I wasn't consciously aware of the similarity between 'He's So Fine' and 'My Sweet Lord' when I wrote the song, as it was more improvised and not so fixed," Harrison wrote in *I Me Mine*. "Although when my version of the song came out and started to get a lot of airplay, people started talking about it, and it was then I thought, 'Why didn't I realise?' It would have been very easy to change a note here or there and not affect the feeling of the record." (Mastropolo, 2016, para. 6)

Generally speaking, **false memory** refers to the phenomenon where someone recalls something that did not happen or recalls it differently from the way it actually happened. False memories can be elicited by presenting subjects with a list of words that are related to each other (e.g., bed, rest, tired, dream, snooze, yawn) and then testing them with a *critical lure*, which is, a word that is not from the original list but semantically related to the list words (e.g., sleep). This approach is referred to as the **Deese-Roediger-McDermott (DRM) paradigm** (Roediger & McDermott,1995).

A particular problem for eyewitnesses is that our memories are often influenced by the things that occur to us after we have learned the information (Loftus, 1979, 2005). This newer information can distort our original memories such that we are no longer sure what is the original and what was provided later. The **misinformation effect** refers to errors in memory that occur when new information influences existing memories.

In an experiment by Elizabeth Loftus and John Palmer (1974), participants viewed a film of a traffic accident and then randomly answered one of three questions:

- "About how fast were the cars going when they *hit* each other?"
- "About how fast were the cars going when they *smashed* each other?"
- "About how fast were the cars going when they *contacted* each other?"

Although all the participants saw the same accident, their estimates of the cars' speed varied by condition. Participants in the "smashed" condition estimated the highest average speed at 40.8 miles per hour, and those in the "contacted" condition estimated the lowest average speed at 30.8 miles per hour.

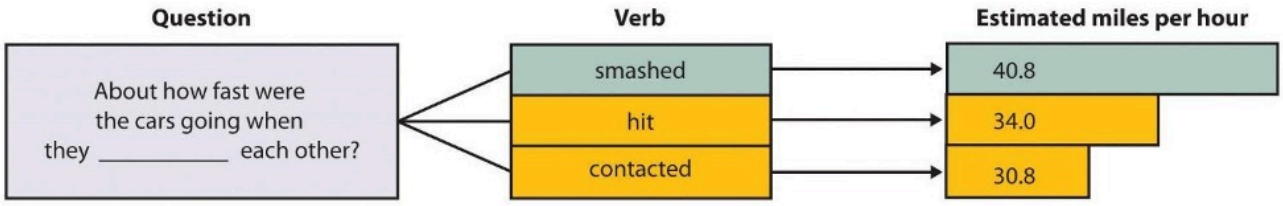


Figure ME.18. Misinformation effect. *Participants viewed a film of a traffic accident and then answered a question about the accident. According to random assignment, the verb in the question was filled by either "hit," "smashed," or "contacted" each other. The wording of the question influenced the participants' memory of the accident (Loftus & Palmer, 1974).* ***Source:*** *Figure 8.19 as found in Introduction to Psychology (Libretexts) is shared under a CC BY-NC-SA 3.0 Licence.*

In addition to distorting our memories for events that have actually occurred, misinformation may lead us to falsely remember information that never occurred. In Elizabeth Loftus and Jacqueline Pickrell's (1995) famous "getting lost in the mall" study, the researchers first obtained three true events that happened to each participant (e.g., moving to a new house) from their close relative, and added a false event that did not happen (e.g., being lost in a shopping mall). The participants were then asked to provide details for each event. Out of the 24 participants, six "remembered" the false event. After being told that one of the four

events was false and asked to identify it, 19 participants were able to identify the getting-lost memory as false, while the remaining five incorrectly thought that one of the true events was false. This study was replicated in 2023. The researchers found that 35% of the 123 participants generated a false memory for getting lost in a mall in childhood (Murphy et al., 2023).

The misinformation effect can have serious consequences in the criminal justice system if incorrect information is given to witnesses, causing them to change their memories, or to jurors, who may misremember evidence presented in court. In a study by William Crozier and colleagues (2020), mock jurors misremembered evidence from a police report containing misleading information. Exposure to misinformation made them believe more strongly in the suspect's guilt. Even when warned about the presence of misinformation, the effect persisted, showing how robust this memory distortion can be.

Eyewitnesses to crimes are frequently overconfident in their memories, and there is only a small correlation between memory accuracy and the subjective confidence about the memory.

Depending on your age, you may have a clear memory of when you first heard about the 9/11 attacks in the United States in 2001, or the passing of Queen Elizabeth II in 2022. This type of memory, which we experience along with a great deal of emotion, is known as a **flashbulb memory** — a vivid and emotional memory of an unusual event that people believe they remember very well (Brown & Kulik, 1977). People are very certain of their memories of these important events, and they are frequently overconfident. Jennifer Talarico and David Rubin (2003) tested the accuracy of flashbulb memories by asking students to recall their memories of how they learned about either the September 11, 2001 terrorist attacks or an everyday event that occurred around the same time. The researchers recorded these memories on September 12, 2001, and then asked the participants to recall them again after one, six, or 32 weeks. As time passed, the accuracy of both emotional and everyday memories declined, but the participants' confidence in their memory of learning about the attacks remained high and even became overconfident after 32 weeks. This study highlights how overconfidence can lead us to falsely believe that our memories are correct.

Image Descriptions

Figure ME.15. Stress and Memory image description:

1. Stress (Go to **Step 2** or **Step 3**)
2. Hypothalamus, Pituitary (gland), Adrenal cortex
3. Glutamate, Epinephrine, Cortisol, Estrogen, etc.
4. Hippocampus, Amygdala
5. Processing

6. Long-term Memory ***[Return to Figure ME.15]***

Chapter Resources

AMELIA LIANGZI SHI

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The reference list for this chapter has been excluded from this file to reduce page count. The full reference list can be viewed online at opentextbc.ca/psychologymtdi/chapter/memory-chapter-resources/.

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CHAPTER 4. LEARNING

Ephrathah Hadgu

Think back to your first weeks of kindergarten and how different it was from daycare or being at home. You had to learn how to sit at a desk, raise your hand to speak, go to a designated place for lunch, complete worksheets, and much more. You likely noticed many of these behaviours by observing your teacher or the other children around you. Imitation and insight played significant roles, but they probably weren't enough on their own. Adjusting to a new routine and completing tasks you might not have wanted to do required additional strategies.

Your teacher likely used reinforcements, such as offering free periods at the end of the week or reducing your workload, to encourage engagement. They might also have employed punishments, like taking away sugary snacks or giving you time-outs, to discourage undesirable behaviour. Through these methods, you learn based on the consequences of your actions. Some of this learning may have occurred unconsciously. For instance, even if you weren't tired after lunch, the teacher turning off the lights and playing soothing music might have signalled that it was time for your daily nap, leading you to feel sleepy and head to the mats.

These examples illustrate the various ways we learn every day. Learning is a complex process that encompasses more than one method or definition. Throughout this chapter, we will explore the processes of learning by observation, classical conditioning, operant conditioning, and the numerous factors that influence learning.

What is Learning?

DINESH RAMOO

Birds build nests and migrate as winter approaches. Infants suckle at their parent's breast. Dogs shake water off wet fur. Salmon swim upstream to spawn, and spiders spin intricate webs. What do these seemingly unrelated behaviours have in common? They all are unlearned behaviours. Both instincts and reflexes are innate (unlearned) behaviours that organisms are born with. **Reflexes** are a motor or neural reaction to a specific stimulus in the environment. They tend to be simpler than instincts, involve the activity of specific body parts and systems (e.g., the knee-jerk reflex and the contraction of the pupil in bright light), and involve more primitive centres of the central nervous system (e.g., the spinal cord and the medulla). In contrast, **instincts** are innate behaviours that are triggered by a broader range of events, such as maturation and the change of seasons. They are more complex patterns of behaviour, involve movement of the organism as a whole (e.g., sexual activity and migration), and involve higher brain centres.

Both reflexes and instincts help an organism adapt to its environment and do not have to be learned. For example, every healthy human baby has a sucking reflex, present at birth. Babies are born knowing how to suck on a nipple, whether artificial (from a bottle) or human. Nobody teaches the baby to suck, just as no one teaches a sea turtle hatchling to move toward the ocean. In terms of evolutionary pressure, genetic coding for such behaviour is adaptive. Newborns cannot survive if they have to learn to do these things. Babies need to feed and cannot learn to suck on something put into their mouth as this will not be feasible. Similarly, turtles need to reach the waters of the ocean immediately after hatching if they are to survive. Learning, like reflexes and instincts, allows an organism to adapt to its environment. But unlike instincts and reflexes, learned behaviours involve change and experience; **learning** is a relatively permanent change in behaviour or knowledge that results from experience. In contrast to the innate behaviours discussed above, learning involves acquiring knowledge and skills through experience. Learning requires a much more complex nervous system and is more expensive when viewed through the lens of evolution. However, there is an advantage; learning allows an organism to acquire a wider range of behavioural responses to changing environments. If sea levels recede but mother turtles continue to lay their eggs at the same locations as they did before, the instinct to reach the ocean will make hatchlings continue their genetically coded behaviour and they will have to travel farther and farther to reach the ocean, resulting in more deaths., earned behaviour will change and adapt as the environment changes, making the species more resistant to sudden fluctuations in their environment.

Learning to surf, like any complex learning process (e.g., learning about the discipline of psychology), involves a complex interaction of conscious and unconscious processes. Learning has traditionally been studied in terms of its simplest components—the associations our minds automatically make between events. Our minds have a natural tendency to connect events that occur closely together or in sequence. **Associative learning** occurs when an organism makes connections between stimuli or events that occur together in the environment. You will see that associative learning is central to all three basic learning processes discussed in this chapter: classical conditioning tends to involve unconscious processes; operant conditioning tends to involve conscious processes; and observational learning adds social and cognitive layers to all the basic associative processes, both conscious and unconscious. These learning processes will be discussed in detail later in the chapter, but a brief overview of each will help you as you begin to explore how learning is understood from a psychological perspective.

In classical conditioning, also known as Pavlovian conditioning, organisms learn to associate events, or stimuli, that repeatedly happen together. We experience this process throughout our daily lives. For example, you might see a flash of lightning in the sky during a storm and then hear a loud boom of thunder. The sound of the thunder naturally makes you jump (loud noises stimulate that reflex). Because lightning reliably predicts the impending boom of thunder, you might associate the two and jump when you see lightning. Psychological researchers study this associative process by focusing on what can be seen and measured: behaviours. Researchers ask, "if one stimulus triggers a reflex, can we train a different stimulus to trigger that same reflex?" In operant conditioning, organisms learn, again, to associate events: a behaviour and its consequence (reinforcement or punishment). A pleasant consequence encourages more of that behaviour in the future, whereas a punishment deters the behaviour. Imagine you are teaching your dog, Hodor, to sit. You tell Hodor to sit, and give them a treat when they do. After repeated experiences, Hodor begins to associate the act of sitting with receiving a treat. Hodor learns that the consequence of sitting is that he gets a doggie biscuit (Figure LE.2). Conversely, if the dog is punished when exhibiting a behaviour, it becomes conditioned to avoid that behaviour (e.g., receiving a small shock when crossing the boundary of an invisible electric fence).



Figure LE.2. Operant conditioning. *In operant conditioning, a response is associated with a consequence. This dog has learned that certain behaviours result in receiving a treat.* ***Alt. text:*** *A man standing next to a black dog on top of a field.* ***Source:*** *Photo by Ahmet Kurt on Unsplash.*

Observational learning extends the effective range of both classical and operant conditioning. In contrast to classical and operant conditioning, in which learning occurs only through direct experience, observational learning is the process of watching others and then imitating what they do. A lot of learning among humans and other animals comes from observational learning.

All of the approaches covered in this chapter are part of a particular tradition in psychology, called behaviourism, which we discuss in the next section. However, these approaches do not represent the entire study of learning. Separate traditions of learning have taken shape within different fields of psychology, such as memory and cognition, so you will find that other chapters round out your understanding of the topic. Over time these traditions tend to converge. For example, in this chapter you will see how cognition has come to play a larger role in behaviourism, whereas more extreme adherents once insisted that behaviours are triggered by the environment with no intervening thought.

Classical Conditioning

DINESH RAMOO

Ivan Pavlov

Does the name Ivan Pavlov ring a bell? Even if you are new to the study of psychology, chances are that you have heard of Pavlov and his famous dogs.

Pavlov (1849–1936), a Russian scientist, performed extensive research on dogs and is best known for his experiments in classical conditioning (Figure L.3). As we discussed briefly in the previous section, **classical conditioning** is a process by which we learn to associate stimuli with results and, consequently, to anticipate events.

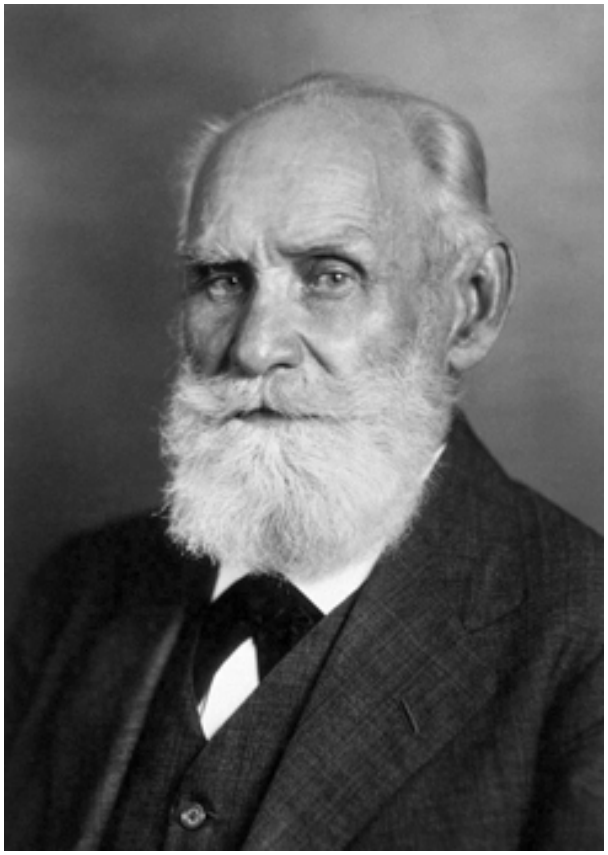

Figure LE.3. Ivan Pavlov. *Ivan Pavlov's research on the digestive system of dogs unexpectedly led to his discovery of the learning process now known as classical conditioning.* ***Alt. text:*** *A portrait shows Ivan Pavlov.* ***Source:*** *"Ivan Pavlov NLM3" is in the Public Domain.*

Pavlov came to his conclusions about how learning occurs completely by accident. Pavlov was a physiologist, not a psychologist. Physiologists study the life processes of organisms, from the molecular level to the level of cells, organ systems, and entire organisms. Pavlov's area of interest was the digestive system (Hunt, 2007). He was the first Russian to win the Nobel Prize for his contributions to medicine. In his studies with dogs, Pavlov measured the amount of saliva produced in response to various foods. Over time, Pavlov (1927) observed that the dogs began to salivate not only at the taste of food, but also at the sight of food, at the sight of an empty food bowl, and even at the sound of the laboratory assistants' footsteps. Salivating to food in the mouth is reflexive, so no learning is involved. However, dogs don't naturally salivate at the sight of an empty bowl or the sound of footsteps.

These unusual responses intrigued Pavlov, and he wondered what accounted for what he called the dogs' "psychic secretions" (Pavlov, 1927). To explore this phenomenon objectively, Pavlov designed a series of carefully controlled experiments to see which stimuli would cause the dogs to salivate. He was able to train the dogs to salivate in response to stimuli that clearly had nothing to do with food, such as the sound of a bell, a light, and a touch on the leg. Through his experiments, Pavlov realised that an organism has two types of responses to its environment: (1) unconditioned (unlearned) responses, or reflexes, and (2) conditioned (learned) responses.

In Pavlov's experiments, the dogs salivated each time meat powder was presented to them. The meat powder in this situation was an unconditioned stimulus (US): a stimulus that elicits a reflexive response in an organism. The dogs' salivation was an unconditioned response (UCR): a natural (unlearned) reaction to a given stimulus. Before conditioning, think of the dogs' stimulus and response like this:

Meat powder (US) → Salivation (UCR)

In classical conditioning, a neutral stimulus is presented immediately before an unconditioned stimulus. Pavlov would sound a tone (like a bell ringing) and then give the dogs the meat powder (Figure L.4). The tone was the neutral stimulus (NS), which is a stimulus that does not naturally elicit a response. Prior to conditioning, the dogs did not salivate when they just heard the tone because the tone had no association for the dogs.

Tone (NS) + Meat Powder (US) → Salivation (UCR)

When Pavlov paired the tone with the meat powder over and over again, the previously neutral stimulus (the tone) also began to elicit salivation from the dogs. Thus, the neutral stimulus became the conditioned stimulus (CS), which is a stimulus that elicits a response after repeatedly being paired with an unconditioned stimulus. Eventually, the dogs began to salivate to the tone alone, just as they previously had salivated at the sound of the assistants' footsteps. The behaviour caused by the conditioned stimulus is called the conditioned response (CR). In the case of Pavlov's dogs, they had learned to associate the tone (CS) with being fed, and they began to salivate (CR) in anticipation of food.

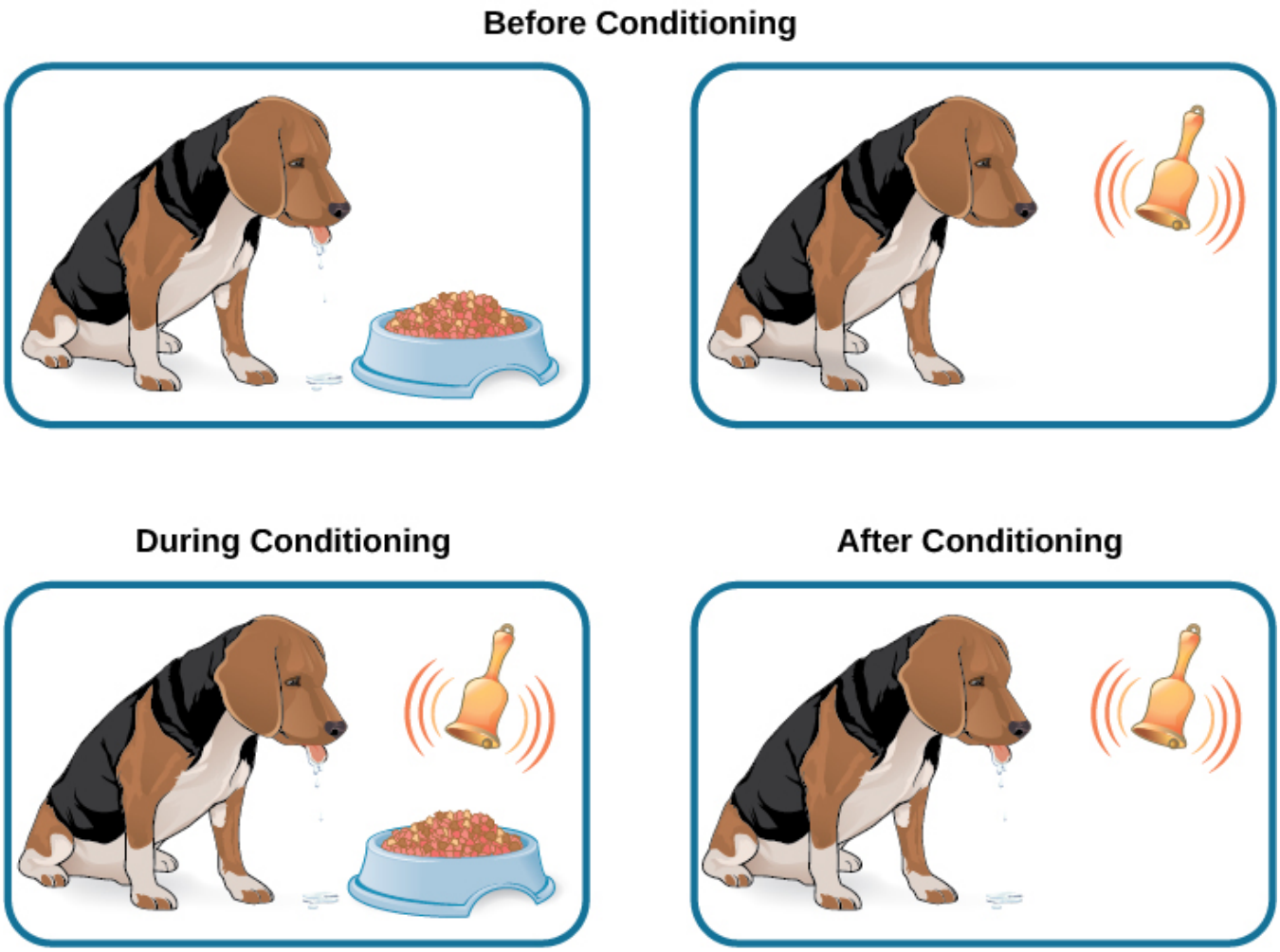

Figure LE.4. Conditioning. *Before conditioning, an unconditioned stimulus (food) produces an unconditioned response (salivation), and a neutral stimulus (bell) does not produce a response. During conditioning, the unconditioned stimulus (food) is presented repeatedly just after the presentation of the neutral stimulus (bell). After conditioning, the neutral stimulus alone produces a conditioned response (salivation), thus becoming a conditioned stimulus.* ***Alt. text:*** *Three illustrations show classical conditioning in a dog. Before conditioning: the dog salivates at food but not at a bell. During conditioning: the dog salivates at food when the bell rings. After conditioning: the dog salivates at the bell alone.* ***Source:*** *Figure 6.4 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

View this video about Pavlov and his dogs to learn more: **Pavlov's Classical Conditioning (6 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=823#oembed-1***

“Pavlov’s Classical Conditioning” video by Sprouts is licensed under the Standard YouTube Licence.

Real World Application of Classical Conditioning

How does classical conditioning work in the real world?

Let’s say you have a cat named Zelda, who is quite spoiled. You keep Zelda’s food in a separate cabinet, and you also have a special electric can opener that you use only to open cans of cat food. For every meal, Zelda hears the distinctive sound of the electric can opener (“zzhzhz”) and then gets her food. Zelda quickly learns that when she hears “zzhzhz” that means it’s feeding time. What do you think Zelda does when she hears the electric can opener? Zelda will likely get excited and run to where you are preparing their food. This is an example of classical conditioning. In this case, what are the US, CS, UCR, and CR?

What if the cabinet holding Zelda’s food becomes squeaky? In that case, Zelda hears “squeak” (the cabinet), “zzhzhz” (the electric can opener), and then she gets the food. Zelda will learn to get excited when she hears the “squeak” of the cabinet. Pairing a new neutral stimulus (“squeak”) with the conditioned stimulus (“zzhzhz”) is called **higher-order conditioning**, or **second-order conditioning**. This means you are using the conditioned stimulus of the can opener to condition another stimulus: the squeaky cabinet (Figure L.5). It is hard to achieve anything above second-order conditioning. For example, if you ring a bell, open the cabinet (“squeak”), use the can opener (“zzhzhz”), and then feed Zelda, Zelda will likely never get excited when hearing the bell alone.

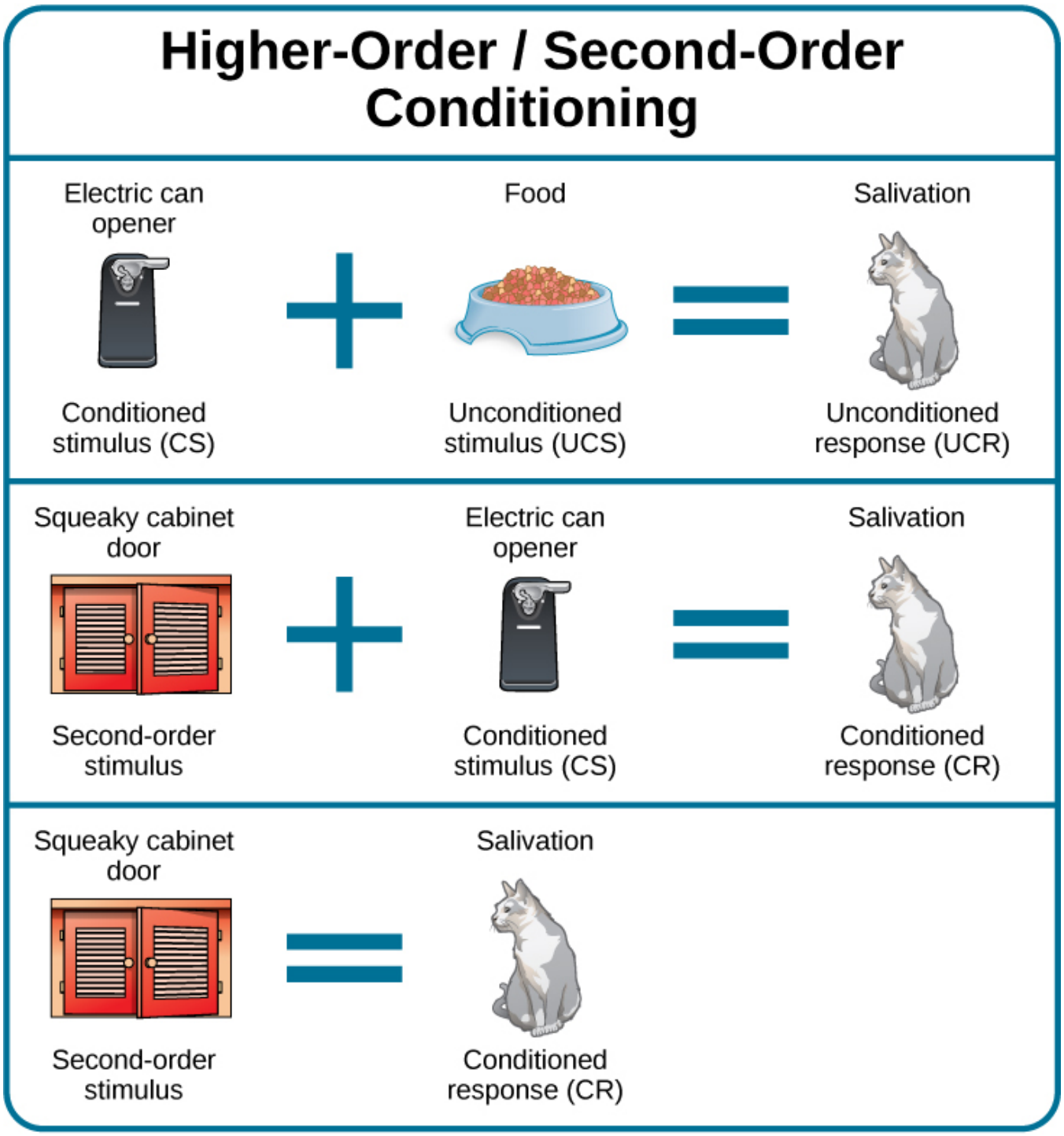

Figure LE.5. Higher-order/Second-order conditioning. *In higher-order conditioning, an established conditioned stimulus is paired with a new neutral stimulus (the second-order stimulus), so that eventually the new stimulus also elicits the conditioned response, without the initial conditioned stimulus being presented.* ***Alt. text:*** *Diagram labeled "Higher-Order / Second-Order Conditioning" with three rows. First: can opener (conditioned stimulus) plus food (unconditioned stimulus) equals a salivating cat (unconditioned response). Second: squeaky cabinet door (second-order stimulus) plus can opener equals a salivating cat (conditioned response). Third: squeaky cabinet door alone equals a salivating cat (conditioned response).* ***Source:*** *Figure 6.5 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Now consider the case of Farah, who was diagnosed with cancer. When Farah received their first chemotherapy treatment, they vomited shortly after the chemicals were injected. In fact, on every trip to the doctor for chemotherapy treatment, shortly after the drugs were injected, Farah vomited. Farah's treatment was a success and their cancer went into remission. Now, when Farah visits their oncologist's office every 6 months for a check-up, they become nauseous. In this case, the chemotherapy drugs are the unconditioned stimulus (US), vomiting is the unconditioned response (UCR), the doctor's office is the conditioned stimulus (CS) after being paired with the US, and nausea is the conditioned response (CR). Let's assume that the chemotherapy drugs that Farah takes are given through a syringe injection. After entering the doctor's office, Farah sees a syringe, and then gets their medication. In addition to the doctor's office, Farah will learn to associate the syringe with the medication and will respond to syringes with nausea. This is an example of higher-order (or second-order) conditioning, when the conditioned stimulus (the doctor's office) serves to condition another stimulus (the syringe). Because it is hard to achieve anything above second-order conditioning, if someone rang a bell, for example, every time Farah received a syringe injection of chemotherapy drugs in the doctor's office, Farah likely would not get sick in response to the bell.

Classical conditioning even applies to babies. For example, Logan buys formula in blue canisters for their six-month-old baby, Reagan. Whenever Logan takes out a formula container, Reagan gets excited, tries to reach toward the food, and most likely salivates. Why does Reagan get excited when they see the formula canister? What are the US, CS, UCR, and CR here?

So far, all of the examples have involved food, but classical conditioning extends beyond the basic need to be fed. Consider our earlier example of a dog whose owners install an invisible electric dog fence. A small electrical shock (unconditioned stimulus) elicits discomfort (unconditioned response). When the unconditioned stimulus (shock) is paired with a neutral stimulus (the edge of a yard), the dog associates the discomfort (unconditioned response) with the edge of the yard (conditioned stimulus) and stays within the set boundaries. In this example, the edge of the yard elicits fear and anxiety in the dog. Fear and anxiety are the conditioned response.

Everyday Connection: Classical Conditioning at Stingray City

Kate and her spouse recently vacationed in the Cayman Islands, and booked a boat tour to Stingray City, where they could feed and swim with the southern stingrays. The boat captain explained how the normally solitary stingrays have become accustomed to interacting with humans. About 40 years ago, fishermen began to clean fish and conch (unconditioned stimulus) at a particular sandbar near a barrier reef, and large numbers of stingrays would swim in to eat (unconditioned response) what the fishermen threw into the water; this continued for years. By the late 1980s, word of the large group of stingrays spread among scuba divers, who then started feeding them by hand. Over time, the southern stingrays in the area were classically conditioned much like Pavlov's dogs. When they hear the sound of a boat engine (neutral stimulus that becomes a conditioned stimulus), they know that they will get to eat (conditioned response).

As soon as they reached Stingray City, over two dozen stingrays surrounded their tour boat. The couple slipped into the water with bags of squid, the stingrays' favourite treat.

The swarm of stingrays bumped and rubbed up against their legs like hungry cats (Figure L.6). Kate was able to feed, pet, and even kiss (for luck) these amazing creatures. Then all the squid was gone, and so were the stingrays.



Figure LE.6. Classical conditioning. *Kate holds a southern stingray at Stingray City in the Cayman Islands. These stingrays have been classically conditioned to associate the sound of a boat motor with food provided by tourists.* ***Alt. text:*** *A photograph shows a woman standing in the ocean holding a stingray.* ***Source:*** *Figure 6.6 as found in* ***Psychology 2e by OpenStax*** *is licensed under a* ***CC BY 4.0 Licence****.*

General Processes in Classical Conditioning

Acquisition

Now that you know how classical conditioning works and have seen several examples, let's take a look at some of the general processes involved. In classical conditioning, the initial period of learning is known as **acquisition**, when an organism learns to connect a neutral stimulus and an unconditioned stimulus. During acquisition, the neutral stimulus begins to elicit the conditioned response, and eventually the neutral stimulus becomes a conditioned stimulus capable of eliciting the conditioned response by itself. Timing is important for conditioning to occur. Typically, there should be only a brief interval between presentation of the conditioned stimulus and the unconditioned stimulus. Depending on what is being conditioned, sometimes this interval is as little as five seconds (Chance, 2009). However, with other types of conditioning, the interval can be up to several hours.

Taste aversion is a type of conditioning in which an interval of several hours may pass between the conditioned stimulus (something ingested) and the unconditioned stimulus (nausea or illness). Here's how it works. Between classes, you and a friend grab a quick lunch from a food cart on campus. You share a dish of chicken curry and head off to your next class. A few hours later, you feel nauseous and become ill. Although your friend is fine and you determine that you have intestinal flu (the food is not the culprit), you've developed a taste aversion; the next time you are at a restaurant and someone orders curry, you immediately feel ill. While the chicken dish is not what made you sick, you are experiencing taste aversion: you've been conditioned to be averse to a food after a single, bad experience.

How does conditioning occur based on a single instance and involving an extended time lapse between the event and the negative stimulus? Research into taste aversion suggests that this response may be an evolutionary adaptation designed to help organisms quickly learn to avoid harmful foods (Garcia & Rusiniak, 1980; Garcia & Koelling, 1966). Not only may this contribute to species survival via natural selection, but it may also help us develop strategies for challenges, such as helping cancer patients through the nausea induced by certain treatments (Holmes, 1993; Jacobsen et al., 1993; Hutton, Baracos, & Wismer, 2007; Skolin et al., 2006). But why would a person develop an aversion to the taste or smell of a food rather than to all the other stimuli that accompanied the food? Why not the cutlery or the music that was playing at the time?

Garcia and Koelling (1966) showed not only that taste aversions could be conditioned, but also that there were biological constraints to learning. In their study, separate groups of rats were conditioned to associate either a flavour with illness, or lights and sounds with illness. Results showed that all rats exposed to flavour-illness pairings learned to avoid the flavour, but none of the rats exposed to lights and sounds with illness learned to avoid

lights or sounds. This added evidence to the idea that classical conditioning could contribute to species survival by helping organisms learn to avoid stimuli that posed real dangers to health and welfare.

Robert Rescorla demonstrated how powerfully an organism can learn to predict the US from the CS. Take, for example, the following two situations. Tafadawa's family always has dinner on the table every day at 6:00. Hai's family switches it up so that some days they eat dinner at 6:00, some days they eat at 5:00, and other days they eat at 7:00. For Tafadawa, 6:00 reliably and consistently predicts dinner, so Tafadawa will likely start feeling hungry every day right before 6:00, even if he's had a late snack. Hai, on the other hand, will be less likely to associate 6:00 with dinner, since 6:00 does not always predict that dinner is coming. Rescorla, along with his colleague at Yale University, Alan Wagner, developed a mathematical formula that could be used to calculate the probability that an association would be learned given the ability of a conditioned stimulus to predict the occurrence of an unconditioned stimulus and other factors; today this is known as the Rescorla-Wagner model (Rescorla & Wagner, 1972). We also know that conditioning can be unrelated to food. It can also trigger an emotional response, rather than a physical one. For example, if an experimenter sounds a tone just before applying a mild shock to a rat's feet, the tone will elicit fear or anxiety after one or two pairings. Similar **fear conditioning** plays a role in creating many anxiety disorders in humans, such as phobias and panic disorders, where people associate cues (such as closed spaces, or a shopping mall) with panic or other emotional trauma. Here, rather than a physical response (like drooling), the CS triggers an emotion.

Extinction

Once we have established the connection between the unconditioned stimulus and the conditioned stimulus, how do we break that connection and get the dog, cat, or child to stop responding? In Zelda's case, imagine what would happen if you stopped using the electric can opener for her food and began to use it only for human food. Now, Zelda would hear the can opener, but she would not get food. In classical conditioning terms, you would be giving the conditioned stimulus, but not the unconditioned stimulus. Pavlov explored this scenario in his experiments with dogs: sounding the tone without giving the dogs the meat powder. Soon the dogs stopped responding to the tone. **Extinction** is the decrease in the conditioned response when the unconditioned stimulus is no longer presented with the conditioned stimulus. When presented with the conditioned stimulus alone, the dog, cat, or other organism would show a weaker and weaker response, and finally no response. In classical conditioning terms, there is a gradual weakening and disappearance of the conditioned response.

What happens when learning is not used for a while—when what was learned lies dormant? As we just discussed, Pavlov found that when he repeatedly presented the bell (conditioned stimulus) without the meat powder (unconditioned stimulus), extinction occurred; the dogs stopped salivating to the bell. However, after a couple of hours of resting from this extinction training, the dogs again began to salivate when Pavlov rang the bell. What do you think would happen with Zelda's behaviour if your electric can opener broke, and you did not use it for several months? When you finally got it fixed and started using it to open Zelda's food again, Zelda would remember the association between the can opener and food—she would get excited and run to the kitchen when she heard the sound. The behaviour of Pavlov's dogs and Zelda illustrates a concept Pavlov called **spontaneous recovery**: the return of a previously extinguished conditioned response following a rest period (Figure L.7).

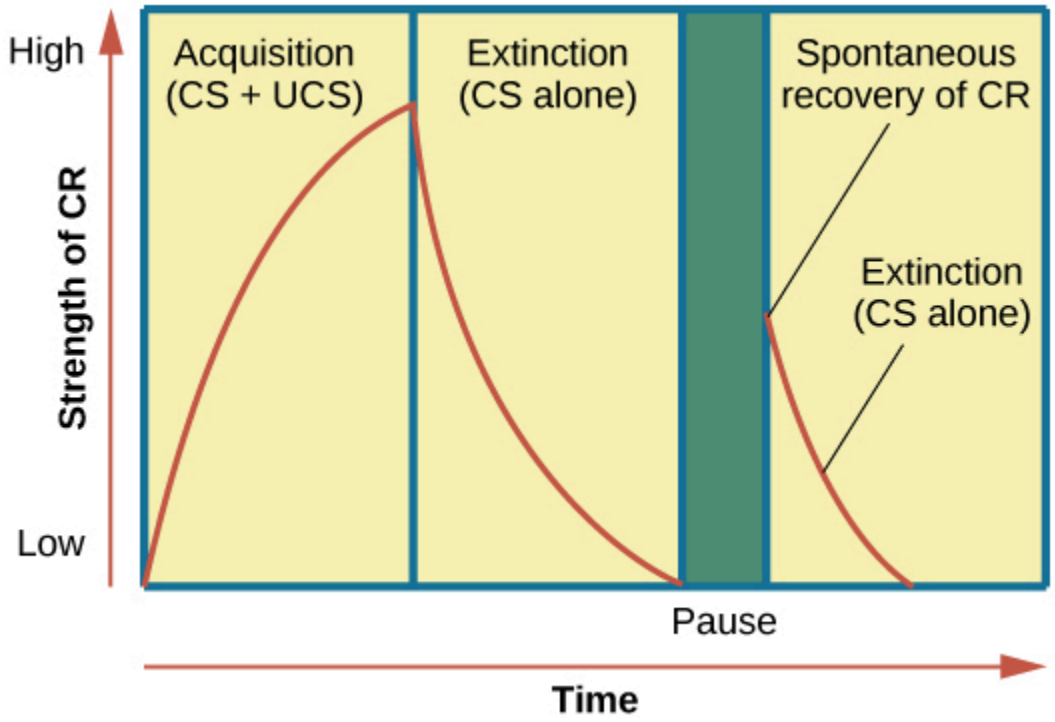

Figure LE.7. Curve of acquisition, extinction and spontaneous recovery. *This is the curve of acquisition, extinction, and spontaneous recovery. The rising curve shows the conditioned response quickly getting stronger through the repeated pairing of the conditioned stimulus and the unconditioned stimulus (acquisition). Then the curve decreases, which shows how the conditioned response weakens when only the conditioned stimulus is presented (extinction). After a break or pause from conditioning, the conditioned response reappears (spontaneous recovery).* ***Alt. text:*** *A chart has an x-axis labeled "time" and a y-axis labeled "strength of CR;" there are four columns of graphed data. The first column is labeled "acquisition (CS + UCS) and the line rises steeply from the bottom to the top. The second column is labeled "Extinction (CS alone)" and the line drops rapidly from the top to the bottom. The third column is labeled "Pause" and has no line. The fourth column has a line that begins midway and drops sharply to the bottom. At the point where the line begins, it is labeled "Spontaneous recovery of CR"; the halfway point on the line is labeled "Extinction (CS alone)."* ***Source:*** *Figure 6.7 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Of course, these processes also apply in humans. For example, let's say that every day when you walk to campus, an ice cream truck passes your route. Day after day, you hear the truck's music (neutral stimulus), so you finally stop and purchase a chocolate ice cream bar. You take a bite (unconditioned stimulus) and then your mouth waters (unconditioned response). This initial period of learning is known as acquisition, when you begin to connect the neutral stimulus (the sound of the truck) and the unconditioned stimulus (the taste of the chocolate ice cream in your mouth). During acquisition, the conditioned response gets stronger and stronger through repeated pairings of the conditioned stimulus and unconditioned stimulus. Several days (and ice cream bars) later, you notice that your mouth begins to water (conditioned response) as soon as you hear the truck's musical jingle—even before you bite into the ice cream bar. Then one day you head down the street. You hear the truck's music (conditioned stimulus), and your mouth waters (conditioned response). However, when you get to the truck, you discover that they are all out of ice cream. You leave disappointed. The next few days you pass by the truck and hear the music, but don't stop to get an ice cream bar because you're running late for class. You begin to salivate less and less when you hear the music, until by the end of the week, your mouth no longer waters when you hear the tune. This illustrates extinction. The conditioned response weakens when only the conditioned stimulus (the sound of the truck) is presented, without being followed by the unconditioned stimulus (chocolate ice cream in the mouth). Then the weekend comes. You don't have to go to class, so you don't pass the truck. Monday morning arrives and you take your usual route to campus. You round the corner and hear the truck again. What do you think happens? Your mouth begins to water again. Why? After a break from conditioning, the conditioned response reappears, which indicates spontaneous recovery.

Acquisition and extinction involve the strengthening and weakening, respectively, of a learned association. Two other learning processes—**stimulus discrimination** and stimulus generalisation—are involved in determining which stimuli will trigger learned responses. Animals (including humans) need to distinguish between stimuli—for example, between sounds that predict a threatening event and sounds that do not—so that they can respond appropriately (such as running away if the sound is threatening). When an organism learns to respond differently to various stimuli that are similar, it is called stimulus discrimination. In classical conditioning terms, the organism demonstrates the conditioned response only to the conditioned stimulus. Pavlov's dogs discriminated between the basic tone that sounded before they were fed and other tones (e.g., the doorbell) because the other sounds did not predict the arrival of food. Similarly, Zelda, the cat, discriminated between the sound of the can opener and the sound of the electric mixer. When the electric mixer is going, Zelda is not about to be fed, so she does not come running to the kitchen looking for food. In our other example, Farah, the cancer patient, discriminated between oncologists and other types of doctors. Farah learned not to feel ill when visiting doctors for other types of appointments, such as their annual physical.

On the other hand, when an organism demonstrates the conditioned response to stimuli that are similar to the condition stimulus, it is called **stimulus generalisation**, the opposite of stimulus discrimination. The more similar a stimulus is to the condition stimulus, the more likely the organism is to give the conditioned response. For instance, if the electric mixer sounds very similar to the electric can opener, Zelda may come running after hearing its sound. But if you do not feed Zelda following the electric mixer sound, and you continue to feed her consistently after the electric can opener sound, Zelda will quickly learn to discriminate between the two sounds (provided they are sufficiently dissimilar that she can tell them apart). In our other example, Farah continued to feel ill whenever visiting other oncologists or other doctors in the same building as their oncologist.

Behaviourism

John B. Watson, shown in Figure L.8, is considered the founder of behaviourism. Behaviourism is a school of thought that arose during the first part of the 20th century, incorporating elements of Pavlov's classical conditioning (Hunt, 2007). In many ways, behaviourism arose as a response to what many saw as the unscientific, even mystical direction that psychology was taking in the early 20th century. Psychoanalysis postulated quite a few unfalsifiable and unquantifiable entities such as the unconscious, impulses, the ego, and the id, among others. Psychologists were being presented with conclusions from case studies done by Freud and his colleagues as evidence but there was no way to replicate those findings. In stark contrast with Freud, who considered the reasons for behaviour to be hidden in the unconscious, Watson championed the idea that all behaviour can be studied as a simple stimulus-response reaction, without regard for internal processes. Such processes were observable and measurable. The experiments could be replicated by other psychologists to test whether the postulates were universal. Watson argued that, in order for psychology to become a legitimate science, it must shift its concern away from internal mental processes because mental processes cannot be seen or measured. Instead, he asserted that psychology must focus on outward observable behaviour that can be measured.



Figure LE.8. John B. Watson. *John B. Watson used the principles of classical conditioning in the study of human emotion.* ***Alt. text:*** *A photograph shows John B. Watson.* ***Source:*** *"John B. Watson" from the Johns Hopkins Gazette is in the Public Domain.*

Watson's ideas were influenced by Pavlov's work. According to Watson, human behaviour, just like animal behaviour, is primarily the result of conditioned responses. Whereas Pavlov's work with dogs involved the conditioning of reflexes, Watson believed the same principles could be extended to the conditioning of human emotions (Watson, 1919). Thus began Watson's work with his graduate student Rosalie Rayner and a baby called Little Albert. Through their experiments with Little Albert, Watson and Rayner (1920) demonstrated how fears can be conditioned.

In 1920, Watson was the chair of the psychology department at Johns Hopkins University. Through his position at the university he came to meet Little Albert's mother, Arvilla Merritte, who worked at a campus hospital (DeAngelis, 2010). Watson offered her a dollar to allow her son to be the subject of his experiments in classical conditioning. Through these experiments, Little Albert was exposed to and conditioned to fear certain things. Initially he was presented with various neutral stimuli, including a rabbit, a dog, a monkey, masks, cotton wool, and a white rat. He was not afraid of any of these things. Then Watson, with the help of Rayner, conditioned Little Albert to associate these stimuli with an emotion—fear. For example, Watson handed Little Albert the white rat, and Little Albert enjoyed playing with it.

Then Watson made a loud sound, by striking a hammer against a metal bar hanging behind Little Albert's head, each time Little Albert touched the rat. Little Albert was frightened by the sound—demonstrating a reflexive fear of sudden loud noises—and began to cry. Watson repeatedly paired the loud sound with the white rat. Soon Little Albert became frightened by the white rat alone. In this case, what are the US, CS, UCR, and CR? Days later, Little Albert demonstrated stimulus generalisation—he became afraid of other furry things: a rabbit, a furry coat, and even a Santa Claus mask (Figure LE.9). Watson had succeeded in conditioning a fear response in Little Albert, thus demonstrating that emotions could become conditioned responses. It had been Watson's intention to produce a phobia—a persistent, excessive fear of a specific object or situation— through conditioning alone, thus countering Freud's view that phobias are caused by deep, hidden conflicts in the mind. However, there is no evidence that Little Albert experienced phobias in later years. Little Albert's mother moved away, ending the experiment. While Watson's research provided new insight into conditioning, it would be considered unethical by today's standards.



Figure LE.9. Little Albert. *Through stimulus generalisation, Little Albert came to fear furry things, including Watson in a Santa Claus mask.* ***Alt. text:*** *A photograph shows a man wearing a mask with a white beard; his face is close to a baby who is crawling away. A caption reads, "Now he fears even Santa Claus."* ***Source:*** *"Little Albert" from the Akron Psychology Archives is in the Public Domain.*

View scenes from this video on John Watson's experiment in which "Little Albert" was conditioned to respond in fear to furry objects, to learn more.

Watch this video: **Baby Albert Experiments (3.5 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=823#oembed-2***

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Operant Conditioning

DINESH RAMOO

The previous section of this chapter focused on the type of associative learning known as classical conditioning. Remember that in classical conditioning, something in the environment triggers a reflex automatically, and researchers train the organism to react to a different stimulus. Now we turn to the second type of associative learning, **operant conditioning.** In operant conditioning, organisms learn to associate a behaviour and its consequence (Table LE.1). A pleasant consequence makes that behaviour more likely to be repeated in the future. For example, Spirit, a dolphin at the National Aquarium in Baltimore, does a flip in the air when Spirit's trainer blows a whistle. The consequence is that Spirit gets a fish.

Table LE.1. Classical and operant conditioning compared

	Classical Conditioning	Operant Conditioning
Conditioning approach	An unconditioned stimulus (such as food) is paired with a neutral stimulus (such as a bell). The neutral stimulus eventually becomes the conditioned stimulus, which brings about the conditioned response (salivation).	The target behaviour is followed by reinforcement or punishment to either strengthen or weaken it, so that the learner is more likely to exhibit the desired behaviour in the future.
Stimulus timing	The stimulus occurs immediately before the response.	The stimulus (either reinforcement or punishment) occurs soon after the response.

Psychologist B. F. Skinner saw that classical conditioning is limited to existing behaviours that are reflexively elicited, and it doesn't account for new behaviours such as riding a bike. He proposed a theory about how such behaviours come about. Skinner believed that behaviour is motivated by the consequences we receive for the behaviour: the reinforcements and punishments. His idea that learning is the result of consequences is based on the law of effect, which was first proposed by psychologist Edward Thorndike. He worked with puzzle boxes within which he put street cats. The cats were incentivised to escape the boxes with food incentives. However, in order to escape the boxes, the cats had to do a series of moves like pulling a level and touching a button. Thorndike found that behaviours that led to escape increased with time but the cats did not get an insight that led to repeating the behaviours without errors (the number of errors just went down with each repetition). Thorndike called this the Law of Effect. According to the **law of effect**, behaviours that are followed by consequences that are satisfying to the organism are more likely to be repeated, and behaviours that are followed by unpleasant consequences are less likely to be repeated (Thorndike, 1911). Essentially, if an organism does something that brings about a

desired result, the organism is more likely to do it again. If an organism does something that does not bring about a desired result, the organism is less likely to do it again. An example of the law of effect is in employment. One of the reasons (and often the main reason) we show up for work is because we get paid to do so. If we stop getting paid, we will likely stop showing up—even if we love our job.

Working with Thorndike's law of effect as his foundation, Skinner began conducting scientific experiments on animals (mainly rats and pigeons) to determine how organisms learn through operant conditioning (Skinner, 1938). He placed these animals inside an operant conditioning chamber, which has come to be known as a "Skinner box" (Figure LE.10). A Skinner box contains a lever (for rats) or disk (for pigeons) that the animal can press or peck for a food reward via the dispenser. Speakers and lights can be associated with certain behaviours. A recorder counts the number of responses made by the animal.

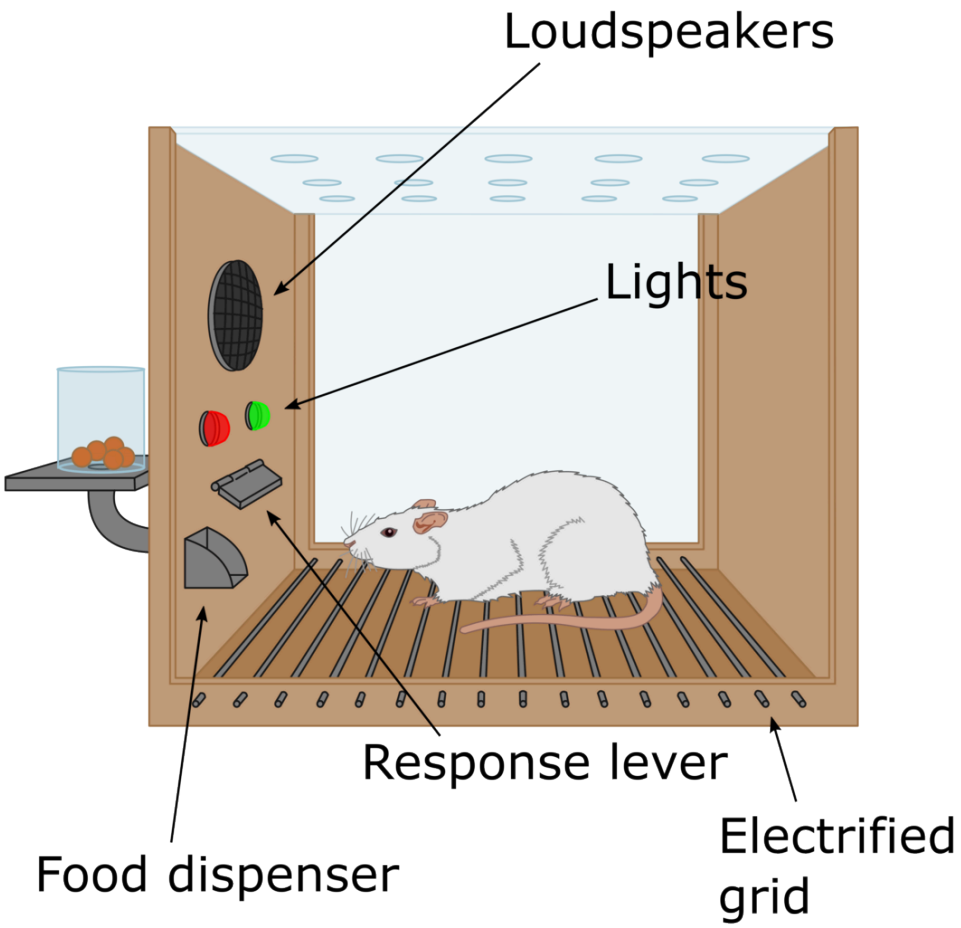

Figure LE.10. Operant Conditioning. *(a) B. F. Skinner developed operant conditioning for systematic study of how behaviours are strengthened or weakened according to their consequences. (b) In a Skinner box, a rat presses a lever in an operant conditioning chamber to receive a food reward.* ***Alt. text:*** *Diagram of a Skinner box with a rat inside. The box includes a speaker, red and green lights, a lever, a food dispenser on the side, and a grid floor.* ***Source:*** *Figure 6.10 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modifications of the following works: B.F. Skinner at Harvard circa 1950 (cropped) by Silly rabbit is licensed under a CC BY 3.0 Unported Licence.*

In discussing operant conditioning, we use several everyday words—positive, negative, reinforcement, and punishment—in a specialised manner. In operant conditioning, positive and negative do not mean good and bad. Instead, *positive* means you are adding something, and *negative* means you are taking something away. *Reinforcement* means you are increasing a behaviour, and *punishment* means you are decreasing a behaviour. Reinforcement can be positive or negative, and punishment can also be positive or negative. All reinforcers (positive or negative) *increase* the likelihood of a behavioural response. All punishers (positive or

negative) *decrease* the likelihood of a behavioural response. Now let's combine these four terms: positive reinforcement, negative reinforcement, positive punishment, and negative punishment (Table LE.2).

Table LE.2. Positive and negative reinforcement and punishment

	Reinforcement	**Punishment**
Positive	Something is *added* to *increase* the likelihood of a behaviour.	Something is *added* to *decrease* the likelihood of a behaviour.
Negative	Something is *removed* to *increase* the likelihood of a behaviour.	Something is *removed* to *decrease* the likelihood of a behaviour.

Reinforcement

The most effective way to teach a person or animal a new behaviour is with positive reinforcement. In **positive reinforcement**, a desirable stimulus is added to increase a behaviour.

For example, you tell your five-year-old child, Karson, that if they clean their room, they will get a toy. Karson quickly cleans their room because they want a new art set. Let's pause for a moment. Some people might say, "Why should I reward my child for doing what is expected?" But in fact we are constantly and consistently rewarded in our lives. Our pay cheques are rewards, as are high grades and acceptance into our preferred school. Being praised for doing a good job and for passing a driver's test is also a reward. Positive reinforcement as a learning tool is extremely effective. It has been found that one of the most effective ways to increase achievement in school districts with below-average reading scores was to pay the children to read. Specifically, second-grade students in Dallas were paid $2 each time they read a book and passed a short quiz about the book. The result was a significant increase in reading comprehension (Fryer, 2010). What do you think about this program? If Skinner were alive today, he would probably think this was a great idea. He was a strong proponent of using operant conditioning principles to influence students' behaviour at school. In fact, in addition to the Skinner box, he also invented what he called a teaching machine that was designed to reward small steps in learning (Skinner, 1961)—an early forerunner of computer-assisted learning. His teaching machine tested students' knowledge as they worked through various school subjects. If students answered questions correctly, they received immediate positive reinforcement and could continue; if they answered incorrectly, they did not receive any reinforcement. The idea was that students would spend additional time studying the material to increase their chance of being reinforced the next time (Skinner, 1961).

In **negative reinforcement**, an undesirable stimulus is removed to increase a behaviour. For example, car manufacturers use the principles of negative reinforcement in their seatbelt systems, which go "beep, beep, beep" until you fasten your seatbelt. The annoying sound stops when you exhibit the desired behaviour, increasing the likelihood that you will buckle up in the future. Negative reinforcement is also used frequently in horse training. Riders apply pressure—by pulling the reins or squeezing their legs—and then remove the pressure when the horse performs the desired behaviour, such as turning or speeding up. The pressure is the negative stimulus that the horse wants to remove.

Punishment

Many people confuse negative reinforcement with punishment in operant conditioning, but they are two very different mechanisms. Remember that reinforcement, even when it is negative, always increases a behaviour. In contrast, **punishment** always decreases a behaviour. In **positive punishment**, you add an undesirable stimulus to decrease a behaviour. An example of positive punishment is scolding a student to get the student to stop texting in class. In this case, a stimulus (the reprimand) is added in order to decrease the behaviour (texting in class). In **negative punishment**, you remove a pleasant stimulus to decrease behaviour. For example, when a child misbehaves, a parent can take away a favourite toy. In this case, a stimulus (the toy) is removed in order to decrease the behaviour.

Punishment, especially when it is immediate, is one way to decrease undesirable behaviour. For example, imagine that your four-year-old, Sasha, hit another child. You have Sasha write 100 times "I will not hit other children" (positive punishment). Chances are Sasha won't repeat this behaviour. While strategies like this are common today, in the past children were often subject to physical punishment, such as spanking. It's important to be aware of some of the drawbacks in using physical punishment on children. First, punishment may teach fear. Sasha may become fearful of the street, but Sasha also may become fearful of the person who delivered the punishment—you, the parent. Similarly, children who are punished by teachers may come to fear the teacher and try to avoid school (Gershoff et al., 2010). Consequently, most schools in the United States have banned corporal punishment. Second, punishment may cause children to become more aggressive and prone to antisocial behaviour and delinquency (Gershoff, 2002). They see their parents resort to spanking when they become angry and frustrated, so, in turn, they may act out this same behaviour when they become angry and frustrated. For example, because you spank Sasha when you are angry with them for misbehaving, Sasha might start hitting their friends when they won't share their toys.

While positive punishment can be effective in some cases, Skinner suggested that the use of punishment should be weighed against the possible negative effects. Today's psychologists and parenting experts favour reinforcement over punishment—they recommend that you catch your child doing something good and reward them for it.

Shaping

In his operant conditioning experiments, Skinner often used an approach called shaping. Instead of rewarding only the target behaviour, in **shaping,** we reward successive approximations of a target behaviour. Why is shaping needed? Remember that in order for reinforcement to work, the organism must first display the behaviour. Shaping is needed because it is extremely unlikely that an organism will display anything but the simplest of behaviours spontaneously. In shaping, behaviours are broken down into many small, achievable steps. The specific steps used in the process are the following:

1. Reinforce any response that resembles the desired behaviour.
2. Then reinforce the response that more closely resembles the desired behaviour. You will no longer reinforce the previously reinforced response.
3. Next, begin to reinforce the response that even more closely resembles the desired behaviour.
4. Continue to reinforce closer and closer approximations of the desired behaviour.
5. Finally, only reinforce the desired behaviour.

Shaping is often used in teaching a complex behaviour or chain of behaviours. Skinner used shaping to teach pigeons not only such relatively simple behaviours as pecking a disk in a Skinner box, but also many unusual and entertaining behaviours, such as turning in circles, walking in figure eights, and even playing ping pong; the technique is commonly used by animal trainers today. An important part of shaping is stimulus discrimination. Recall Pavlov's dogs; he trained them to respond to the tone of a bell, and not to similar tones or sounds. This discrimination is also important in operant conditioning and in shaping behaviour. Watch this video of Skinner's pigeons playing ping pong to learn more.

Watch this video: **BF Skinner Foundation – Pigeon Ping Pong Clip (1 minute)**

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"BF Skinner Foundation – Pigeon Ping Pong Clip" video by bfskinnerfoundation is licensed under the Standard YouTube Licence.

It's easy to see how shaping is effective in teaching behaviours to animals, but how does shaping work with humans? Let's consider a parent whose goal is to have their child learn to clean their room. The parent uses shaping to help the child master steps toward the goal. Instead of performing the entire task, they set up these steps and reinforce each step. First, the child cleans up one toy. Second, the child cleans up five toys. Third, the child chooses whether to pick up ten toys or put their books and clothes away. Fourth, the child cleans up everything except two toys. Finally, the child cleans their entire room.

Primary and Secondary Reinforcers

Rewards such as stickers, praise, money, toys, and more can be used to reinforce learning. Let's go back to Skinner's rats again. How did the rats learn to press the lever in the Skinner box? They were rewarded with food each time they pressed the lever. For animals, food would be an obvious reinforcer.

What would be a good reinforcer for humans? For your child Karson, it was the promise of a toy when they cleaned their room. How about Sydney, the soccer player? If you gave Sydney a piece of candy every time Sydney scored a goal, you would be using a **primary reinforcer.** Primary reinforcers are reinforcers that have innate reinforcing qualities. These kinds of reinforcers are not learned. Water, food, sleep, shelter, sex, and touch, among others, are primary reinforcers. Pleasure is also a primary reinforcer. Organisms do not lose their drive for these things. For most people, jumping in a cool lake on a very hot day would be reinforcing and the cool lake would be innately reinforcing; the water would cool the person off (a physical need), as well as provide pleasure.

A **secondary reinforcer** has no inherent value and only has reinforcing qualities when linked with a primary reinforcer. Praise, linked to affection, is one example of a secondary reinforcer, as when you called out "Great shot!" every time Sydney made a goal. Another example, money, is only worth something when you can use it to buy other things—either things that satisfy basic needs (food, water, shelter—all primary reinforcers) or other secondary reinforcers. If you were on a remote island in the middle of the Pacific Ocean and you had stacks of money, the money would not be useful if you could not spend it. What about the stickers on the behaviour chart? They also are secondary reinforcers.

Sometimes, instead of stickers on a sticker chart, a token is used. Tokens, which are also secondary reinforcers, can then be traded in for rewards and prizes. Entire behaviour management systems, known as token economies, are built around the use of these kinds of token reinforcers. Token economies have been found to be very effective at modifying

behaviour in a variety of settings such as schools, prisons, and mental hospitals. For example, a study by Cangi and Daly (2013) found that use of a token economy increased appropriate social behaviours and reduced inappropriate behaviours in a group of autistic school children. Autistic children tend to exhibit disruptive behaviours such as pinching and hitting. When the children in the study exhibited appropriate behaviour (not hitting or pinching), they received a "quiet hands" token. When they hit or pinched, they lost a token. The children could then exchange specified amounts of tokens for minutes of playtime.

Everyday Connection: Behaviour Modification in Children

Parents and teachers often use behaviour modification to change a child's behaviour. Behaviour modification uses the principles of operant conditioning to accomplish behaviour change so that undesirable behaviours are switched for more socially acceptable ones. Some teachers and parents create a sticker chart, in which several behaviours are listed (Figure L.11). Sticker charts are a form of token economies, as described in the text. Each time children perform the behaviour, they get a sticker, and after a certain number of stickers, they get a prize, or reinforcer. The goal is to increase acceptable behaviours and decrease misbehaviour.

Remember, it is best to reinforce desired behaviours, rather than to use punishment. In the classroom, the teacher can reinforce a wide range of behaviours, from students raising their hands, to walking quietly in the hall, to turning in their homework. At home, parents might create a behaviour chart that rewards children for things such as putting away toys, brushing their teeth, and helping with dinner. In order for behaviour modification to be effective, the reinforcement needs to be connected with the behaviour; the reinforcement must matter to the child and be done consistently.



Figure LE.11. Positive reinforcement. *Sticker charts are a form of positive reinforcement and a tool for behaviour modification. Once this child earns a certain number of stickers for demonstrating a desired behaviour, she will be rewarded with a trip to the ice cream parlour.* ***Alt. text:*** *A child placing stickers on a chart hanging on the wall.* ***Source:*** ***"Sticker chart"*** *by* ***Abigail Batchelder*** *is licensed under a* ***CC BY 2.0 Licence****.*

Time-out is another popular technique used in behaviour modification with children. It operates on the principle of negative punishment. When a child demonstrates an undesirable behaviour, they are removed from the desirable activity at hand (Figure LE.12). For example, say that Paton and their sibling Bennet are playing with building blocks. Paton throws some blocks at Bennet, so you give Paton a warning that they will go to time-out if they do it again. A few minutes later, Paton throws more blocks at Bennet. You remove Paton from the room for a few minutes. When Paton comes back, they don't throw blocks.

There are several important points that you should know if you plan to implement time-out as a behaviour modification technique. First, make sure the child is being removed from a desirable activity and placed in a less desirable location. If the activity is something undesirable for the child, this tech-

nique will backfire because it is more enjoyable for the child to be removed from the activity. Second, the length of the time-out is important. The general rule of thumb is one minute for each year of the child's age. Paton is five; therefore, they sit in a time-out for five minutes. Setting a timer helps children know how long they have to sit in time-out. Finally, as a caregiver, keep several guidelines in mind over the course of a time-out: remain calm when directing your child to time-out; ignore your child during time-out (because caregiver attention may reinforce misbehaviour); and give the child a hug or a kind word when time-out is over.





Figure LE.12. Behaviour modification. *Time-out is a popular form of negative punishment used by caregivers. When a child misbehaves, they are removed from a desirable activity in an effort to decrease the unwanted behaviour. For example, (a) a child might be playing on the playground with friends and push another child; (b) the child who misbehaved would then be removed from the activity for a short period of time.* ***Alt. text:*** *a) kids on test climb rock (b) boy in black t-shirt and blue denim jeans sitting on concrete bench.* ***Source:*** *(a)* ***"Kids on test climb rock"*** *by* ***Rachel*** *is licensed under an* ***Unsplash Licence****, (b)* ***"boy sitting on concrete bench"*** *by* ***Kelly Sikkema*** *is licensed under an* ***Unsplash Licence****.*

Reinforcement Schedules

Remember, the best way to teach a person or animal a behaviour is to use positive reinforcement. For example, Skinner used positive reinforcement to teach rats to press a lever in a Skinner box. At first, the rat might randomly hit the lever while exploring the box, and out would come a pellet of food. After eating the pellet, what do you think the hungry rat did next? It hit the lever again, and received another pellet of food. Each time the rat hit the lever, a pellet of food came out. When an organism receives a reinforcer each time it displays a behaviour, it is called **continuous reinforcement.** This reinforcement schedule is the quickest way to teach someone a behaviour, and it is especially effective in training a new behaviour. Let's look back at the dog that was learning to sit earlier in the chapter. Now, each

time the dog sits, you give the dog a treat. Timing is important here: you will be most successful if you present the reinforcer immediately after the dog sits, so that the dog can make an association between the target behaviour (sitting) and the consequence (getting a treat).

Once a behaviour is trained, researchers and trainers often turn to another type of reinforcement schedule—**partial reinforcement.** In partial reinforcement, also referred to as intermittent reinforcement, the person or animal does not get reinforced every time they perform the desired behaviour. There are several different types of partial reinforcement schedules (Table LE.3). These schedules are described as either fixed or variable, and as either interval or ratio. *Fixed* refers to the number of responses between reinforcements, or the amount of time between reinforcements, which is set and unchanging. *Variable* refers to the number of responses or amount of time between reinforcements, which varies or changes. *Interval* means the schedule is based on the time between reinforcements, and *ratio* means the schedule is based on the number of responses between reinforcements.

Table LE.3. Reinforcement Schedules

Reinforcement Schedule	Description	Result	Example
Fixed Interval	Reinforcement is delivered at predictable time intervals (e.g., after 5, 10, 15, and 20 minutes).	Moderate response rate with significant pauses after reinforcement	Hospital patient uses patient-controlled, doctor-timed pain relief
Variable Interval	Reinforcement is delivered at unpredictable time intervals (e.g., after 5, 7, 10, and 20 minutes).	Moderate yet steady response rate	Checking Instagram for notifications
Fixed Ratio	Reinforcement is delivered after a predictable number of responses (e.g., after 2, 4, 6, and 8 responses).	High response rate with pauses after reinforcement	Piecework—factory worker getting paid for every x number of items manufactured
Variable Ratio	Reinforcement is delivered after an unpredictable number of responses (e.g., after 1, 4, 5, and 9 responses).	High and steady response rate	Gambling

Now let's combine these four terms:

- A **fixed interval reinforcement schedule** is when behaviour is rewarded after a set amount of time. For example, June undergoes major surgery in a hospital. During recovery, June is expected to experience pain and will require prescription medications for pain relief. June is given an IV drip with a patient-controlled painkiller. June's doctor sets a limit: one dose per hour. June pushes a button when pain becomes difficult, and

they receive a dose of medication. Since the reward (pain relief) only occurs on a fixed interval, there is no point in exhibiting the behaviour when it will not be rewarded.

- With a **variable interval reinforcement schedule**, the person or animal gets the reinforcement based on varying amounts of time, which are unpredictable. Say that Tate is the manager at a fast-food restaurant. Every once in a while someone from the quality control division comes to Tate's restaurant. If the restaurant is clean and the service is fast, everyone on that shift earns a $20 bonus. Tate never knows when the quality control person will show up, so they always try to keep the restaurant clean and ensure that their employees provide prompt and courteous service. Tate's productivity regarding prompt service and keeping a clean restaurant are steady because Tate wants their crew to earn the bonus.
- With a **fixed ratio reinforcement schedule**, there are a set number of responses that must occur before the behaviour is rewarded. Reed sells glasses at an eyeglass store, and earns a commission every time they sell a pair of glasses. Reed always tries to sell people more pairs of glasses, including prescription sunglasses or a backup pair, so they can increase their commission. Reed does not care if the person really needs the prescription sunglasses, they just want the bonus. The quality of what Reed sells does not matter because Reed's commission is not based on quality; it's only based on the number of pairs sold. This distinction in the quality of performance can help determine which reinforcement method is most appropriate for a particular situation. Fixed ratios are better suited to optimize the quantity of output, whereas a fixed interval, in which the reward is not quantity based, can lead to a higher quality of output.
- In a **variable ratio reinforcement schedule**, the number of responses needed for a reward varies. This is the most powerful partial reinforcement schedule. An example of the variable ratio reinforcement schedule is gambling. Imagine that Quinn—generally a smart, thrifty person—visits Las Vegas for the first time. Quinn is not a gambler, but out of curiosity they put a quarter into the slot machine, and then another, and another. Nothing happens. Two dollars in quarters later, Quinn's curiosity is fading, and they are just about to quit. But then, the machine lights up, bells go off, and Quinn gets 50 quarters back. That's more like it! Quinn gets back to inserting quarters with renewed interest, and a few minutes later they have used up all the gains and are $10 in the hole. Now might be a sensible time to quit. And yet, Quinn keeps putting money into the slot machine because they never know when the next reinforcement is coming. Quinn keeps thinking that with the next quarter they could win $50, or $100, or even more. Because the reinforcement schedule in most types of gambling has a variable ratio schedule, people keep trying and hoping that the next time they will win big. This is one of the reasons that gambling is so addictive—and so resistant to extinction.

In operant conditioning, extinction of a reinforced behaviour occurs at some point after reinforcement stops, and the speed at which this happens depends on the reinforcement schedule. In a variable ratio schedule, the point of extinction comes very slowly, as described above. But in the other reinforcement schedules, extinction may come quickly. For example, if June presses the button for the pain relief medication before the allotted time their doctor has approved, no medication is administered. June is on a fixed interval reinforcement schedule (dosed hourly), so extinction occurs quickly when reinforcement doesn't come at the expected time. Among the reinforcement schedules, variable ratio is the most productive and the most resistant to extinction. Fixed interval is the least productive and the easiest to extinguish (Figure L.13).

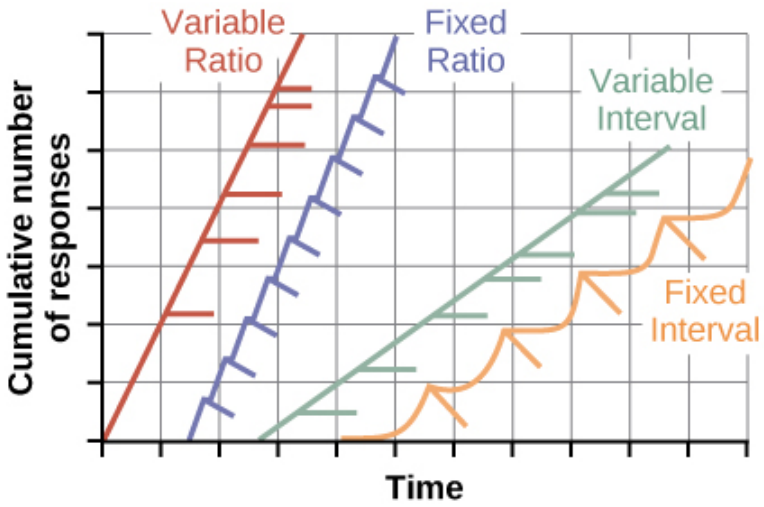

Figure LE.13. Reinforcement schedules. *The four reinforcement schedules yield different response patterns. The variable ratio schedule is unpredictable and yields high and steady response rates, with little if any pause after reinforcement (e.g., gambler). A fixed ratio schedule is predictable and produces a high response rate, with a short pause after reinforcement (e.g., eyeglass saleswoman). The variable interval schedule is unpredictable and produces a moderate, steady response rate (e.g., restaurant manager). The fixed interval schedule yields a scallop-shaped response pattern, reflecting a significant pause after reinforcement (e.g., surgery patient).* ***Alt. text:*** *Graph with time on the x-axis and cumulative responses on the y-axis, comparing reinforcement schedules. Variable ratio and fixed ratio both show steep slopes; variable ratio is steady with random reinforcement points, while fixed ratio has evenly spaced reinforcements with small pauses after each. Variable interval and fixed interval both rise at moderate slopes; variable interval is steady with random reinforcements, while fixed interval shows evenly spaced reinforcements with pauses after each.* ***Source:*** *"Schedule of reinforcement" is in the Public Domain.*

Dig Deeper: Gambling and the Brain

Skinner (1953) stated, "If the gambling establishment cannot persuade a patron to turn over money with no return, it may achieve the same effect by returning part of the patron's money on a variable-ratio schedule" (p. 397).

Skinner uses gambling as an example of the power of the variable-ratio reinforcement schedule for maintaining behaviour even during long periods without any reinforcement. In fact, Skinner was so confident in his knowledge of gambling addiction that he even claimed he could turn a pigeon into a pathological gambler ("Skinner's Utopia," 1971). It is indeed true that variable-ratio schedules keep behaviour quite persistent—just imagine the frequency of a child's tantrums if a parent gives in even once to the behaviour. The occasional reward makes it almost impossible to stop the behaviour.

Recent research in rats has failed to support Skinner's idea that training on variable-ratio schedules alone causes pathological gambling (Laskowski et al., 2019). However, other research suggests that gambling does seem to work on the brain in the same way as most addictive drugs, and so there may be some combination of brain chemistry and reinforcement schedule that could lead to problem gambling (Figure L.14). Specifically, modern research shows the connection between gambling and the activation of the reward centres of the brain that use the neurotransmitter (brain chemical) dopamine (Murch & Clark, 2016).

Interestingly, gamblers don't even have to win to experience the "rush" of dopamine in the brain. "Near misses," or almost winning but not actually winning, also have been shown to increase activity in the ventral striatum and other brain reward centres that use dopamine (Chase & Clark, 2010). These brain effects are almost identical to those produced by addictive drugs like cocaine and heroin (Murch & Clark, 2016). Based on the neuroscientific evidence showing these similarities, the DSM-5 now considers gambling an addiction, while earlier versions of the DSM classified gambling as an impulse control disorder.

In addition to dopamine, gambling also appears to involve other neurotransmitters, including norepinephrine and serotonin (Potenza, 2013).

Norepinephrine is secreted when a person feels stress, arousal, or thrill. It may be that pathological gamblers use gambling to increase their levels of this neurotransmitter. Deficiencies in serotonin might also contribute to compulsive behaviour, including a gambling addiction (Potenza, 2013).



Figure LE.14. Gambling. *Some research suggests that pathological gamblers use gambling to compensate for abnormally low levels of the hormone norepinephrine, which is associated with stress and is secreted in moments of arousal and thrill.* ***Alt. text:*** *Cards and poker chips on a table with a roulette wheel.* ***Source:*** ***"Playing cards on brown wooden table"*** *by* ***Aidan Howe*** *is licensed under an* ***Unsplash Licence****.*

It may be that pathological gamblers' brains are different than those of other people, and perhaps this difference may somehow have led to their gambling addiction, as these studies seem to suggest. However, it is very difficult to ascertain the cause because it is impossible to conduct a true experiment (it would be unethical to try to turn randomly assigned participants into problem gamblers). Therefore, it may be that causation actually moves in the opposite direction—perhaps the act of gambling somehow changes neurotransmitter levels in some gamblers' brains. It also is possible that some overlooked factor, or confounding variable, played a role in both the gambling addiction and the differences in brain chemistry.

Other Types of Learning

John B. Watson and B. F. Skinner were behaviourists who believed that all learning could be explained by the processes of conditioning—that is, that associations, and associations alone, influence learning. But some kinds of learning are very difficult to explain using only conditioning. Thus, although classical and operant conditioning play a key role in learning, they constitute only a part of the total picture. One type of learning that is not determined only by conditioning occurs when we suddenly find the solution to a problem, as if the idea just popped into our head. This type of learning is known as **insight**, the sudden understanding of a solution to a problem. The German psychologist Wolfgang Köhler (1957-1925) carefully observed what happened when he presented chimpanzees with a problem that was not easy for them to solve, such as placing food in an area that was too high in the cage to be

reached. He found that the chimps first engaged in trial-and-error attempts at solving the problem, but when these failed they seemed to stop and contemplate for a while. Then, after this period of contemplation, they would suddenly seem to know how to solve the problem, for instance, by using a stick to knock the food down or by standing on a chair to reach it. Köhler argued that it was this flash of insight, not the prior trial-and-error approaches that were so important for conditioning theories, that allowed the animals to solve the problem.

Strict behaviourists like Watson and Skinner focused exclusively on studying behaviour rather than cognition (such as thoughts and expectations). In fact, Skinner was such a staunch believer that cognition didn't matter that his ideas were considered **radical behaviourism**. Skinner considered the mind a "black box"—something completely unknowable—and, therefore, something not to be studied. However, another behaviourist, Edward C. Tolman, had a different opinion. Tolman's experiments with rats demonstrated that organisms can learn even if they do not receive immediate reinforcement (Tolman & Honzik, 1930; Tolman, Ritchie, & Kalish, 1946). This finding was in conflict with the prevailing idea at the time that reinforcement must be immediate in order for learning to occur, thus suggesting a cognitive aspect to learning.

Edward Tolman studied the behaviour of three groups of rats that were learning to navigate through mazes (Tolman & Honzik, 1930). The first group always received a reward of food at the end of the maze but the second group never received any reward. The third group did not receive any reward for the first 10 days and then began receiving rewards on the 11th day of the experimental period. As you might expect when considering the principles of conditioning, the rats in the first group quickly learned to negotiate the maze, while the rats of the second group seemed to wander aimlessly through it. The rats in the third group, however, although they wandered aimlessly for the first 10 days, quickly learned to navigate to the end of the maze as soon as they received food on day 11. By the next day, the rats in the third group had caught up in their learning to the rats that had been rewarded from the beginning. Tolman argued that this was because as the unreinforced rats explored the maze, they developed a **cognitive map:** a mental picture of the layout of the maze (Figure LE.15). As soon as the rats became aware of the food (beginning on the 11th day), they were able to find their way through the maze quickly, just as quickly as the comparison group, which had been rewarded with food all along. This is known as **latent learning**: learning that occurs but is not observable in behaviour until there is a reason to demonstrate it.

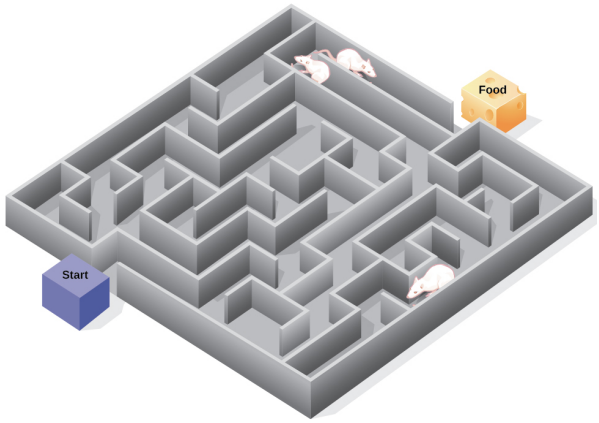

Figure LE.15. Cognitive maps. *Psychologist Edward Tolman found that rats use cognitive maps to navigate through a maze. Have you ever worked your way through various levels on a video game? You learned when to turn left or right, move up or down. In that case you were relying on a cognitive map, just like the rats in a maze.* ***Alt. text:*** *An illustration shows three rats in a maze, with a starting point and food at the end.* ***Source:*** *Figure 6.15 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modifications of the following works: "Maze Puzzle (Blender)" by FutUndBeidl is licensed under a CC BY 2.0 Licence.*

Latent learning also occurs in humans. Children may learn by watching the actions of their parents but only demonstrate it at a later date, when the learned material is needed. For example, suppose that Zan's parent drives Zan to school every day. In this way, Zan learns the route from their house to their school, but Zan's never driven there themselves, so they have not had a chance to demonstrate that they've learned the way. One morning Zan's parent has to leave early for a meeting, so they can't drive Zan to school. Instead, Zan follows the same route on their bike that Zan's parent would have taken in the car. This demonstrates latent learning. Zan had learned the route to school, but had no need to demonstrate this knowledge earlier.

Observational Learning

DINESH RAMOO

Previous sections of this chapter focused on classical and operant conditioning, which are forms of associative learning. Human beings are not driven by just unconscious associative conditioning or even voluntary operant conditioning. We also learn from our peers and elders. Teaching is perhaps as innate a human (and even mammalian) characteristic as you can find. We are born helpless and our survival depends on learning from other people. Such cultural transmission is what allows human beings to spread throughout the world from the hot Sahara Desert to the icy stretches of Siberia. Like most traditional societies, Indigenous pedagogies rely on experiential learning. This means learning to do things through observation and imitation.

In **observational learning**, we learn by watching others and then imitating, or modelling, what they do or say. For instance, have you ever gone to YouTube to find a video showing you how to do something? The individuals performing the imitated behaviour are called **models.** Research suggests that this imitative learning involves a specific type of neuron, called a mirror neuron (Hickock, 2010; Rizzolatti, Fadiga, Fogassi, & Gallese, 2002; Rizzolatti, Fogassi, & Gallese, 2006). Humans and other animals are capable of observational learning. As you will see, the phrase "monkey see, monkey do" really is accurate (Figure LE.16). The same could be said about other animals. For example, in a study of social learning in chimpanzees, researchers gave juice boxes with straws to two groups of captive chimpanzees. The first group dipped the straw into the juice box, and then sucked on the small amount of juice at the end of the straw. The second group sucked through the straw directly, getting much more juice. When the first group, the "dippers," observed the second group, "the suckers," what do you think happened? All of the "dippers" in the first group switched to sucking through the straws directly. By simply observing the other chimps and modelling their behaviour, they learned that this was a more efficient method of getting juice (Yamamoto, Humle, and Tanaka, 2013).



Figure LE.16. Observational learning. *This spider monkey learned to drink water from a plastic bottle by seeing the behaviour modelled by a human.* ***Alt. text:*** *A person drinking from a water bottle, and a monkey next to the person drinking water from a bottle in the same manner.* ***Source:*** *"spider monkey drinks water" by US Air Force, Senior Airman Kasey Close is in the Public Domain in the United States.*

Like Tolman, whose experiments with rats suggested a cognitive component to learning, psychologist Albert Bandura's ideas about learning were different from those of strict behaviourists. Bandura and other researchers proposed a brand of behaviourism called social learning theory, which took cognitive processes into account. According to Bandura, pure behaviourism could not explain why learning can take place in the absence of external reinforcement. He felt that internal mental states must also have a role in learning and that observational learning involves much more than imitation. In imitation, a person simply copies what the model does. Observational learning is much more complex. According to Lefrançois (2012) there are several ways that observational learning can occur:

1. You learn a new response. After watching your coworker get chewed out by your boss for coming in late, you start leaving home 10 minutes earlier so that you won't be late.
2. You choose whether or not to imitate the model depending on what you saw happen to the model.
3. You learn a general rule that you can apply to other situations.

Bandura identified three kinds of models: live, verbal, and symbolic. A live model demonstrates a behaviour in person. A verbal instructional model does not perform the behaviour, but instead explains or describes the behaviour, as when a soccer coach tells their young players to kick the ball with the side of the foot, not with the toe. A symbolic model can be fictional characters or real people who demonstrate behaviours in books, movies, television shows, video games, or Internet sources (Figure LE.17).



Figure LE.17. Learning from a model. *(a) Yoga students learn by observation as their yoga instructor demonstrates the correct stance and movement for her students (live model). (b) Models don't have to be present for learning to occur: through symbolic modelling, this child can learn a behaviour by watching someone demonstrate it on a phone.* ***Alt. text:*** *a) Three people doing yoga on a dock. b) A child using a smart phone.* ***Source:*** *A modification of the following works: "a group of women sitting on top of yoga mats" by Natalia Blauth is licensed under an Unplash Licence; "woman in white long sleeve shirt holding black smartphone" by zhenzhong liu is licensed under an Unsplash Licence.*

Steps in the Modelling Process

Of course, we don't learn a behaviour simply by observing a model. Bandura described specific steps in the process of modelling that must be followed if learning is to be successful: attention, retention, reproduction, and motivation. First, you must be focused on what the model is doing—you have to pay attention. Next, you must be able to retain, or remember, what you observed; this is retention. Then, you must be able to perform the behaviour that you observed and committed to memory; this is reproduction. Finally, you must have motivation. You need to want to copy the behaviour, and whether or not you are motivated depends on what happened to the model. If you saw that the model was reinforced for their behaviour, you will be more motivated to copy them. This is known as **vicarious reinforcement**. On the other hand, if you observed the model being punished, you would be less motivated to copy them. This is called **vicarious punishment**. For example, imagine that four-year-old Lake watched their older sibling Opal playing with their parent's makeup, and then saw Opal get a time out when their parent came in. After their parent left the room, Lake was tempted to play in the make-up, but did not want to get a time-out from their parent. What do you think Lake did? Once you actually demonstrate the new behaviour, the reinforcement you receive plays a part in whether or not you will repeat the behaviour.

Bandura researched modelling behaviour, particularly children's modelling of adults' aggressive and violent behaviours (Bandura, Ross, & Ross, 1961). He conducted an experiment with a five-foot inflatable doll that he called a Bobo doll. In the experiment, children's

aggressive behaviour was influenced by whether the teacher was punished for their behaviour. In one scenario, a teacher acted aggressively with the doll, hitting, throwing, and even punching the doll, while a child watched. There were two types of responses by the children to the teacher's behaviour. When the teacher was punished for their bad behaviour, the children decreased their tendency to act as the teacher had. When the teacher was praised or ignored (and not punished for her behaviour), the children imitated what the teacher did, and even what the teacher said. They punched, kicked, and yelled at the doll.

Watch this clip about the famous Bobo doll experiment to see a portion of the experiment and an interview with Albert Bandura.

Watch this video: **Social Learning Theory: Bandura's Bobo Beatdown Experiments (5 mins)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=835#oembed-1***

"Social Learning Theory: Bandura's Bobo Beatdown Experiments" video by Sprouts is licensed under the Standard YouTube Licence.

What are the implications of this study? Bandura concluded that we watch and learn, and that this learning can have both prosocial and antisocial effects. Prosocial (positive) models can be used to encourage socially acceptable behaviour. Parents in particular should take note of this finding. If you want your children to read, then read to them. Let them see you reading. Keep books in your home. Talk about your favourite books. If you want your children to be healthy, then let them see you eat right and exercise, and spend time engaging in physical fitness activities together. The same holds true for qualities like kindness, courtesy, and honesty. The main idea is that children observe and learn from their parents, even their parents' morals, so be consistent and toss out the old adage "Do as I say, not as I do," because children tend to copy what you do instead of what you say. Besides parents, many public figures, such as Martin Luther King, Jr. and Mahatma Gandhi, are viewed as prosocial models who are able to inspire global social change. Can you think of someone who has been a prosocial model in your life?

The antisocial effects of observational learning are also worth mentioning. Research suggests that this learning may help to explain why children who experienced abuse often grow up to abuse others (Murrell, Christoff, & Henning, 2007). Children who experience abuse, who grow up witnessing their parents deal with anger and frustration through violent and aggressive acts, often learn to behave in that manner themselves. Sadly, it's a vicious cycle that's difficult to break.

Chapter Resources

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CHAPTER 5. COGNITION, LANGUAGE AND INTELLIGENCE

Ephrathah Hadgu

Is a tomato a fruit or a vegetable? Technically, it's a fruit, scientifically speaking, but it is mainly used as a vegetable in culinary contexts. So, what category does it fit into? How do we conceptualize and define a tomato? This chapter will guide you through different theories on how we categorize our everyday environment and how this categorization aids us in navigating complex societies. Another way we survive is through judgment and decision-making. Although we are far from perfect in these areas, this chapter will explore how we fine-tune these skills and learn the predictable patterns that enhance our survival.

Communication is the foundation of our societies. We cannot build and sustain complex communities without the use of sophisticated language. Language is ever-changing, and our ability to understand each other motivates the use of this powerful tool. This chapter explores how language is acquired and processed in the human mind, emphasizing its crucial role in social interaction and cultural development.

Given the intricacies of our minds, the concept of intelligence has been a focal point of study. As one of the oldest topics in psychology, there is a rich history of intelligence testing and debates over its definition. This chapter will address how our understanding of cognition, intelligence, and language has evolved over time. By the end, you will have a deeper insight into these foundational concepts and, perhaps, a clearer idea of what a tomato represents to you and others.

The Elements of Cognition: Categories and Concepts

DINESH RAMOO

Concepts and Categories

Cognitive Psychology focuses on how individuals think and make sense of their surroundings. It specifically explores mental processes like language and intelligence. **Cognition** includes the process of thinking, which means mentally handling knowledge representations of the world. This thinking process encompasses forming concepts, making decisions, solving problems, and reasoning.

Consider the following set of objects: some dust, papers, a computer monitor, two pens, a cup, and an orange. What do these things have in common? Only that they all happen to be on my desk as I write this. This set of things can be considered a **category**, a set of objects that can be treated as equivalent in some way. However, most of our categories seem much more informative; they share many properties. For example, consider the following categories: trucks, wireless devices, weddings, psychopaths, and trout. Although the objects in a given category are different from one another, they have many commonalities. When you know something is a truck, you know quite a bit about it. The psychology of categories concerns how people learn, remember, and use informative categories such as trucks or psychopaths.



Figure CO.1. Categories. *Although you've likely never seen this particular truck before, you know a lot about it because of the knowledge you've accumulated in the past about the features in the category of trucks.* ***Alt. text:*** *A transport truck driving on a flat highway.* ***Source:*** *"truck on highway during daytime" by Rhys Moult is licensed under an Unsplash Licence.*

The mental representations we form of categories are called **concepts**. There is a category of trucks in the world, and I also have a concept of trucks in my head. We assume that people's concepts correspond more or less closely to the actual category, but it can be useful to distinguish the two, as when someone's concept is not really correct.

Concepts are at the core of intelligent behaviour. One aspect of working with concepts is **relationality**. This is an Indigenous concept about how we relate to each other and to the natural worlds (Antoine et al., 2018). Relationality is a vital part of how human beings interact with each other and their environment. For example, we expect people to be able to know what to do in new situations and when confronting new objects. If you go into a new classroom and see chairs, a blackboard, a projector, and a screen, you know what these things are and how they will be used. You'll sit on one of the chairs and expect the instructor to write on the blackboard or project something onto the screen. You do this even if you have never seen any of these particular objects before, because you have concepts of classrooms, chairs, projectors, and so forth, that tell you what they are and what you're supposed to do with them. Furthermore, if someone tells you a new fact about the projector — for example, that it has a halogen bulb — you are likely to extend this fact to other projectors you encounter. In short, concepts allow you to extend what you have learned about a limited number of objects to a potentially infinite set of entities.

You know thousands of categories, most of which you have learned without careful study or instruction. Although this accomplishment may seem simple, we know that it isn't, because it is difficult to program computers to solve such intellectual tasks. If you teach a learning program that a robin, a swallow, and a duck are all birds, it may not recognise a cardinal or peacock as a bird. As we'll shortly see, the problem is that objects in categories are often surprisingly diverse. One aspect of such human categorisation is **holism**. Within Indigenous perspectives, holism encompasses the idea of viewing and categorising the world based on relationships and taking into account the whole picture (Blackstock, 2007). The interconnectedness of objects and living beings within their environment may go part of the way towards explaining why different cultures classify things in different ways. For example, the Bible classifies bats with birds (because they are all flying creatures) while biologists might classify them as mammals (because they share more traits with animals that give birth to live young and breastfeed them).

Simpler organisms, such as animals and human infants, also have concepts (Mareschal, Quinn, & Lea, 2010). Squirrels may have a concept of predators, for example, that is specific to their own lives and experiences. However, animals likely have many fewer concepts and cannot understand complex concepts, such as mortgages or musical instruments.

Nature of Categories

Traditionally, it has been assumed that categories are well-defined. This means that you can give a definition that specifies what is in and out of the category. Such a definition has two parts. First, it provides the **necessary features** for category membership; what must objects have in order to be in it? Second, those features must be **jointly sufficient** for membership; if an object has those features, then it is in the category. For example, if a dog is defined as a four-legged animal that barks, this would mean that every dog is four-legged, an animal, and barks, and also that anything that has all those properties is a dog.

Unfortunately, it has not been possible to find definitions for many familiar categories. Definitions are neat and clear-cut, but the world is messy and often unclear. For example, consider our definition of dogs. In reality, not all dogs have four legs, and not all dogs bark. Some dogs lose their bark with age, which might be seen as an improvement for some, but no one would doubt that a barkless dog is still a dog. It is often possible to find some necessary features (e.g., all dogs have blood and breathe), but these features are generally not sufficient to determine category membership (e.g., you also have blood and breathe but are not a dog).

Even in domains where one might expect to find clear-cut definitions, such as science and law, there are often problems. For example, many people were upset when Pluto was downgraded from its status as a planet to a dwarf planet in 2006.

Upset turned to outrage when they discovered that there was no hard-and-fast definition of planethood: “Aren’t these astronomers scientists? Can’t they make a simple definition?” In fact, they couldn’t. After an astronomical organisation tried to make a definition for planets, a number of astronomers complained that it might not include accepted planets such as Neptune and refused to use it. If everything looked like our planet, our moon, and our sun, it would be easy to give definitions of planets, moons, and stars, but the universe has not conformed to this ideal. This may explain why Indigenous pedagogies emphasise experiential learning. This involves learning by doing rather than through abstraction. Categorising the world occurs through observation, action, and reflection. We see this in the translation of information from English into Indigenous languages. For example, the Cree translation of the Lord’s Prayer did not initially include the abstract term “debt” preferring the more concrete term “shortcomings” or “ ” resulting in the phrase “forgive us our shortcomings” (Kepin, 2015).

Borderline Items

Experiments also showed that the psychological assumptions of well-defined categories were not correct. James Hampton (1979) asked subjects to judge whether a number of items were in different categories. Hampton found that items were neither clear members nor clear nonmembers. Instead, many items were just barely considered category members and others were just barely not members, with much disagreement among subjects. Sinks were barely included as members of the kitchen utensil category, and sponges were barely excluded. People just included seaweed as a vegetable and just barely excluded tomatoes and gourds. Hampton found that members and nonmembers formed a continuum, with no obvious break in people’s membership judgments. If categories were well defined, such examples should be very rare. Many studies since then have found such **borderline members** that are not clearly in or clearly out of the category.

Michael McCloskey and Sam Glucksberg (1978) found further evidence for borderline membership by asking people to judge category membership twice, separated by two weeks. They found that when people made repeated category judgments — such as “Is an olive a fruit?” or “Is a sponge a kitchen utensil?” — they changed their minds about borderline items, up to 22% of the time. So, not only do people disagree with one another about borderline items, they disagree with themselves! As a result, researchers often say that categories are **fuzzy**, that is, they have unclear boundaries that can shift over time. Throughout history, people have used context as a way to define what goes where. For example, Indigenous pedagogies connect specific places, experiences and groups of people to learning (Antoine, 2018). This allows categories and concepts to be linked to a local place. A good example of this is the Australian Aboriginal techniques for memorisation which recorded

seasonal food sources, political relationships, and tool use without the need for a written script (Reser et al., 2021). However, the limitation of such an approach is that knowledge is limited to one's geographic location and there may be limitations in conceptualising universal concepts outside one's own experiential space.

Typicality

A related finding that turns out to be most important is that even among items that clearly are in a category, some seem to be "better" members than others (Rosch, 1973). Among birds, for example, robins and sparrows are very **typical**. In contrast, ostriches and penguins are very **atypical**, meaning not typical. If someone says, "There's a bird in my yard," the image you have will likely be of a smallish, passerine bird, such as a robin, and probably not an eagle, hummingbird, or turkey.

Here are two categories with members of that category ordered by typicality (Rosch & Mervis, 1975).

- **Furniture**
  - chair
  - table
  - desk
  - bookcase
  - lamp
  - cushion
  - rug
  - stove
  - picture
  - vase
- **Fruit**
  - orange
  - banana
  - pear
  - plum
  - strawberry
  - pineapple
  - lemon
  - honeydew
  - date
  - tomato

Typically, you can find out which category members belong in, merely by asking people. Category members may be listed in order of their rated typicality. Typicality is perhaps the most important variable in predicting how people interact with categories, but there are other influences of typicality.

Here are some ways that typicality influences cognition:

- Typical items are judged category members more often (Hampton, 1979).
- Speed of categorisation is faster for typical items (Rips, Shoben, & Smith, 1973).
- Typical members are learned before atypical ones (Rosch & Mervis, 1975).
- Learning a category is easier if typical examples are provided (Mervis & Pani, 1980).
- In language comprehension, references to typical members are understood more easily (Garrod & Sanford, 1977).
- In language production, people tend to say typical items before atypical ones (e.g., "apples and lemons" rather than "lemons and apples") (Onishi, Murphy, & Bock,

2008).

We can understand the two phenomena of borderline members and typicality as two sides of the same coin. Think of the most typical category member; this is often called the category **prototype**. Items that are less and less similar to the prototype become less and less typical. At some point, these less typical items become so atypical that you start to doubt whether they belong in the category at all. Is a rug really an example of furniture? It's in the home like chairs and tables, but it's also different from most furniture in its structure and use. From day to day, you might change your mind as to whether this atypical example belongs in or out of the category. So, changes in typicality ultimately lead to borderline members.

Intuitively, it is not surprising that robins are better examples of birds than penguins are or that a table is a more typical kind of furniture than a rug is. However, given that robins and penguins are known to be birds, why should one be more typical than the other? One possible answer is the frequency with which we encounter the object. We see a lot more robins than penguins, so they must be more typical. Frequency does have some effect, but it is actually not the most important variable (Rosch, Simpson, & Miller, 1976). For example, one may see both rugs and tables every single day, but one of them is much more typically seen as furniture than the other.



Figure CO.2. Resemblance. *When you think of "bird," how closely does the Japanese robin resemble your general figure?* ***Alt. text:*** *Photograph of a Japanese robin.* ***Source:*** *Japanese Robin by unknown author is used under a CC0 Licence.*

Category Hierarchies

Many important categories fall into **hierarchies**, in which more concrete categories are nested inside larger, abstract categories. For example, consider the following categories: brown bear, bear, mammal, vertebrate, animal, and entity. Clearly, all brown bears are bears, all bears are mammals, all mammals are vertebrates, and so on. Any given object typically does not fall into just one category; it could be in a dozen different categories, some of which are structured in this hierarchical manner. Examples of biological categories come to mind most easily, but within the realm of human artifacts, hierarchical structures can readily be found, as in the following categories: desk chair, chair, furniture, artifact, and object.

Roger Brown (1958), a child language researcher, was perhaps the first to note that there seems to be a preference for which category we use to label things. If your office desk chair is in the way, you'll probably say, "Move that chair," rather than, "Move that desk chair" or "piece of furniture." Brown thought that the use of a single, consistent name probably helped children to learn the name for things. Indeed, children's first labels for categories tend to be exactly those names that adults prefer to use (Anglin, 1977).

This preference is referred to as a preference for the **basic level of categorisation**, and it was first studied in detail by Eleanor Rosch and her students (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). The basic level represents a kind of Goldilocks effect in which the category used for something is not too small (e.g., northern brown bear) and not too big (e.g., animal), but it is just right (e.g., bear). The simplest way to identify an object's basic-level category is to discover how it would be labelled in a neutral situation. Rosch and her students showed subjects pictures and asked them to provide the first name that came to mind. They found that 1,595 names were at the basic level, with 14 more specific names (i.e., subordinates) used. Only once did anyone use a more general name (i.e., superordinate). Furthermore, in printed text, basic-level labels are much more frequent than most subordinate or superordinate labels (e.g., Wisniewski & Murphy, 1989).

The preference for the basic level is not merely a matter of labelling. Basic-level categories are usually easier to learn. As such, people are faster at identifying objects as members of basic-level categories (Rosch, Mervis et al., 1976).

As Brown noted (1958), children use these categories first in language learning, and superordinates are especially difficult for children to fully acquire. This is a controversial claim, as some say that infants learn superordinates before anything else (Mandler, 2004). However, if true, then it is very puzzling that older children have great difficulty learning the correct meaning of words for superordinates, as well as in learning artificial superordinate categories (Horton & Markman, 1980; Mervis, 1987). As a result, it seems fair to say that the answer to this question is not yet fully known.

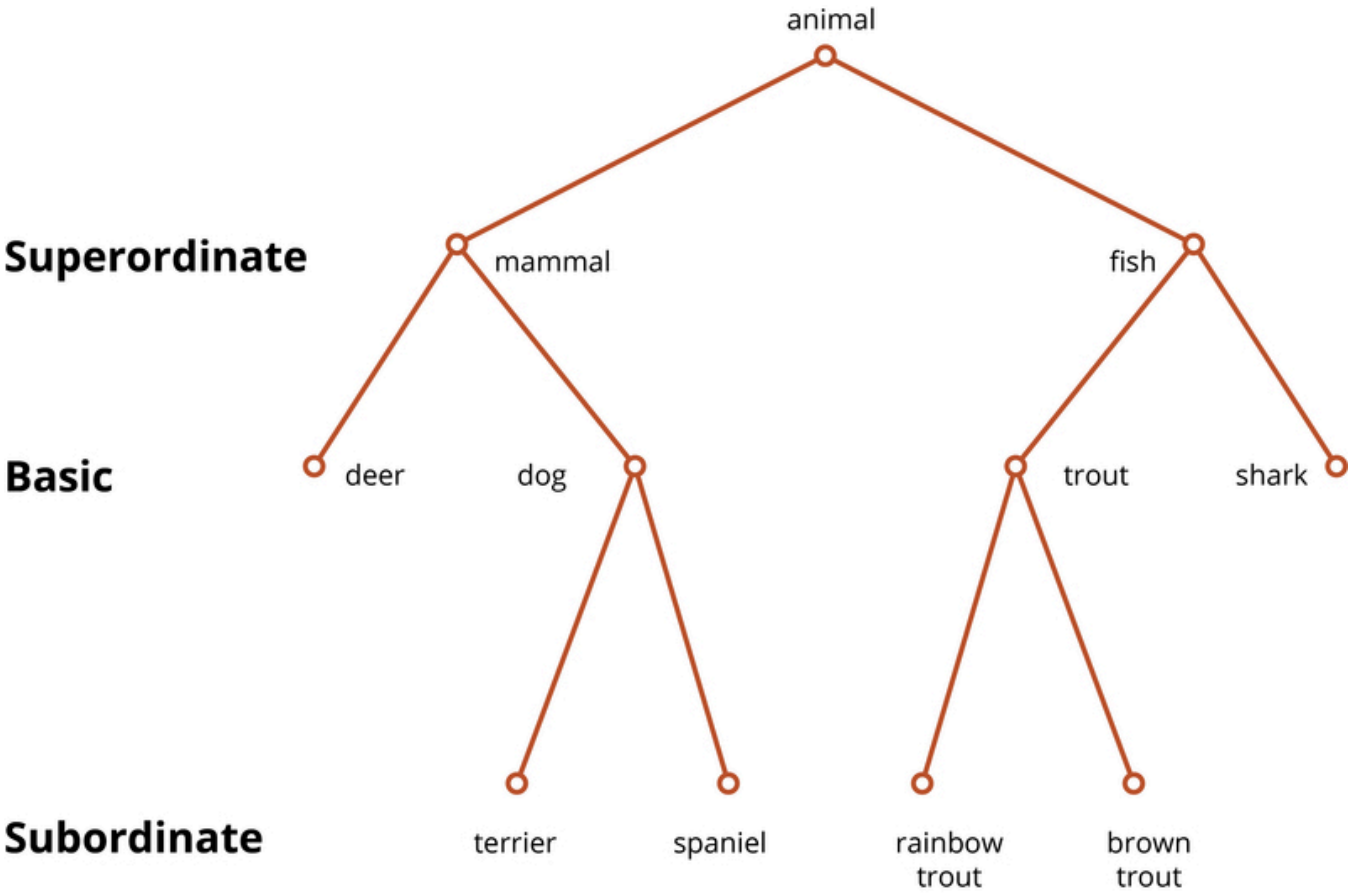


Figure CO.3. Hierarchically organised categories. *This is a highly simplified illustration of hierarchically organised categories, with the superordinate, basic, and subordinate levels labelled. Keep in mind that there may be even more specific subordinates (e.g., rose-ringed parakeet) and more general superordinates (e.g., living thing). [Image Description]* ***Source:*** *Figure 8.6 in Psychology (Noba) is shared under a CC BY-NC-SA 4.0 Licence and was authored, remixed, and/or curated by NOBA (The Noba Project) via source content that was edited to the style and standards of the LibreTexts platform][Source: Psychology (Noba) (Chapter 7.8)]*

Rosch and colleagues (Rosch, Mervis et al., 1976) initially proposed that basic-level categories cut the world at its joints, that is, merely reflect the big differences between categories like chairs and tables or between cats and mice that exist in the world. However, it turns out that the determination of a basic level is not universal. North Americans are likely to use names like “tree,” “fish,” and “bird” to label natural objects, but people in less industrialized societies seldom use these labels and instead use more specific words, equivalent to “elm,” “trout,” and “finch” (Berlin, 1992). Because Canadians and many other people living in industrialized societies typically know so much less than our ancestors did about the natural world, our basic level has moved up to what would have been the superordinate level a century ago. Furthermore, experts in a domain often have a preferred level that is more specific than that of non-experts. For example, birdwatchers see sparrows rather than just birds, and carpen-

ters see roofing hammers rather than just hammers (Tanaka & Taylor, 1991). This all suggests that the preferred level is not only based on how different categories exist in the world, but that people's knowledge and interest in the categories has an important effect.

One explanation of the basic-level preference is that basic-level categories are more differentiated. The category members are similar to one another, but they are different from members of other categories (Murphy & Brownell, 1985; Rosch, Mervis et al., 1976). The alert reader will note a similarity to the explanation of typicality provided above. However, here we are talking about the entire category and not individual members. Chairs are pretty similar to one another, sharing a lot of features (e.g., legs, a seat, a back, similar size and shape, etc.), and they also do not share that many features with other furniture. Superordinate categories are not as useful because their members are not very similar to one another. What features are common to most furniture? There are very few. Subordinate categories are not as useful because they are very similar to other categories. For example, desk chairs are quite similar to dining room chairs and easy chairs. As a result, it can be difficult to decide which subordinate category an object belongs in (Murphy & Brownell, 1985). Experts can differ from novices, in that they use categories that are more differentiated because they know different things about the categories;, therefore the categories have different degrees of similarity.

Theories of Concept Representation

Now that we know these facts about the psychology of concepts, the question arises of how concepts are mentally represented. There have been two main answers. The first, somewhat confusingly called the **prototype theory**, suggests that people have a summary representation of the category, a mental description that is meant to apply to the category as a whole. The significance of summary will become apparent when the next theory is described. This description can be represented as a set of **weighted features** (Smith & Medin, 1981). The features are weighted by their frequency in the category. For the category of birds, having wings and feathers would have a very high weight; eating worms would have a lower weight; living in Antarctica would have a lower weight still, but not zero, as some birds do live there.



Figure CO.4. Prototype theory. *If you were asked what kind of animal this is, according to prototype theory, you would consult your summary representations of different categories and select the one that is most similar to this image — probably a lizard.* ***Alt. text:*** *Photograph of a lizard crawling across grass.* ***Source:*** *"a large lizard sitting on the ground in the grass" by Noppon Meenuch is licensed under an Unsplash Licence.*

The idea behind prototype theory is that when you learn a category, you learn a general description that applies to the category as a whole. For example, birds have wings and usually fly, some eat worms, and some swim underwater to catch fish. People can state these generalisations, and sometimes we learn about categories by reading or hearing such statements as "The komodo dragon can grow to be 10 feet long."

When you try to classify an item, you see how well it matches that weighted list of features. For example, if you saw something with wings and feathers fly onto your front lawn and eat a worm, you could unconsciously consult your concepts and see which ones contained the features you observed. This example possesses many of the highly weighted bird features, so it should be easy to identify as a bird.

This theory readily explains the phenomena we discussed earlier. Typical category members have more, or higher-weighted, features. Therefore, it is easier to match them to your conceptual representation. In contrast, less typical items have fewer, or lower-weighted, features, and they may have features of other concepts. Therefore, they don't match your representation as well. This makes people less certain in classifying such items. Borderline items may have features in common with multiple categories or may not be very close to any of them. For example, edible seaweed does not have many of the common features of vegetables but also is not close to any other food concept — such as meat, fish, fruit, and so on — making it hard to know what kind of food it is.

A very different account of concept representation is the **exemplar theory**, with the word exemplar simply being a fancy name for an example (Medin & Schaffer, 1978). This theory denies that there is a summary representation. Instead, the theory claims that your concept of vegetables consists of remembered examples of vegetables you have seen. This could, of course, include hundreds or thousands of exemplars over the course of your life, although we don't know for sure how many exemplars you actually remember.

How does this theory explain classification? When you see an object, you unconsciously compare it to the exemplars in your memory, and you judge how similar it is to exemplars in different categories. For example, if you see an object on your plate and want to identify it, it will probably activate memories of vegetables, meats, fruit, and so on. In order to categorise this object, you calculate how similar it is to each exemplar in your memory. These similarity scores are added up for each category. Perhaps the object is very similar to a large number of vegetable exemplars, moderately similar to a few fruits, and only minimally similar to some exemplars of meat you remember. These similarity scores are compared, and the category with the highest score is chosen. That being said, the decision regarding which category is chosen is more complex than this, but the full details are beyond this discussion.

Why would someone propose such a theory of concepts? One answer is that in many experiments studying concepts, people learn concepts by seeing exemplars over and over again until they learn to classify them correctly. Under such conditions, it seems likely that people eventually memorise the exemplars (Smith & Minda, 1998). There is also evidence that close similarity to well-remembered objects has a large effect on classification. Scott Allen and Lee Brooks (1991) taught people to classify items by following a rule. However, they also had their subjects study the items, which were richly detailed. In a later test, the experimenters gave people new items that were very similar to one of the old items but were in a different category. That is, they changed one property so that the item no longer followed the rule. They discovered that people were often fooled by such items. Rather than following the category rule they had been taught, they seemed to recognise the new item as being very similar to an old one and so put it, incorrectly, into the same category.

Many experiments have been done to compare the prototype and exemplar theories. Overall, the exemplar theory seems to have won most of these comparisons. However, the experiments are somewhat limited in that they usually involve a small number of exemplars that people view over and over again. It is not so clear that exemplar theory can explain real-world classification in which people do not spend much time learning individual items (e.g., how much time do you spend studying squirrels or chairs?). Also, given that some part of our knowledge of categories is learned through general statements we read or hear, it seems that there must be room for a summary description separate from exemplar memory.

Many researchers would now acknowledge that concepts are represented through multiple cognitive systems. For example, your knowledge of dogs may be based in part on general descriptions such as "dogs have four legs," but you probably also have strong memories

of some exemplars, such as your family dog or other dogs you have known, that influence your categorisation. Furthermore, some categories also involve rules (e.g., a strike in baseball). How these systems work together is the subject of current study.

Knowledge

The final topic has to do with how concepts fit with our broader knowledge of the world. We have been talking very generally about people learning the features of concepts. For example, they see a number of birds and then learn that birds generally have wings, or perhaps they remember bird exemplars. From this perspective, it makes no difference what those exemplars or features are — people just learn them. However, consider two possible concepts of buildings and their features (see Table CO.2).

Table CO.2. Examples of two fictional concepts

Donker	**Blegdav**
has thick windows	has steel windows
is red	is purple
divers live there	farmers live there
is under water	is in the desert
get there by submarine	get there by submarine
has fish as pets	has polar bears as pets

Imagine you had to learn these two concepts by seeing exemplars of them, each exemplar having some of the features listed for the concept as well as some idiosyncratic features. Learning the donker concept would be pretty easy. It seems to be a kind of underwater building, perhaps for deep-sea explorers. Its features seem to go together. In contrast, the blegdav doesn't really make sense. If it is in the desert, how can you get there by submarine, and why do they have polar bears as pets? Why would farmers live in the desert or use submarines? What good would steel windows do in such a building? This concept seems peculiar. In fact, if people are asked to learn new concepts that make sense, such as donkers, they learn them quite a bit faster than concepts such as blegdavs that don't make sense (Murphy & Allopenna,1994). Furthermore, the features that seem connected to one another, such as being underwater and getting there by submarine, are learned better than features that do not seem related to the others, such as being red.

Such effects demonstrate that when we learn new concepts, we try to connect them to the knowledge we already have about the world. If you were to learn about a new animal that does not seem to eat or reproduce, you would be very puzzled and think that you

must have gotten something wrong. By themselves, the prototype and exemplar theories do not predict this. They simply say that you learn descriptions or exemplars, and they do not put any constraints on what those descriptions or exemplars are. However, the **knowledge approach** to concepts emphasises that concepts are meant to tell us about real things in the world, and so our knowledge of the world is used in learning and thinking about concepts.

We can see this effect of knowledge when we learn about new pieces of technology. For example, most people could easily learn about tablet computers (e.g., iPads) when they were first introduced by drawing on their knowledge of laptops, cell phones, and related technology. Of course, this reliance on past knowledge can also lead to errors, as when people don't learn about features of their new tablet that weren't present in their cell phone or expect the tablet to be able to do something it can't.

Schemas are a way for us to cognitively organise the knowledge that we have amassed about specific things: people, activities, categories, events, and so on. For example, you may have a complex and highly detailed schema about using an iPad if you have a lot of experience. Your knowledge about using it is organised, and integrating new knowledge (e.g., using a new app) is likely to be much easier than it is for someone whose schema is limited to the basics. Schemas provide a cognitive structure for us to organise and use knowledge; for example, your schema for what to do on a first date is likely to be affected by things like your age, cultural background, experience, and so on. Schemas are cognitive, but they interact with feelings and behaviour. We will return to schema later in this chapter.

Establishing Concepts

Concepts are central to our everyday thought. When we are planning for the future or thinking about our past, we think about specific events and objects in terms of their categories. If you're visiting a friend with a new baby, you have some expectations about what the baby will do, what gifts would be appropriate, how you should behave toward it, and so on. Knowing about the category of babies helps you to effectively plan and behave when you encounter this child you've never seen before.

Learning about those categories is a complex process that involves seeing exemplars (e.g., babies), hearing or reading general descriptions (e.g., "babies like black-and-white pictures"), general knowledge (e.g., babies have kidneys), and learning the occasional rule (e.g., all babies have a rooting reflex). Current research is focusing on how these different processes take place in the brain. It seems likely that these different aspects of concepts are accomplished by different neural structures (Maddox & Ashby, 2004).

Another interesting topic is how concepts differ across cultures. As different cultures have different interests and different kinds of interactions with the world, it seems clear that their concepts will somehow reflect those differences. On the other hand, the structure of cate-

gories in the world also imposes a strong constraint on what kinds of categories are actually useful. A great example of this would be the difference between analytic versus holistic reasoning. Analytical reasoning examines problems by breaking it up into its constituent parts. This narrows the focus to objects rather than to their context. On the other hand, holistic reasoning is marked by dialectic thinking where the large-scale patterns and context within which a problem emerges are seen as the source of the solution as well. In other words, the big picture is important for holistic thinkers, while how the parts make up the whole is important for analytical thinkers. In attention tasks, where participants were given images with a focal object on a background, North Americans were found to focus on the focal object while East Asians considered the context within which the focal object was found (Masuda & Nisbett, 2001).The social orientation of a culture also affects cognition. Northern China has historically been home to wheat farming while the South is more likely to be useful for rice growing. Rice cultivation requires extensive cooperation within a community and cannot be done without community engagement and social coordination. Wheat farming on the other hand is more individualistic and requires less help and input from the community. Talhelm et al. (2014) found that even today, Chinese in rice-growing regions were more holistic and interdependent in their thinking compared to people in wheat-growing regions. Now this may be of interest for historical reasons, but such issues also affect decision-making in the modern world. For instance, holistically oriented Chinese managers were found to take context into account in decision-making compared to their more analytical American counterparts (Maddux, 2006). This also affected how entrepreneurs considered uncertainty about new products in the market. While holistic thinkers were more likely to wait and consider other background factors that could be affecting market performance at any given time, analytical thinkers were more likely to focus on only the uncertainty of the moment (Liu & Almor, 2014).

Some researchers have suggested that differences between Eastern and Western modes of thought have led to qualitatively different kinds of concepts (e.g., Norenzayan, Smith, Kim, & Nisbett, 2002). Although such differences are intriguing, we should also remember that different cultures seem to share common categories such as chairs, dogs, parties, and jars, so the differences may not be as great as suggested by experiments designed to detect cultural effects. The interplay of culture, the environment, and basic cognitive processes in establishing concepts has yet to be fully investigated.

Decision Making and Problem-Solving

EPHRATHAH HADGU

When waking up every day, we are faced with many decisions, like about breakfast: Should I eat breakfast today? What should I eat? Should I choose something I crave or something nutritious? Am I too tired to make breakfast, or am I running late and should buy it instead? While this may seem like a simple decision for many, it highlights the various approaches we can take in making choices. The following chapter will explore these different approaches in depth!

Just as we encounter daily decisions, we also face numerous problems that require solutions. These problems range from small to significant, from logical to emotional. We are natural problem solvers, but how effective are we? This chapter will examine how we make decisions and solve problems, why we sometimes make the wrong choices, and strategies to improve our decision-making and problem-solving skills.



***The art of non-decision making*. Alt. text:** *A red "no" symbol is superimposed over a green road sign that reads "Decisions" in white capital letters.* **Source:** *https://realkm.com/2021/07/03/the-art-of-non-decision-making/*

Humans are not perfect decision-makers nor problem solvers. Not only are we not perfect, but we depart from perfection or rationality in systematic and predictable ways. The understanding of these systematic and predictable departures is core to the field of decision making and problem solving. By understanding these limitations, we can also identify strategies for making better and more effective decisions.

What is Decision-making?

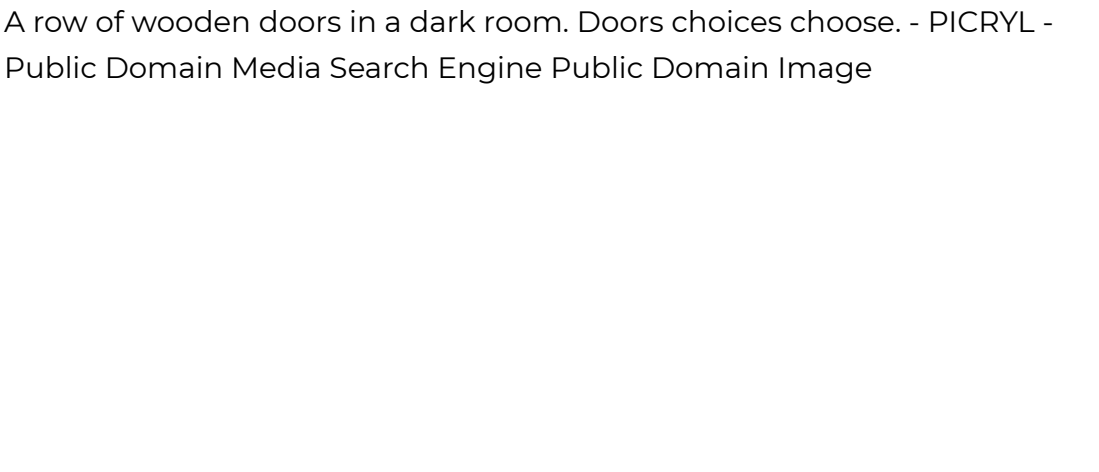
Thinking enables us to **solve problems** and **make decisions**. Every day you have the opportunity to make countless decisions: should you eat dessert, cheat on a test, or attend a sports event with your friends? If you reflect on your history of choices you will realize that they vary in quality; some are rational and some are not. **Decision-making** is when we have to select the best option based on several possibilities. **Problem-solving** is when we have to find a way around an obstacle to reach our goal.

Suppose you were planning a trip for your summer break. You visit a travel agent and they present two different options that suit your budget; the first is a backpacking tour around Italy, and the second is a stay at an all-inclusive resort in Hawaii. You must now **decide** based on the available options. But how?

Ideally, when we make any decision or attempt to solve any problem, we want to deliberate and make sure that we use the proper steps to get a satisfactory result.

We can engage in **systemic decision-making** eliminating unwanted options to reach the best solution. In our previous example, we can do our research between Italy and Hawaii, create a list of pros and cons, and start systemically weighing each negative against each positive.

We can also engage in rational decision making for other types of problems we encounter by taking different steps outlined by Bazerman and Moore (2013). Imagine that during your senior year in college, you apply to a number of doctoral programs, law schools, or business schools (or another set of programs in whatever field most interests you). The good news is that you receive many acceptance letters. So, how should you decide where to go? Here are the six steps that you should take to make a rational decision: (1) define the problem (i.e., selecting the right graduate program), (2) identify the criteria necessary to judge the multiple options (location, prestige, faculty, etc.), (3) weight the criteria (rank them in terms of importance to you), (4) generate alternatives (the schools that admitted you), (5) rate each alternative on each criterion (rate each school on each criteria that you identified, and (6) compute the optimal decision. Acting rationally would require that you follow these six steps in a fully rational manner.



A row of wooden doors in a dark room. Doors choices choose. - PICRYL - Public Domain Media Search Engine Public Domain Image

People often have to use incomplete information and intuition to make even the most important of decisions. A fully rational decision requires a careful, systematic process. Source: [Image: CC0 Public Domain, https://goo.gl/m25gce]

Emotions and decision making:

Suppose you are perusing the food court for your snack and you get a craving for French fries. You might just buy some and eat them, without putting much if any rational thought into your decision. For a long time, decisions such as this troubled rational decision-making theorists, because such choices are not based on logical reasons. Because of the work of psychologists such as Danny Kahneman, however, we now know that decision making often involves irrational processes that can be driven by our emotions. In fact, people often rely heavily on their emotions, or "gut instinct, rather than pure reason to make decisions. Decisions made in business and organizations can be quite costly.

The involvement of emotions in decision-making makes predicting human behaviour very difficult. There are individual differences in emotional reactions, and many of these are driven by developmental experience and temperament. Even our day-to-day moods can affect our decision-making. Research suggests, for example, that when we are in a positive mood, we tend to make more efficient decisions with less rational consideration of the alternatives. We also tend to be content with those choices (Lerner, Li, Valdesolo, & Kassam, 2015).

Researchers have discovered a few situations in which our emotions are likely to influence decisions somewhat predictably. One of these is when we try to estimate risks in anticipating the consequences of our decisions. For example, if you buy the wrong new phone, you risk being unhappy with it or needing to take it in for lots of repairs. Research suggests that we base our decisions, at least in part, on our anticipation of how we will feel if we make a bad choice (Kahneman & Tversky, 1979; Mellers, Fincher, Drummond, & Bigony, 2013), and that, in general, we try hard to avoid making decisions we will regret later (Van Dijk & Zeelenberg, 2005). For many of us, "bad" outweighs "good" in our anticipation, so we might make less than optimal choices just to avoid the risk of feeling bad later. Given the option to receive 10 cents of a shared (with one other person) dollar, for example, most people will opt out

altogether, taking nothing instead of the 10 cents, because they would feel they had been treated unfairly by having to share the dollar. This is irrational behaviour, since 10 cents is clearly better than nothing at all.

Understanding how emotions can shift the likelihood of a purchase is of particular interest to advertisers. If the context that produces positive emotion can be identified in all situations, it can be used effectively to persuade consumers to buy. In many cases, language can play a role in producing this context by framing choices in positive or negative ways. We are more likely to buy a food that is labelled "75 percent fat-free" than one that is described as "25 percent fat," for example (Sanford, Fay, Stewart, & Moxey, 2002; Hohle & Teigen, 2018). The first statement frames the product in terms of "fat-free", and as such is preferred to the second statement, even though the product is exactly the same

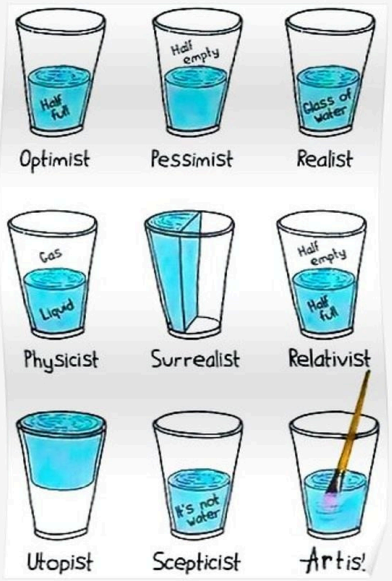
Framing & Anchoring effects

However, we can be prone to specific **biases** –mistakes that can impair our judgment.

The **framing effect** is a type of bias that occurs when the way that our options are presented affect the way we perceive them. Things can be "framed" to sound more positive or sound more negative. The most famous example of this is a glass filled halfway with water – do you see the glass as half-empty or half-full? One of those options definitely sounds more positive than the other.

In the case of our example, let's say you come across an ad that says that a flight to Hawaii has now been reduced from $2000 to $1000. This information can be framed in two different ways, which may affect your decision. It can be framed based on cost – a ticket to Hawaii costs $1000. However, it can also be framed based on savings – you can now save $1000 on your trip to Hawaii!

Although the information is correct in both statements, one may seem more appealing than the other, thus the framing effect.



Framing the content of the glass of water changes one's perspective on the content of this cup. Image from: https://printerval.com/glass-of-water-optimist-pessimist-realist-etc-cool-and-funny-designs-p40687709

Another type of bias that may affect our decision making is the **anchoring effect**. This is when we focus on a single arbitrary factor that magnifies the importance of that factor, which affects how we compare it to others. Typically, we tend to anchor on the first piece of information that we are presented with, which affects our subsequent comparisons.

In our previous example, suppose you were presented with the $1000 you would save on a trip to Hawaii. You come across another ad that states that a trip to Italy costs $600 – no sales, no price change. Based on the prices presented to you, which

would you choose?

Some may rationalize the cost and consider that the Italy flight costs $600 whereas the Hawaii flight costs $1000. But – some may reason out and say, "but hey, the Hawaii flight is a better deal! It's a sale price! It's just way better value!" This might be an example of the anchoring effect – when a person has anchored and focused on a single piece of information that may not have been important prior in the decision-making process. In this case, the person would be anchoring to the concept of "savings".

Heuristics:

While, ideally, people would engage in systemic and rational decision-making and consider all the relevant factors, sometimes, time is not on our side. When we have to make quick decisions, we often rely on **heuristics** –mental "rules of thumb" that are typically derived

from experience. They help us make quick decisions but can be susceptible to errors. For example, have you ever had a hard time trying to decide on a book to buy, then you see one ranked highly on a book review website? Although selecting a book to purchase can be a complicated decision, you might rely on the "rule of thumb" that a recommendation from a credible source is likely a safe bet—so you buy it.

Availability Heuristic:

The **availability heuristic** relies on speed, where our decision is based on how quickly we can recall a similar event. For example, do you think more words begin with "k," or more that have "k" as the third letter? To figure this out, you would probably make a list of words that start with "k" and compare it to a list of words with "k" as the third letter. Though such a quick test may lead you to believe more words begin with "k," the truth is that there are 3 times as many words that have "k" as the third letter (Schwarz et al., 1991). In this case, words beginning with "k" are more readily available to memory (i.e., more accessible), so they seem to be more numerous. Another example is the very common fear of flying: dying in a plane crash is extremely rare, but people often overestimate the probability of it occurring because plane crashes tend to be highly memorable and publicized.

Representativeness heuristic:

Another heuristic we often use in quick decision-making is the **representativeness heuristic.** In this mental shortcut, we base on our judgement on how similar an event is to a prototype that we hold about that event. In other words, we make our decision based on how closely it resembles our "ideal".

Suppose you flip a fair coin six times. Which of the following outcomes would be more likely: six heads in a row, or tails, tails, heads, tail, heads, heads, tails.



Hand tossing a coin.
https://www.pexels.com/photo/a-hand-tossing-a-coin-8817677/

At first glance, most people would think that option a would be quite unlikely. This may be true, but in reality, both options are equally unlikely. In order to get the exact pattern as stated in option b, we would have the same probability as option a.

But why do we think that option b is more likely to occur? This is because of the representativeness heuristic. Option B looks more "random", making it more "ideal" when it comes to six consecutive coin flips. In many situations, an object's similarity to a category is a good indicator of its membership in that category, and an individual using the representativeness heuristic will arrive at a correct judgment. However, when base-rate conflicts with representativeness information, the use of this heuristic is less appropriate. For example, if asked to judge whether a quiet, thin man who likes to read poetry is a classics professor at a prestigious university or a truck driver, the representativeness heuristic might lead one to guess he's a professor. However, considering the base-rates, we know there are far fewer university

classics professors than truck drivers. Therefore, although the man fits the mental image of a professor, the actual probability of him being one (considering the number of professors out there) is lower than that of being a truck driver.

What is Problem-Solving?

Much like decision-making, there are also factors that affect our problem-solving. We engage in **problem-solving** when the solutions are not immediately clear to us, and there are no clearly defined options, which may lead to multiple possibilities. We must figure out how to get from our current state of affairs, which is in some way unsatisfactory, to our desired end state (Bourne, Dominowski, & Loftus, 1979; Güss, 2019). We use problem-solving skills in many avenues of life, from the formal mathematics problems we have all solved in school, to informal day-to-day problems, such as how to get along with a roommate.

Defining The Problems

The first step in solving a problem is to figure out exactly what your problem is—to develop a representation of the problem.

On one end of the spectrum, we use formal problem-solving skills to solve math problems.

Our goal in arithmetic is usually straightforward: to move from not knowing the correct answer to knowing it. Researchers refer to problems with easy-to-discern beginning and end states, such as arithmetic, as well-defined problems. We often find it fairly easy to find a strategy for solving **well-defined problems** because we can easily define what outcome we want from the start (Funke, 2019).

On the other end of the problem-solving spectrum **are ill-defined problems**, such as how to deal with a messy roommate. Our goal in this case might be difficult to define in precise terms.

We may want to stop doing what we feel is an unfair share of housecleaning, but how will we know when we have reached that goal? As you might imagine, it's often more difficult to find solution strategies for ill-defined problems than it is for well-defined ones, because it is hard to define the desired outcome (Chevallier, 2016).

Strategies for problem solving

There are several strategies we can use to solving problems. The first, and often most common strategy is **trial and error**. We can keep trying different solutions until we find one that eventually works. This process can be quite tedious and time-consuming.

We can also solve problems by systemically approaching the issue and determining the appropriate goals. Two ways to do this are through the use of **backward search and means-ends analysis**.

When applying **backward search,** we start with the end goal first, and then work our way backwards. It's like writing a novel with the ending in mind, and then working our way to the beginning or solving a maze by working a maze from the end to the beginning of the maze. This type of strategy is more useful for well-defined problems.

When we use **means ends analysis**, we examine the distance between the beginning and the end, and then divide the problem into sub-goals that will eventually lead us to the final goal. Like our previous example, rather than writing a novel in one sitting, we can divide the novel into multiple parts and chapters, and focus on each part before moving on to the next. Or Another example that is a bit more specific is called the tower of Hanoi problem. Four disks of different diameters are stacked from largest up to smallest on the leftmost of three pegs. Your task is to shift the whole stack to the peg on the far right, but only by moving one disk at a time and by never having a larger disk set on top of a smaller disk. Note that the solution involves accomplishing a series of subgoals.

File:Iterative algorithm solving a 6 disks Tower of Hanoi.gif

Iterative algorithm solving a 6 disks Tower of Hanoi. *https://commons.wikimedia.org/wiki/File:Iterative_algorithm_solving_a_6_disks_Tower_of_Hanoi.gif*

One other common way to attempt to solve problems is through the use of **analogies**. Analogical problem-solving is when we try to come up with a solution to a current problem by comparing it to another problem that has been solved in the past.

We are not always aware of using a method to solve a problem. Sometimes we seem to solve a problem quickly, without intensive effort or concentration, through a phenomenon known as **insight**. In fact, several groundbreaking scientific discoveries have been described as "eureka" moments of insight. George de Mestral took his dog for a walk in the woods and

when he returned home, George noticed his pants were covered in burrs that were hard to remove. Curious, he looked at one under a microscope and saw the small hooks at the ends of the burr spines. He thought about it and, eureka, Velcro was invented (Freeman & Golden, 1997). Sometimes sudden solutions occur after an incubation period during which we have mentally "set aside" a problem that we've been working on. When we return to the problem after a period of time, the solution comes to mind without further conscious strategizing. Some studies suggest this type of problem solving is automatic (Bassok & Novick, 2012; Sio & Ormerod, 2009).

Problems in Problem Solving

Sometimes we fall into patterns of thinking that make it difficult to solve problems to which those patterns don't apply. One common difficulty can happen early in representing the problem. We must define the problem using relevant information and ignore any irrelevant information. When deciding what movie to go and see, you might make your decision based on the number of times you have seen trailers of a movie, rather than looking at reviews or asking friends who may have seen it already. In fact, the number of trailers released may be a function of studio concerns about the quality of the movie.

There are certain impediments that we encounter when trying to solve problems. Have you ever tried to solve a problem but you seem to just be stuck and can't find a way to move forward? You might be experiencing one of these impediments.

A **mental set** is when we get stuck at focusing only on what has worked in the past without exploring alternatives. This can hinder problem-solving because we can get stuck in the cycle of trial and error without exploring new ways of tackling the problem. Has this happened to you while studying for a math test and come across a problem that looks very similar to others you've done in the past, your first instinct might be to use the same steps to solve this one. Oups! It doesn't work, but instead of getting creative and seeking out other ways to solve the problem, you are stuck on this specific solution type.

Much like being stuck on the same solution, we can also be stuck on the properties of an object and their function. **Functional fixedness** is the inability to view other possibilities in the use, function, or expression of an object or item. If you always use an object in a specific way, it becomes really difficult to imagine other ways to use it.
class="horiz-picture-small-adjustment"



Candles. https://vectorportal.com/vector/candles/34874

Quick exercise: Take a look at this candle. We know that a candle can light up and omit heat. But what else can a candle be used for? What are some other functions of a candle?

Now consider the functions of the candle, and try to solve the following problem.

Does the solution surprise you? Were you impeded by a mental set or the functional fixedness of one or more of the objects?

Conclusion

Our days are filled with decisions ranging from the small (what should I wear today?) to the important (should we get married?). Many have real-world consequences on our health, finances and relationships. Simon, Kahneman, and Tversky created a field that highlights the surprising and predictable deficiencies of the human mind when making decisions. As we understand more about our own biases and thinking shortcomings we can begin to take them into account or to avoid them. Only now have we reached the frontier of using this knowledge to help people make better decisions?

Cognitive Processes That May Lead to Inaccuracy

DINESH RAMOO

Cognitive Biases: Efficiency Versus Accuracy

We have seen how our cognitive efforts to solve problems can make use of heuristics. Research has shown that human thinking is subject to a number of cognitive processes; we all use them routinely, although we might not be aware that we do. While these processes provide us with a level of cognitive efficiency in terms of time and effort, they may result in problem-solving and decision-making that is flawed. In this section, we will discover a number of these processes.

Cognitive biases are errors in memory or judgment that are caused by the inappropriate use of cognitive processes. Refer to Table CO.4 for specific examples. The study of cognitive biases is important, both because it relates to the important psychological theme of accuracy versus inaccuracy in perception and because being aware of the types of errors that we may make can help us avoid them, thereby improving our decision-making skills.

Table CO.4. Cognitive processes that pose threats to accuracy.

Cognitive Process	Description	Examples of Threats to Accurate Reasoning
Confirmation bias	The tendency to verify and confirm our existing memories rather than to challenge and disconfirm them	Once beliefs become established, they become self-perpetuating and difficult to change, regardless of their accuracy.
Functional fixedness	When schemas prevent us from seeing and using information in new and nontraditional ways	Creativity may be impaired by the overuse of traditional, expectancy-based thinking.
Counterfactual thinking	When we "replay" events such that they turn out differently, especially when only minor changes in the events leading up to them make a difference	We may feel particularly bad about events that might not have occurred if only a small change had occurred before them.
Hindsight Bias	The tendency to reconstruct a narrative of the past that includes our ability to predict what happened	Knowledge is reconstructive.
Salience	When some stimuli (e.g., those that are colourful, moving, or unexpected) grab our attention, making them more likely to be remembered	We may base our judgments on a single salient event while we ignore hundreds of other equally informative events that we do not see.

Confirmation bias is the tendency to verify and confirm our existing beliefs and ignore or discount information that disconfirms them. For example, one might believe that organic produce is inherently better: higher in nutrition, lower in pesticides, and so on. Even though there is no difference between white eggs and brown eggs, people often think that the latter are healthier for you. Religious people are often quick to notice inconsistencies and errors in religions other than their own while not noticing the same in the one they happen to follow. Adhering to confirmation bias would mean paying attention to information that confirms the superiority of organic produce and ignoring or not believing any accounts that suggest otherwise or believing one's own religion is superior and true whereas every other religion is man-made. Confirmation bias is psychologically comfortable, such that we can proceed to make decisions with our views unchallenged. However, just because something "feels" right, does not necessarily make it so. Confirmation bias can make people make poor decisions because they fail to pay attention to contrary evidence.

A good example of confirmation bias is seen in people's attention to political messaging. Jeremy Frimer, Linda Skitka, and Matt Motyl (2017) found that both liberal and conservative voters in Canada and the United States were averse to hearing about the views of their ideological opponents. Furthermore, the participants in their studies indicated that their aversion was not because they felt well-informed, but rather because they were strategically avoiding learning information that would challenge their pre-existing views. A similar phenomenon would be a study done on the Colbert Report. The Colbert Report was a comedy show created as a satire on conservative talk shows in the United States. LaMarre et al. (2009)

showed segments of the show to a sample of 332 people and asked for their opinion. They found that participants who had a conservative political leaning were more likely to state that Colbert was only pretending to be joking and that he genuinely meant it when he criticized liberal policies. You may be able to think of more modern examples in our world of podcasts and online news sharing platforms. As researchers point out, confirmation bias can result in people on all sides of the political scene remaining within their ideological bubbles, avoiding dialogue with opposing views, and becoming increasingly entrenched and narrow-minded in their positions.

Avoiding confirmation bias and its effects on reasoning requires, first of all, understanding of its existence and, secondly, working to reduce its effects by actively and systematically reviewing disconfirmatory evidence (Lord, Lepper, & Preston, 1984). For example, someone who believes that vaccinations are dangerous might change their mind if they wrote down the arguments for vaccination after considering some of the evidence.

It must be evident that confirmation bias has a role to play in **stereotypes**, which are a set of beliefs, or schemas, about the characteristics of a group. John Darley and Paget Gross (1983) demonstrated how schemas about social class could influence memory. In their research, they gave participants a picture and some information about a Grade 4 girl named Hannah. To activate a schema about her social class, Hannah was pictured sitting in front of a nice suburban house for one-half of the participants and pictured in front of an impoverished house in an urban area for the other half. Next, the participants watched a video that showed Hannah taking an intelligence test. As the test went on, Hannah got some of the questions right and some of them wrong, but the number of correct and incorrect answers was the same in both conditions. Then, the participants were asked to remember how many questions Hannah got right and wrong. Demonstrating that stereotypes had influenced memory, the participants who thought that Hannah had come from an upper-class background remembered that she had gotten more correct answers than those who thought she was from a lower-class background. You can imagine how the stereotypes that we have against certain groups can affect our behaviour with members of those groups.

All of us, from time to time, fall prone to the feeling, "I knew it all along!" This tendency is called **hindsight bias**, and it refers to the narrative that is constructed about something that happened in the past that helps us make sense of the event. Hindsight bias is the brain's tendency to rewrite one's knowledge of history after it happens. The tendency to feel like "I knew it all along" is coupled with an inability to reconstruct the lack of knowledge that formerly existed. Thus, we overestimate our ability to predict the future because we have reconstructed an illusory past (Kahneman, 2011).

All of us are prone to thinking about past events and imagine that they may have turned out differently. If we can easily imagine an outcome that is better than what actually happened, then we may experience sadness and disappointment; on the other hand, if we can easily imagine that a result might have been worse than what actually happened, we may

be more likely to experience happiness and satisfaction. The tendency to think about and experience events according to "what might have been" is known as **counterfactual thinking** (Kahneman & Miller, 1986; Roese, 2005).

Imagine, for instance, that you were participating in an important contest, and you finished in second place, winning the silver medal. How would you feel? Certainly, you would be happy that you won the silver medal, but wouldn't you also be thinking about what might have happened if you had been just a little bit better — you might have won the gold medal! On the other hand, how might you feel if you won the bronze medal for third place? If you were thinking about the counterfactuals — that is, the "what might have beens" — perhaps the idea of not getting any medal at all would have been highly accessible; you'd be happy that you got the medal that you did get, rather than coming in fourth.

Victoria Medvec, Scott Madey, and Thomas Gilovich (1995) investigated this idea by videotaping the responses of athletes who won medals in the 1992 Summer Olympic Games. They videotaped the athletes both as they learned that they had won a silver or a bronze medal and again as they were awarded the medal. Then, the researchers showed these videos, without any sound, to raters who did not know which medal which athlete had won. The raters were asked to indicate how they thought the athlete was feeling, using a range of feelings from "agony" to "ecstasy." The results showed that the bronze medalists were, on average, rated as happier than were the silver medalists. In a follow-up study, raters watched interviews with many of these same athletes as they talked about their performance. The raters indicated what we would expect on the basis of counterfactual thinking — the silver medalists talked about their disappointments in having finished second rather than first, whereas the bronze medalists focused on how happy they were to have finished third rather than fourth.



***Counterfactual thinking**. Counterfactual thinking might be a factor here. Does the bronze medalist look happier to you than the silver medalist? Medvec, Madey, and Gilovich (1995) found that, on average, bronze medalists were happier. **Alt. text:** Photograph of gold, bronze, and silver medalists at the Olympic Games. **Source:** 2010 Winter Olympic Men's Snowboard Cross medalists by Laurie Kinniburgh is used under a CC BY 2.0 Licence.*

You might have experienced counterfactual thinking in other situations. If you were driving across the country and your car was having some engine trouble, you might feel an increased desire to make it home as you approached the end of your journey; you would have been extremely disappointed if the car broke down only a short distance from your home. Perhaps you have noticed that once you get close to finishing something, you feel like you really need to get it done. Counterfactual thinking has even been observed in juries. Jurors who were asked to award monetary damages to others who had been in an accident offered them substantially more in compensation if they barely avoided injury than they offered if the accident seemed inevitable (Miller, Turnbull, & McFarland, 1988).

Psychology in Everyday Life: Cognitive Dissonance and Behviour

One of the most important findings in social-cognitive psychology research was made by Leon Festinger more than 60 years ago. Festinger (1957) found that holding two contradictory attitudes or beliefs at the same time, or acting in a way that contradicts a pre-existing attitude, created a state of **cognitive dissonance**, which is a feeling of discomfort or tension that people actively try to reduce. The reduction in dissonance could be achieved by either changing the behaviour or by changing what is believed. For example, a person who smokes cigarettes while at the same time believing in their harmful effects is experiencing incongruence between actions and behaviour; this creates cognitive dissonance. The person can reduce the dissonance by either changing their behaviour (e.g., giving up smoking) or by changing their belief (e.g., convincing themselves that smoking isn't that bad, rationalising that lots of people smoke without harmful effect, or denying the evidence against smoking). Another example could be a parent who spanks their child while also expressing a belief that spanking is wrong. The dissonance created here can similarly be reduced by either changing their behaviour (e.g., quitting spanking) or by changing their belief (e.g., rationalising that the spanking was a one-off situation, adopting the view that spanking was occasionally justified, or rationalising that many adults were spanked as children).

Cognitive dissonance is both cognitive and social because it involves thinking, and sometimes, social behaviours. Festinger (1957) wanted to see how believers in a doomsday cult would react when told the end of the world was coming, and later, when it failed to happen. By infiltrating a genuine cult, Festinger was able to extend his research into the real world. The cult members devoutly believed that the end was coming but that they would be saved by an alien spaceship, as told to them in a prophecy by the cult leader. Accordingly, they gave away their possessions, quit their jobs, and waited for rescue. When the prophecised end and rescue failed to materialize, one might think that the cult members experienced an enormous amount of dissonance; their strong beliefs, backed up by their behaviour, was incongruent with the rescue and end that failed to materialize. However, instead of reducing their dissonance by ceasing to believe that the end of the world was nigh, the cult members actually increased their faith by altering it to include a view that the world has in fact been saved by the demonstration of their faith. They became even more evangelical.

You might be wondering how cognitive dissonance operates when the inconsistency is between two attitudes or beliefs. For example, suppose the family wage-earner is a staunch supporter of the Green Party, believes in the science of climate change, and is generally aware of environmental issues. At the same time, the family wage-earner loses their job. They send out many job applications, but nothing materializes until there is an offer of full-time employment from a large petroleum company to manage the town's gas station. Here, we would see one's environmental beliefs pitted against the need for a job at a gas station: cognitive dissonance in the making. How would you reduce your cognitive dissonance in this situation? Take the job and rationalise that environmental beliefs can be set aside this time, that one gas station is not so bad, or that there are no other jobs? Turn down the job knowing your family needs the money but retaining your environmental beliefs?

Communicating With Others: Development and Use of Language

DINESH RAMOO

Human language is the most complex behaviour on the planet and, at least as far as we know, in the universe. Language involves both the ability to comprehend spoken and written words and to create communication in real time when we speak or write. Most languages are oral, generated through speaking. Speaking involves a variety of complex cognitive, social, and biological processes, including operation of the vocal cords and the coordination of breath with movements of the throat, mouth, and tongue.

Other languages are sign languages, in which the communication is expressed by movements of the hands. The most common sign language is American Sign Language (ASL), commonly used in many countries across the world and adapted for use in varying countries. The other main sign language used in Canada is la Langue des Signes Québécoise (LSQ); there is also a regional dialect, Maritime Sign Language (MSL).

Although language is often used for the transmission of information (e.g., "turn right at the next light and then go straight" or "place tab A into slot B"), this is only its most basic function. Language also allows us to access existing knowledge, to draw conclusions, to set and accomplish goals, and to understand and communicate complex social relationships. Language is fundamental to our ability to think; without it we would be much less intelligent than we are.

Language can be conceptualised in terms of sounds, meaning, and the environmental factors that help us understand them. Phonemes are the elementary sounds of our language; morphemes are the smallest units of meaning in a language; syntax is the set of grammatical rules that control how words are put together; and contextual information consists of the elements of communication that are not part of the content of language but that help us understand its meaning.

Psychological Consequences of Language Use

What are the psychological consequences of language use? When people use language to describe an experience, their thoughts and feelings are profoundly shaped by the linguistic representation that they have produced rather than the original experience (Holtgraves & Kashima, 2008). For example, Jamin Halberstadt (2003) showed a picture of a person displaying an ambiguous emotion and examined how people evaluated the displayed emotion. When people verbally explained why the target person was expressing a particular emotion, they tended to remember the person as feeling that emotion more intensely than when they simply labelled the emotion.



Figure IL.18. Verbalising emotions. *By verbalising our own emotional experiences, such as in a conversation with a close friend, we can improve our psychological well-being.* ***Alt. text:*** *A picture depicting two friends having a conversation over coffee.* ***Source:*** *Over Coffee by Drew Herron is used under a CC BY-NC-SA 2.0 Licence.*

Thus, constructing a linguistic representation of another person's emotion apparently biased the speaker's memory of that person's emotion. Furthermore, linguistically labelling one's own emotional experience appears to alter the speaker's neural processes. When people linguistically labelled negative images, the amygdala — a brain structure that is critically involved in the processing of negative emotions such as fear — was activated less than when they were not given a chance to label them (Lieberman et al., 2007). Potentially because of these effects of verbalising emotional experiences, linguistic reconstructions of negative life events can have some therapeutic effects on those who suffer from the traumatic experiences (Pennebaker & Seagal, 1999). Sonja Lyubomirsky, Lorie Sousa, and Rene Dickerhoof

(2006) found that writing and talking about negative past life events improved people's psychological well-being, but just thinking about them worsened it. Furthermore, if a certain type of language use (i.e., linguistic practice) is repeated by a large number of people in a community, it can potentially have a significant effect on their thoughts and actions (Holtgraves & Kashima, 2008). This notion is often called **Sapir-Whorf hypothesis** (Sapir, 1921; Whorf, 1956). For instance, if you are given a description of a man, Steven, as having greater than average experience of the world (e.g., well-traveled, varied job experience), a strong family orientation, and well-developed social skills, how do you describe Steven? Do you think you can remember Steven's personality five days later? It will probably be difficult, but if you know Chinese and are reading about Steven in Chinese (the original paper does not specify whether this is Mandarin or Cantonese), as Curt Hoffman, Ivy Lau, and David Johnson (1986) showed, the chances are that you can remember him well. This is because English does not have a word to describe this kind of personality, whereas Chinese does: *shì gù*. This way, the language you use can influence your cognition. In its strong form, it has been argued that language determines thought, but this is probably wrong. Language does not completely determine our thoughts — our thoughts are far too flexible for that — but habitual uses of language can influence our habit of thought and action. For instance, some linguistic practice seems to be associated even with cultural values and social institutions, like dropping pronouns. Pronouns such as "I" and "you" are used to represent the speaker and listener of a speech in English. In an English sentence, these pronouns cannot be dropped if they are used as the subject of a sentence. So, for instance, "I went to the movie last night" is fine, but "Went to the movie last night" is not in standard English. However, in other languages such as Japanese, pronouns can be, and in fact often are, dropped from sentences. It turns out that people living in those countries where pronoun drop languages are spoken tend to have more collectivistic values (e.g., employees having greater loyalty toward their employers) than those who use non–pronoun drop languages such as English (Kashima & Kashima, 1998). It was argued that the explicit reference to "you" and "I" may remind speakers of the distinction between the self and other, and it may remind speakers of the differentiation between individuals. Such a linguistic practice may act as a constant reminder of the cultural value, which, in turn, may encourage people to perform the linguistic practice.

An example of evidence for Sapir-Whorf hypothesis comes from a comparison between English and Mandarin speakers (Boroditsky, 2000). In English, time is often metaphorically described in horizontal terms. For instance, good times are ahead of us, or hardship can be left behind us. We can move a meeting forward or backward. Mandarin speakers use similar horizontal metaphors too, but vertical metaphors are also used. So, for instance, the last month is called *shàng gè yuè* or "above month," and the next month, *xià gè yuè* or "below month." To put it differently, the arrow of time flies horizontally in English, but it can fly both horizontally and vertically in Chinese. Does this difference in language use affect English and Chinese speakers' comprehension of language?

This is what Boroditsky (2000) found. First, English and Mandarin speakers' understanding of sentences that use a horizontal positioning (e.g., June comes before August) did not differ much. When they were first presented with a picture that implies a horizontal positioning (e.g., the black worm is ahead of the white worm), they could read and understand them faster than when they were presented with a picture that implies a vertical positioning (e.g., the black ball is above the white ball). This implies that thinking about the horizontal positioning, when described as ahead or behind, equally primed (i.e., reminded) both English and Chinese speakers of the horizontal metaphor used in the sentence about time. However, English and Chinese speakers' comprehension differed for statements that do not use a spatial metaphor (e.g., August is later than June). When primed with the vertical spatial positioning, Chinese speakers comprehended these statements faster, but English speakers more slowly, than when they were primed with the horizontal spatial positioning. Apparently, English speakers were not used to thinking about months in terms of the vertical line, when described as above or below. Indeed, when they were trained to do so, their comprehension was similar to Chinese speakers (Boroditsky, Fuhrman, & McCormick, 2010).

The idea that language and its structures influence and limit human thought is called **linguistic relativity**. The most frequently cited example of this possibility was proposed by Benjamin Whorf (1897–1941), a linguist who was particularly interested in Aboriginal languages. Whorf argued that the Inuit people of Canada had many words for snow, whereas English speakers have only one, and that this difference influenced how the different cultures perceived snow. Whorf argued that the Inuit perceived and categorised snow in finer details than English speakers possibly because the English language constrained perception. Although the idea of linguistic relativism seemed reasonable, research has suggested that language has less influence on thinking than might be expected. For one, in terms of perceptions of snow, although it is true that the Inuit do make more distinctions among types of snow than English speakers do, the latter also make some distinctions (e.g., think of words like powder, slush, whiteout, and so forth). It is also possible that thinking about snow may influence language, rather than the other way around.

In a more direct test of the possibility that language influences thinking, Eleanor Rosch (1973) compared people from the Dani culture of New Guinea, who have only two terms for colour, dark and bright, with English speakers who use many more terms. Rosch hypothesised that if language constrains perception and categorisation, then the Dani should have a harder time distinguishing colours than English speakers would. However, Rosch's research found that when the Dani were asked to categorise colours using new categories, they did so in almost the same way that English speakers did. Similar results were found by Michael Frank, Daniel Everett, Evelina Fedorenko, and Edward Gibson (2008), who showed that the Amazonian tribe known as the Pirahã, who have no linguistic method for expressing exact quantities, not even the number one, were nevertheless able to perform matches with large numbers without problem.

Although these data led researchers to conclude that the language we use to describe colour and number does not influence our understanding of the underlying sensation, another more recent study has questioned this assumption. Debi Roberson, Ian Davies, and Jules Davidoff (2000) conducted another study with Dani participants and found that, at least for some colours, the names that they used to describe colours did influence their perceptions of the colours. Other researchers continue to test the possibility that our language influences our perceptions, and perhaps even our thoughts (Levinson, 1998), and yet the evidence for this possibility is, as of now, mixed.

Development of Language

Psychology in Everyday Life: The Case of Genie

In the fall of 1970, a social worker in the Los Angeles area found a 13-year-old girl who was being raised in extremely neglectful and abusive conditions. The girl, who came to be known as Genie, had lived most of her life tied to a potty chair or confined to a crib in a small room that was kept closed with the curtains drawn. For a little over a decade, Genie had virtually no social interaction and no access to the outside world. As a result of these conditions, Genie was unable to stand up, chew solid food, or speak (Fromkin, Krashen, Curtiss, Rigler, & Rigler, 1974; Rymer, 1993). The police took Genie into protective custody.

Genie's abilities improved dramatically following her removal from her abusive environment, and early on, it appeared she was acquiring language — much later than would be predicted by critical period hypotheses that had been posited at the time (Fromkin et al., 1974). Genie managed to amass an impressive vocabulary in a relatively short amount of time. However, she never mastered the grammatical aspects of language (Curtiss, 1981). Perhaps being deprived of the opportunity to learn language during a critical period impeded Genie's ability to fully acquire and use language. Genie's case, while not conclusive, suggests that early language input is needed for language learning. This is also why it is important to determine quickly if a child is deaf and to begin immediately to communicate in sign language in order to maximise the chances of fluency (Mayberry, Lock, & Kazmi, 2002).

All children with typical brains who are exposed to language will develop it seemingly effortlessly. They do not need to be taught explicitly how to conjugate verbs, they do not need to memorise vocabulary lists, and they will easily pick up any accent or dialect that they are exposed to. Indeed, children seem to learn to use language much more easily than adults do. You may recall that each language has its own set of phonemes that are used to generate morphemes, words, and so on. Babies can discriminate among the sounds that make up

a language (e.g., they can tell the difference between the “s” in vision and the “ss” in fission), and they can differentiate between the sounds of all human languages, even those that do not occur in the languages that are used in their environments. However, by the time that they are about one year old, they can only discriminate among those phonemes that are used in the language or languages in their environments (Jensen, 2011; Werker & Lalonde, 1988; Werker & Tees, 2002).

Learning Language

Language learning begins even before birth because the fetus can hear muffled versions of speaking from outside the womb. Christine Moon, Robin Cooper, and William Fifer (1993) found that infants only two days old sucked harder on a pacifier when they heard their mothers’ native language being spoken — even when strangers were speaking the languages — than when they heard a foreign language. Babies are also aware of the patterns of their native language, showing surprise when they hear speech that has different patterns of phonemes than those they are used to (Saffran, Aslin, & Newport, 2004).

During the first year or so after birth, long before they speak their first words, infants are already learning language. One aspect of this learning is practice in producing speech. By the time they are six to eight weeks old, babies start making vowel sounds (e.g., ooohh, aaahh, goo) as well as a variety of cries and squeals to help them practice.

At about seven months, infants begin **babbling**, which is to say they are engaging in intentional vocalisations that lack specific meaning. Children babble as practice in creating specific sounds, and by the time they are one year old, the babbling uses primarily the sounds of the language that they are learning (de Boysson-Bardies, Sagart, & Durand, 1984). These vocalisations have a conversational tone that sounds meaningful even though it is not. Babbling also helps children understand the social, communicative function of language (Figure IL.19). Children who are exposed to sign language babble in sign by making hand movements that represent real language (Petitto & Marentette, 1991).



Figure IL.19. Baby vocal exchanges. *Babies often engage in vocal exchanges to help them practice language.* ***Alt. text****: A young child talking on the phone.* ***Source****: Lucas, Age 2½, On the Phone to Mama by Lars Plougmann is used under a CC BY-SA 2.0 Licence.*

At the same time that infants are practicing their speaking skills by babbling, they are also learning to better understand sounds and eventually the words of language. One of the first words that children understand is their own name, usually by about six months, followed by commonly used words like "bottle," "mama," and "doggie" by 10 to 12 months (Mandel, Jusczyk, & Pisoni, 1995).

The infant usually produces their first words at about one year of age. It is at this point that the child first understands that words are more than sounds — they refer to particular objects and ideas. By the time children are two years old, they have a vocabulary of several hundred words, and by kindergarten their vocabularies have increased to several thousand words. By Grade 5, most children know about 50,000 words; by the time they are in university, most know about 200,000. This may vary for people who don't attend university or complete higher education.

The early utterances of children contain many errors, for instance, confusing /b/ and /d/, or /c/ and /z/, and the words that children create are often simplified, in part because they are not yet able to make the more complex sounds of the real language (Dobrich & Scarborough, 1992). Children may say "keekee" for kitty, "nana" for banana, and "vesketti" for spaghetti in part because it is easier. Often these early words are accompanied by gestures that may also be easier to produce than the words themselves. Children's pronunciations become increasingly accurate between one and three years, but some problems may persist until school age.

Most of a child's first words are nouns, and early sentences may include only the noun. "Ma" may mean "more milk please," and "da" may mean "look, there's Fido." Eventually the length of the utterances increases to two words (e.g., "mo ma" or "da bark"), and these primitive sentences begin to follow the appropriate syntax of the native language.

Because language involves the active categorisation of sounds and words into higher level units, children make some mistakes in interpreting what words mean and how to use them. In particular, they often make **overextensions** of concepts, which means they use a given word in a broader context than appropriate. For example, a child might at first call all adult men "daddy" or all animals "doggie."

Children also use contextual information, particularly the cues that parents provide, to help them learn language. Infants are frequently more attuned to the tone of voice of the person speaking than to the content of the words themselves and are aware of the target of speech. Janet Werker, Judith Pegg, and Peter McLeod (1994) found that infants listened longer to a woman who was speaking to a baby than to a woman who was speaking to another adult.

Children learn that people are usually referring to things that they are looking at when they are speaking (Baldwin, 1993) and that the speaker's emotional expressions are related to the content of their speech. Children also use their knowledge of syntax to help them figure out what words mean. If a child sees an adult point to a strange object and hears them say, "this is a dirb," they will infer that a "dirb" is a thing, but if they hear them say, "this is a one of those dirb things," they will infer that it refers to the colour or another characteristic of the object. Additionally, if they hear the word "dirbing," they will infer that "dirbing" is something that we do (Waxman, 1990).

How Children Learn Language: Theories of Language Acquisition

Psychological theories of language learning differ in terms of the importance they place on nature versus nurture, yet it is clear that both matter. Children are not born knowing language; they learn to speak by hearing what happens around them. Human brains, unlike those of any other animal, are wired in a way that leads them, almost effortlessly, to learn language.

Perhaps the most straightforward explanation of language development is that it occurs through principles of learning, including association, reinforcement, and the observation of others (Skinner, 1965). There must be at least some truth to the idea that language is learned because children learn the language that they hear spoken around them rather than some

other language. Also supporting this idea is the gradual improvement of language skills with time. It seems that children modify their language through imitation, reinforcement and shaping, as would be predicted by learning theories.

However, language cannot be entirely learned. For one, children learn words too fast for them to be learned through reinforcement. Between the ages of 18 months and five years, children learn up to 10 new words every day (Anglin, 1993). More importantly, language is more generative than it is imitative. **Generativity** refers to the fact that speakers of a language can compose sentences to represent new ideas that they have never before been exposed to. Language is not a predefined set of ideas and sentences that we choose when we need them, but rather a system of rules and procedures that allows us to create an infinite number of statements, thoughts, and ideas, including those that have never previously occurred. When a child says that they "swimmed" in the pool, for instance, they are showing generativity. No native speaker of English would ever say "swimmed," yet it is easily generated from the normal system of producing language.

Other evidence that refutes the idea that all language is learned through experience comes from the observation that children may learn languages better than they ever hear them. Deaf children whose parents do not use sign language very well nevertheless are able to learn it perfectly on their own, and they may even make up their own language if they need to (Goldin-Meadow & Mylander, 1998). A group of deaf children in a school in Nicaragua, whose teachers could not sign, invented a way to communicate through made-up signs (Senghas, Senghas, & Pyers, 2005). The development of this new Nicaraguan Sign Language has continued and changed as new generations of students have come to the school and started using the language. Although the original system was not a real language (i.e., it was created from scratch and did not descend from our ancestral past), it is becoming closer and closer every year, showing the development of a new language in modern times.

The linguist Noam Chomsky is a believer in the nature approach to language, arguing that human brains contain a language acquisition device that includes a **universal grammar** that underlies all human language (Chomsky, 1965, 1972). According to this approach, each of the many languages spoken around the world — there are between 6,000 and 8,000 — is an individual example of the same underlying set of procedures that are hardwired into human brains. Chomsky's account proposes that children are born with a knowledge of general rules of syntax that determine how sentences are constructed and then coordinate with the language the child is exposed to.

Chomsky differentiates between the **deep structure of an idea** — how the idea is represented in the fundamental universal grammar that is common to all languages — and the **surface structure of the idea** — how it is expressed in any one language. Once we hear or express a thought in surface structure, we generally forget exactly how it happened. At the

end of a lecture, you will remember a lot of the deep structure (i.e., the ideas expressed by the instructor), but you cannot reproduce the surface structure (i.e., the exact words that the instructor used to communicate the ideas).

Although there is general agreement among psychologists that babies are genetically programmed to learn language, there is still debate about Chomsky's idea that there is a universal grammar that can account for all language learning. Nicholas Evans and Stephen Levinson (2009) surveyed the world's languages and found that none of the presumed underlying features of the language acquisition device were entirely universal. In their search, they found languages that did not have noun or verb phrases, that did not have tenses (e.g., past, present, future), and even some that did not have nouns or verbs at all, even though a basic assumption of a universal grammar is that all languages should share these features.

Bilingualism and Cognitive Development

Bilingualism, which is the ability to speak two languages, is becoming more and more frequent in the modern world. Nearly one-half of the world's population, including 17% of Canadian citizens, grows up bilingual.

In Canada, education is under provincial jurisdiction; however, the federal government has been a strong supporter of establishing Canada as a bilingual country and has helped pioneer the French immersion programs in the public education systems throughout the country. In contrast, many US states have passed laws outlawing bilingual education in schools based on the idea that students will have a stronger identity with the school, the culture, and the government if they speak only English. This is, in part, based on the idea that speaking two languages may interfere with cognitive development. There appears to be little evidence for such an assertion. In fact, throughout most of human history, human beings have lived in multilingual societies. In literate societies, it was common for people to use one language for everyday use and another for official or literary purposes (Sanskrit in Ancient India and Southeast Asia, Greek in the Roman empire, Latin in Western Europe, Persian in the Ottoman and Mughal empires, and Classical Arabic in the Islamic World were all used as academic language while other languages were used in day-to-day interactions).

A variety of minority language immersion programs are now offered across the country depending on need and interest. In British Columbia, for instance, the city of Vancouver established a new bilingual Mandarin Chinese-English immersion program in 2002 at the elementary school level in order to accommodate Vancouver's both historic and present strong ties to the Mandarin-speaking world. Similar programs have been developed for both Hindi and Punjabi to serve the large South Asian cultural community in the city of Surrey. By

default, most schools in British Columbia teach in English, with French immersion options available. In both English and French schools, one can study and take government exams in Japanese, Punjabi, Mandarin, French, Spanish, and German at the secondary level.

Some early psychological research showed that, when compared with monolingual children, bilingual children performed more slowly when processing language, and their verbal scores were lower. However, these tests were frequently given in English, even when this was not the child's first language, and the children tested were often of lower socioeconomic status than the monolingual children (Andrews, 1982).

More current research that has controlled for these factors has found that, although bilingual children may, in some cases, learn language somewhat more slowly than do monolingual children (Oller & Pearson, 2002), bilingual and monolingual children do not significantly differ in the final depth of language learning, nor do they generally confuse the two languages (Nicoladis & Genesee, 1997). In fact, participants who speak two languages have been found to have better cognitive functioning, cognitive flexibility, and analytic skills in comparison to monolinguals (Bialystok, 2009). Research has also found that learning a second language produces changes in the area of the brain in the left hemisphere that is involved in language (Figure IL.20), such that this area is denser and contains more neurons (Mechelli et al., 2004). Furthermore, the increased density is stronger in those individuals who are most proficient in their second language and who learned the second language earlier. Thus, rather than slowing language development, learning a second language seems to increase cognitive abilities.

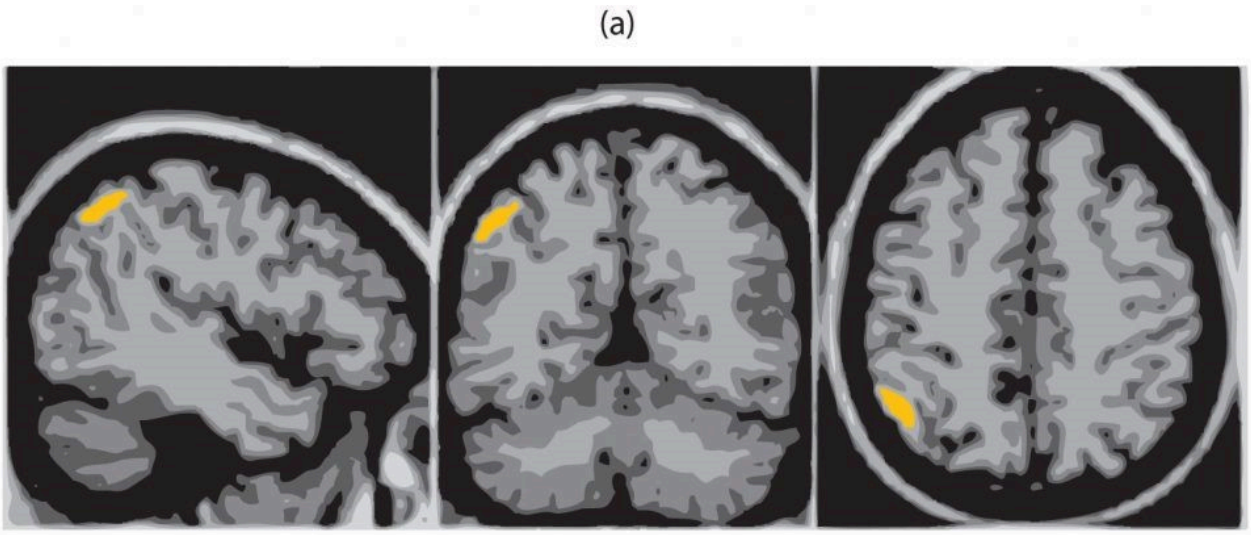


Figure IL.20A. Bilingual children and gray matter. *Andrea Mechelli and colleagues (Mechelli et al., 2004) found that children who were bilingual had increased gray matter density (i.e., more neurons) in cortical areas related to language in comparison to monolinguals (panel a). Alt. text: A brain scan showing three views of a brain, each with a small bright yellow spot. The bright areas show brain regions where bilingual children have increased gray matter density in comparison to monolinguals.* ***Alt. text:*** *A brain scan showing three views of a brain, each with a small bright yellow spot. The bright areas show brain regions where bilingual children have increased gray matter density in comparison to monolinguals.*

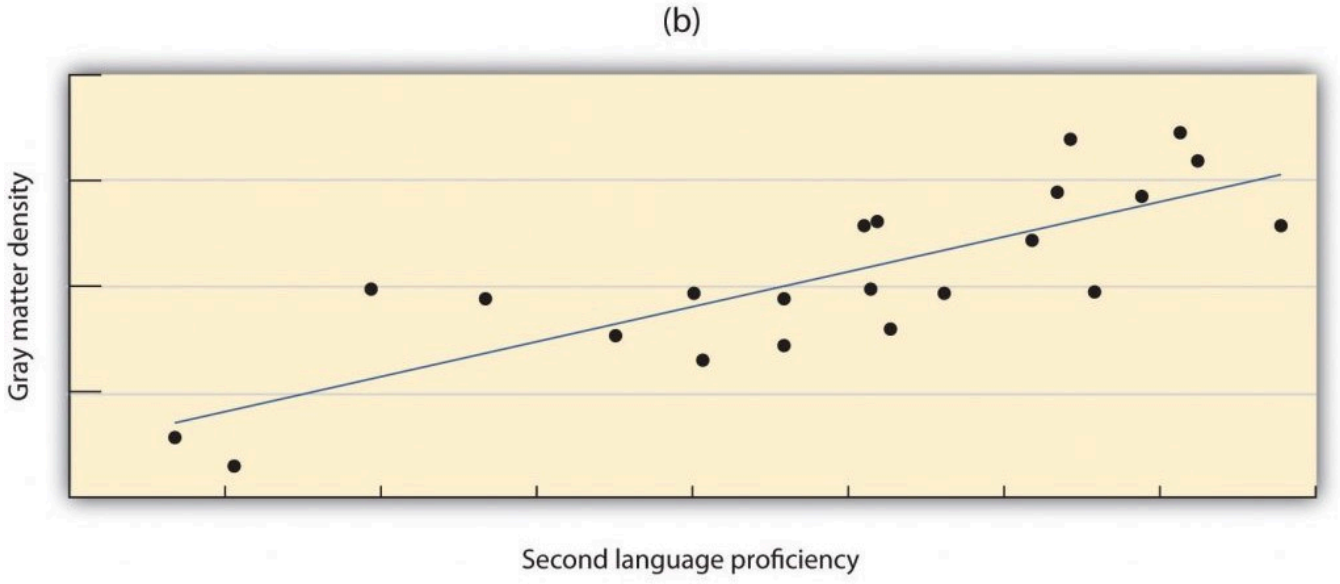


Figure IL.20B. Bilingual children and gray matter. *They found that gray matter density correlated positively with second language proficiency (panel b).* ***Alt. text:*** *A scatter plot showing that grey matter density generally increases when a person has higher second language proficiency.*

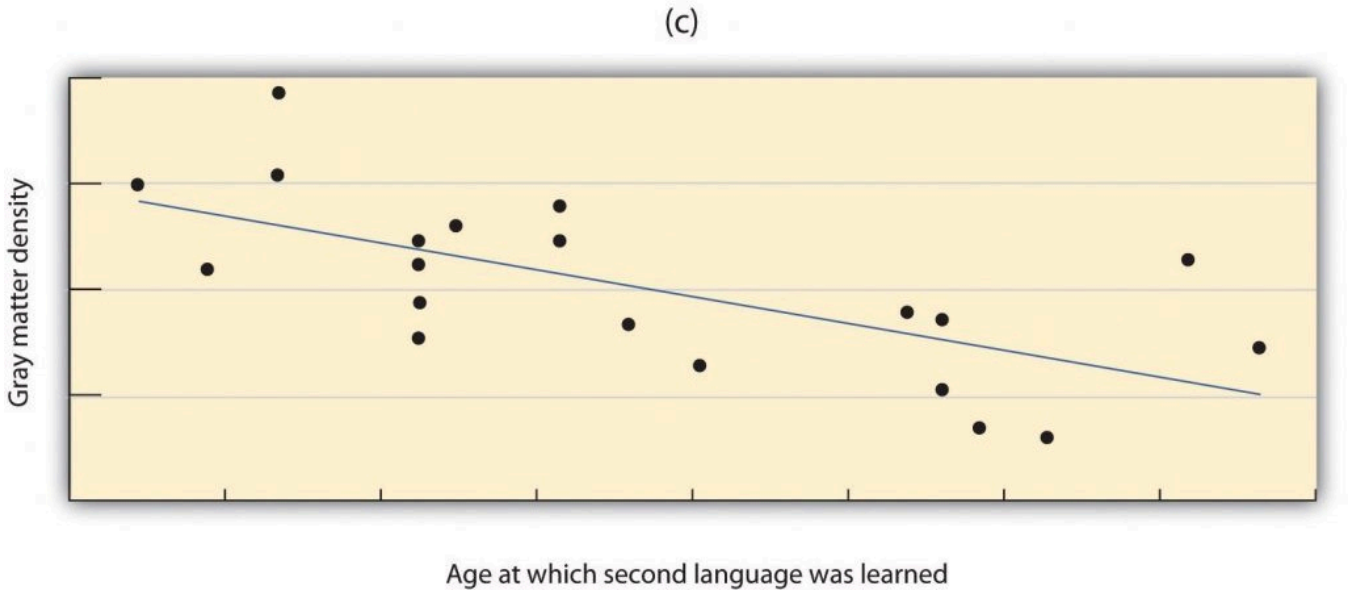


Figure IL.20C. Bilingual children and gray matter. *They found that gray matter density correlated negatively with the age at which the second language was learned (panel c).* ***Alt. text:*** *A scatter plot graph showing that grey matter density generally decreases the older a person was when they learned the second language.* ***Source:*** *Original images by Dinesh Ramood is licensed under a CC BY-NC-SA 4.0 Licence.*

Biology of Language

For the 90% of people who are right-handed, language is stored and controlled by the left cerebral cortex, while for some left-handers this pattern is reversed. These differences can easily be seen in the results of neuroimaging studies that show that listening to and producing language creates greater activity in the left hemisphere than in the right. **Broca's area**, an area in front of the left hemisphere near the motor cortex, is responsible for language production (Figure IL.21). This area was first localized in the 1860s by the French physician Paul Broca, who studied patients with lesions to various parts of the brain. **Wernicke's area**, an area of the brain next to the auditory cortex, is responsible for language comprehension.

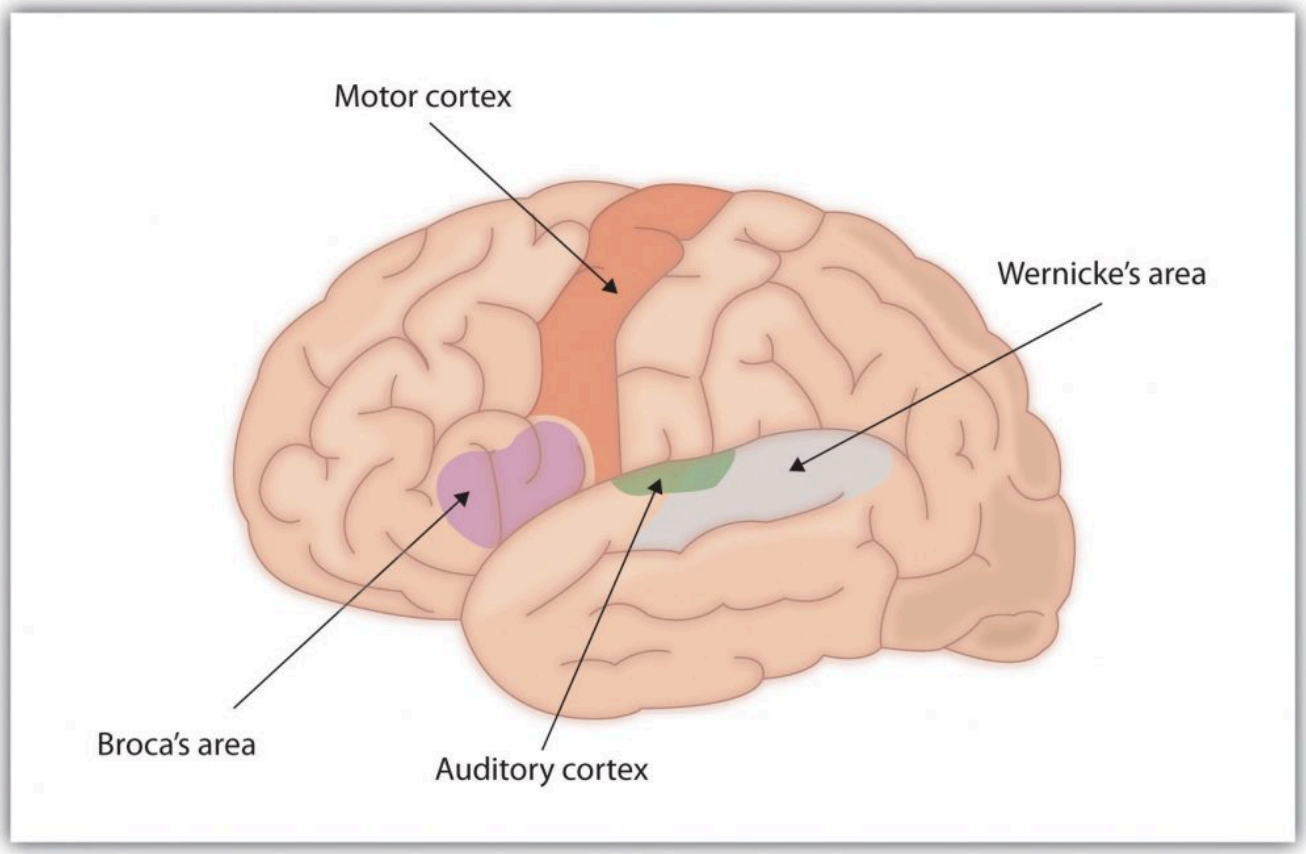


Figure IL.21. Broca's Area and Wernicke's Area. *Drawing of the human brain showing Broca's area and Wernicke's area.* ***Alt. text:*** *This diagram illustrates the position in the human brain of the motor cortex and auditory cortex in relation to Broca's area and Wernicke's area.* ***Source:*** *Original image by Dinesh Ramood is licensed under a CC BY-NC-SA 4.0 Licence.*

Evidence for the importance of Broca's area and Wernicke's area in language is seen in patients who experience **aphasia**, a condition in which language functions are severely impaired. People with Broca's aphasia have difficulty producing speech, whereas people with damage to Wernicke's area can produce speech, but what they say makes no sense, and they have trouble understanding language.

Defining and Measuring Intelligence

DINESH RAMOO

Psychologists have long debated how best to conceptualise and measure intelligence (Sternberg, 2003a). These questions include how many types of intelligence there are, the role of nature versus nurture in intelligence, how intelligence is represented in the brain, and the meaning of group differences in intelligence.

General versus specific intelligences

Many psychology textbooks suggest that the first intelligence tests were developed in France during the early 20th century. However, the earliest known intelligence tests were actually conducted 3,000 years ago in China, where people wrote essays to determine whether they would be hired as a civil servant (a civil servant is someone appointed to work for any level of government). The tests were later expanded to include problem solving questions similar to some modern-day intelligence tests (Saklofske et al., 2015). It was not until the 20th century, that intelligence testing came to the Western world. In France in 1905, self-trained psychologist, Alfred Binet, and a doctor, Theophile Simon, developed one of the first Western intelligence tests—the **Binet-Simon Scale**. They hoped that it could be used to identify students who might struggle in school with the aim of providing additional support (Gredler, 2020). Binet conceptualised intelligence as the ability to engage in focused, but flexible thinking, and so the test questions consisted of basic everyday problems designed to evaluate attention, memory, and verbal skills (Guthrie, 1998; National Institutes of Health, 2014). However, Binet warned that this measure could *only* be considered a test of intelligence if comparisons were made among children from similar backgrounds, because disparities in education or socioeconomic status (SES) would affect the scores (Guthrie, 1998).

The goal was to help teachers better educate these two groups of students. Binet and Simon developed what most psychologists today regard as the first intelligence test (Figure IL.1), which consisted of a wide variety of questions that included the ability to name objects, define words, draw pictures, complete sentences, compare items, and construct sentences.

Binet and Simon (1915; Siegler, 1992) believed that the questions they asked their students, even though they were on the surface dissimilar, all assessed the basic abilities to understand, reason, and make judgments. It turned out that the correlations among these

different types of measures were, in fact, all positive; students who got one item correct were more likely to also get other items correct, even though the questions themselves were very different.



Figure IL.1. Intelligence tests. *This child is completing an intelligence test by answering questions about pictures.* ***Alt. text:*** *A young boy writing a test.* ***Source:*** *Az-Writing Boy E-Citizen by Moonsun1981 is used under a CC BY-SA 3.0 Licence.*

On the basis of these results, psychologist Charles Spearman (1863–1945) hypothesized that there must be a single underlying construct that all of these items measure. Spearman called the construct that the different abilities and skills measured on intelligence tests that they have in common the **general intelligence factor** (*g*). Virtually all psychologists now believe that there is a generalised intelligence factor, *g*, that relates to abstract thinking and that includes the abilities to acquire knowledge, to reason abstractly, to adapt to novel situations, and to benefit from instruction and experience (Gottfredson, 1997; Sternberg, 2003a). People with higher general intelligence learn faster. This may be due to the fact that g is a combination of a number of specific abilities (*s*). These specific abilities include working memory,recall, and encoding abilities.

Soon after Binet and Simon introduced their test, American psychologist Lewis Terman (1877–1956) developed an American version of Binet's test that became known as the **Stanford-Binet Intelligence Test**. The Stanford-Binet is a measure of general intelligence made up of a wide variety of tasks including vocabulary, memory for pictures, naming of familiar objects, repeating sentences, and following commands.

Although there is general agreement among psychologists that *g* exists, there is also evidence for **specific intelligence** (*s*), which is a measure of specific skills in narrow domains. One empirical result in support of the idea of *s* comes from intelligence tests themselves. Although the different types of questions do correlate with each other, some items correlate more highly with each other than do other items; they form clusters or clumps of intelligences. As seen in Figure IL.2, Carroll (1993) argued for three levels for cognition: narrow abilities, broad abilities, and general abilities. The last level refers to the general intelligence factor or g. If we are going to use levels to align with the figure, we need to also include examples of narrow abilities.

Broad abilities include:

- General memory and learning (Gy)
- Comprehension-Knowledge (Gc): the breadth and depth of one's acquired knowledge.
- Fluid intelligence (Gf): the ability to reason and solve problems using new information.
- Crystalized intelligence: the ability to solve problems using past experience.
- Quantitative knowledge (Gq): the ability to comprehend quantitative concepts and manipulate quantitative knowledge (Flanagan et al., 2007). Quantitative knowledge includes numerical abilities such as addition and multiplication.
- Reading & Writing Ability (Grw): the ability to read and write.
- Short-Term Memory (Gsm): the ability to hold information temporarily in short-term memory.
- Broad Retrieval Ability (Gr): the ability to store information and retrieve it.
- Broad Visual Perception (Gv): the ability to perceive, analyze, synthesize, and think with visual information.
- Broad Auditory Processing (Gu): the ability to analyze, synthesize, and discriminate auditory information.
- Broad cognitive Speed (Gs): the ability to perform cognitive tasks quickly.

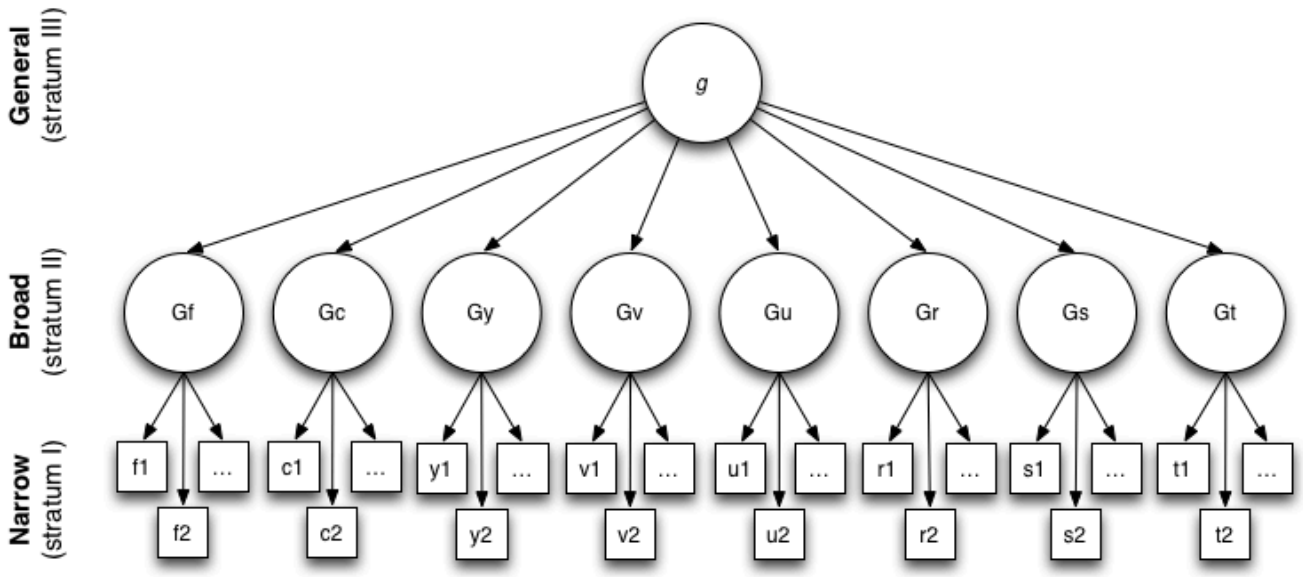


Figure IL.2. Carroll's Three Stratum Model of Human Intelligence*. General intelligence (g) fluid intelligence (Gf), crystallized intelligence (Gc), general memory and learning (Gy), broad visual perception (Gv), broad auditory perception (Gu), broad retrieval ability (Gr), broad cognitive speediness (Gs), and processing speed (Gt). [Image Description]. **Source:** From Three-Stratum Theory, by T. Bates, 2013. Carroll's Three Stratum Model of Human Intelligence by Tim bates is licensed under a CC BY-SA 3.0 Licence.*

One distinction is between **fluid intelligence**, which refers to the capacity to learn new ways of solving problems and performing activities, and **crystallized intelligence**, which refers to the accumulated knowledge of the world we have acquired throughout our lives (Salthouse, 2004). One argument supporting that these intelligences are different is the understanding that crystallized intelligence increases with age — older adults are as good as or better than young people in solving crossword puzzles — whereas fluid intelligence tends to decrease with age (Horn, Donaldson, & Engstrom, 1981; Salthouse, 2004).

Other researchers have proposed even more types of intelligences. Louis Thurstone (1938) proposed that there were seven clusters of **primary mental abilities**, made up of word fluency, verbal comprehension, spatial ability, perceptual speed, numerical ability, inductive reasoning, and memory. However, even these dimensions tend to be at least somewhat correlated, showing again the importance of *g*.

One advocate of the idea of multiple intelligences is the psychologist Robert Sternberg, who proposed a **triarchic theory of intelligence**, focusing on three types of intelligence, and that people may display analytical intelligence, creative intelligence, and practical intelligence. Sternberg (1985, 2003b) argued that traditional intelligence tests assess analytical

intelligence, the ability to answer problems with a single right answer, but that they do not assess creativity well, like the ability to adapt to new situations and create new ideas, or practicality, like the ability to write good memos or to effectively delegate responsibility.

As Sternberg proposed, research has found that creativity is not highly correlated with analytical intelligence (Furnham & Bachtiar, 2008), and exceptionally creative scientists, artists, mathematicians, and engineers do not score higher on intelligence than do their less creative peers (Simonton, 2000). Furthermore, the brain areas that are associated with **convergent thinking**, which is thinking that is directed toward finding the correct answer to a given problem, are different from those associated with **divergent thinking** (Tarasova, Volf, & Razoumnikova, 2010), which is the ability to generate many different ideas for or solutions to a single problem (Figure IL.3). On the other hand, being creative often takes some of the basic abilities measured by *g*, including the abilities to learn from experience, to remember information, and to think abstractly (Bink & Marsh, 2000).

The triarchic theory of intelligence has been criticized for lacking empirical support (Gottfredson, 2003). Sternberg's assertion that existing intelligence tests fail to measure practical intelligence has also been questioned. Given that high IQ predicts higher income and career potential, it may be argued that it includes what is called "street smarts" or practical intelligence. Executive functioning may better account for some kinds of creative intelligence such as divergent thinking and that this may be separate from analytical thinking (Nusbaum, 2011).



Figure IL.3. Divergent thinking. *Test your divergent thinking. How many uses for a paper clip can you think of?* ***Alt. text:*** *A jar of coloured paper clips with several paper clips on the table around it.* ***Source:*** *Wanzikia by Hawyih is in the Public Domain.*

Studies of creative people suggest at least five components that are likely to be important for creativity:

1. **Expertise** — Creative people have carefully studied and know a lot about the topic that they are working in. Creativity comes with a lot of hard work (Ericsson, 1998; Weisberg, 2006).
2. **Imaginative thinking** — Creative people often view a problem in a visual way, allowing them to see it from a new and different point of view.
3. **Risk taking** — Creative people are willing to take on new but potentially risky approaches.
4. **Intrinsic interest** — Creative people tend to work on projects because they love doing them, not because they are paid for them. In fact, research has found that people who are paid to be creative are often less creative than those who are not (Hennessey & Amabile, 2010).
5. **Working in a creative environment** — Creativity is in part a social phenomenon. Dean Simonton (1992) found that the most creative people were supported, aided, and challenged by other people working on similar projects.

The last aspect of the triarchic model, **practical intelligence**, refers primarily to intelligence that cannot be gained from books or formal learning. Practical intelligence represents a type of common sense that is learned from life experiences. Although a number of tests have been devised to measure practical intelligence (Sternberg, Wagner, & Okagaki, 1993; Wagner & Sternberg, 1985), research has not found much evidence that practical intelligence is distinct from *g* or that it is predictive of success at any particular tasks (Gottfredson, 2003). Practical intelligence may include, at least in part, certain abilities that help people perform well at specific jobs, and these abilities may not always be highly correlated with general intelligence (Sternberg, Wagner, & Okagaki, 1993). On the other hand, these abilities or skills are very specific to particular occupations and thus do not seem to represent the broader idea of intelligence.

Another supporter of the idea of multiple intelligences is the psychologist Howard Gardner. Gardner (1983, 1999) argued that it would be evolutionarily functional for different people to have different talents and skills. Additionally, Gardner proposed that there are eight intelligences that can be differentiated from each other, as seen in the table below. Gardner noted that some evidence for multiple intelligences comes from the abilities of "autistic savants," people who may score low on intelligence tests overall but who nevertheless may have exceptional skills in a given domain, such as math, music, art, or in being able to recite statistics in a given sport (Treffert & Wallace, 2004). Zohar (1997) suggested that there may be a 9th intelligence called "spiritual intelligence". Gardener (2000) did not include this in his list of multiple intelligences due to a lack of quantifiable data while acknowledging that "exis-

tential intelligence" might be an option (Allen & Shearer, 2013). This intelligence has been hypothesized to include self-awareness, being a visionary, showing compassion, and sense of purpose (Zohar, 2000).

Table IL.1. Howard Gardner's Eight Specific Intelligences

Intelligence	Description
Linguistic	The ability to speak and write well
Logico-mathematical	The ability to use logic and mathematical skills to solve problems
Spatial	The ability to think and reason about objects in three dimensions
Musical	The ability to perform and enjoy music
Kinesthetic (body)	The ability to move the body in sports, dance, or other physical activities
Interpersonal	The ability to understand and interact effectively with others
Intrapersonal	The ability to have insight into the self
Naturalistic	The ability to recognise, identify, and understand animals, plants, and other living things

Table adapted from Gardner (1999).

The idea of multiple intelligences has been influential in the field of education, and teachers have used these ideas to try to teach differently to different students (Figure IL.4). For instance, to teach math problems to students who have particularly good kinesthetic intelligence, a teacher might encourage the students to move their bodies or hands according to the numbers. On the other hand, some have argued that these intelligences sometimes seem more like abilities or talents rather than real intelligence, and there is no clear conclusion about how many intelligences there are. Are sense of humour, artistic skills, dramatic skills, and so forth also separate intelligences? Furthermore, and again demonstrating the underlying power of a single intelligence, the many different intelligences are in fact correlated and thus represent, in part, the general intelligence factor (Brody, 2003).

In addition, there is limited empirical evidence for multiple intelligences. (Visser et al., 2006). Gottfredson (2006) shows that the empirical support for multiple intelligences is weak while IQ appears to predict numerous life outcomes.



Figure IL.4. The G Factor. *Although intelligence is often conceptualised in a general way, known as the g factor, a variety of specific skills can be useful for particular tasks.* ***Alt. text:*** *Collage with a clown at a playground, an athlete jumping, a painter, a pianist, and a teacher at a whiteboard.* ***Source:*** *Klutz the Clown by Herald Post is used under a CC BY-NC 2.0 Licence; Women Heptathlon LJ French Athletics Championships 2013 t144221 by Marie-Lan Nguyen is used under a CC BY 3.0 Licence; Street Painter by Pedro Ribeiro Simões is used under a CC BY 2.0 Licence; Vardan Mamikonyan Armenian Pianist by Chaojoker is used under a CC BY-SA 3.0 Licence; Teacher at Chalkboard by cybrarian77 is used under a CC BY-NC 2.0 Licence.*

Measuring intelligence: Standardization and the intelligence quotient

The goal of most intelligence tests is to measure *g*, the general intelligence factor. Good intelligence tests are **reliable**, meaning that they are consistent over time, and also demonstrate **construct validity**, meaning that they actually measure intelligence rather than something else. Because intelligence is such an important individual difference dimension, psychologists have invested substantial effort in creating and improving measures of intelligence, and these tests are now some of the most accurate of all psychological tests. In fact, the ability to accurately assess intelligence is one of the most important contributions of psychology to everyday life. Numerous statistical procedures that are used today come from the

early attempts to study intelligence and measure it accurately. While these early intelligence tests may not have been accurate and have often contributed to negative group stereotypes, the statistical and experimental procedures that they helped to establish are of use today.

Intelligence changes with age. A three-year-old who could accurately multiply 183 by 39 would certainly be intelligent, but a 25-year-old who could not do so would be seen as unintelligent. Thus, understanding intelligence requires that we know the norms or standards in a given population of people at a given age. The **standardization** of a test involves giving it to a large number of people at different ages and computing the average score on the test at each age level. Once a large enough representative sample of people have been tested, any individual's score can be compared to **norms** that are based on the population.

The results of studies assessing the measurement of intelligence show that IQ is distributed in the population in the form of a **normal distribution (or bell curve)**, which is the pattern of scores usually observed in a variable that clusters around its average. In a normal distribution, the bulk of the scores fall toward the middle, with many fewer scores falling at the extremes. The normal distribution of intelligence shows that on IQ tests, as well as on most other measures, the majority of people cluster around the average, where IQ = 100, and fewer are either very intelligent or have intellectual challenges (Figure IL.5). Because the standard deviation of an IQ test is about 15, this means that about 2% of people score above an IQ of 130, often considered the threshold for giftedness, and about the same percentage score below an IQ of 70, often being considered the threshold for intellectual disability.

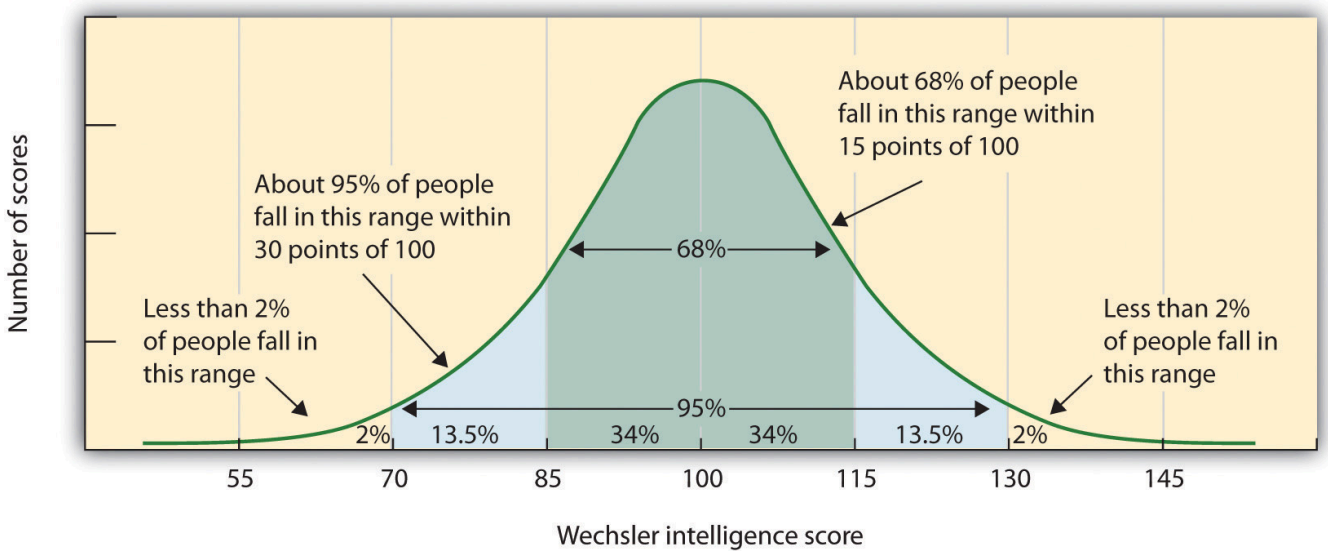


Figure IL.5. Normal IQ scores distribution*. The normal distribution of IQ scores in the general population shows that most people have about average intelligence, while very few have extremely high or extremely low intelligence.* ***Alt. text:*** *Bell curve chart of Wechsler intelligence scores, showing the distribution of scores with 68% between 85 and 115, and 95% between 70 and 130.* ***Source:*** *Figure 5.13 as found in Lifespan Development chapter: Extremes of Intelligence: Intellectual Disability and Giftedness is licensed under a CC BY-NC-SA 4.0 Licence.*

It is important that intelligence tests be standardized on a regular basis because the overall level of intelligence in a population may change over time. The **Flynn effect** refers to the observation that scores on intelligence tests worldwide have increased substantially over the past decades (Flynn, 1999). Although the increase varies somewhat from country to country, the average increase is about three intelligence points in IQ test scores every 10 years. There are many explanations for the Flynn effect, including better nutrition, increased access to information, and more familiarity with multiple-choice tests (Neisser, 1998), but whether people are actually getting smarter is debatable (Neisser, 1997). However, there have been some studies that have found a possible end to the progression of the Flynn effect. Studies in Norway (Sundet et al., 2004), Denmark (Teasdale & Owen, 2005), Australia (Cotton et al., 2005) and the United Kingdom (Flynn, 2009) showed a no increase or a slight decrease in IQ scores in recent years (especially since the 1990s). There are no clear explanations for this phenomenon though air pollution has been part of some speculations (Wuebbles et al. 2019).Once the standardization has been accomplished, we have a picture of the average abilities of people at different ages and can calculate a **person's mental age**, which is the age at which a person is performing intellectually. If we compare the mental age of a person to the person's chronological age, the result is the **IQ**, a measure of intelligence that is adjusted for age. A simple way to calculate IQ is by using the following formula:

[latex]\text{IQ } = \text{ mental age } \div \text{ chronological age } \times 100[/latex]

Thus, a 10-year-old child who does as well as the average 10-year-old child has an IQ of 100 ([latex]10 \div 10 \times 100[/latex]), whereas an eight-year-old child who does as well as the average 10-year-old child would have an IQ of 125 ([latex]10 \div 8 \times 100[/latex]). Most modern intelligence tests are based the relative position of a person's score among people of the same age, rather than on the basis of this formula, but the idea of an intelligence ratio, or intelligence quotient, provides a good description of the score's meaning.

A number of scales are based on IQ. The **Wechsler Adult Intelligence Scale (WAIS)** is the most widely used intelligence test for adults (Watkins, Campbell, Nieberding, & Hallmark, 1995). The current version of the WAIS, the WAIS-IV, was standardized on 2,200 people ranging from 16 to 90 years of age. It consists of 15 different tasks, each designed to assess intelligence, including working memory, arithmetic ability, spatial ability, and general knowledge about the world. The WAIS-IV yields scores on four domains: verbal, perceptual, working memory, and processing speed. The reliability of the test is high, more than 95%, and it shows substantial construct validity. The WAIS-IV is correlated highly with other IQ tests such as the Stanford-Binet, as well as with criteria of academic and life success, including grades, measures of work performance, and occupational level. It also shows significant correlations with measures of everyday functioning among the intellectually disabled.

The Wechsler scale has also been adapted for preschool children, in the form of the Wechsler Primary and Preschool Scale of Intelligence (WPPSI-III), and for older children and adolescents, in the form of the Wechsler Intelligence Scale for Children (WISC-IV).

Sample Items from the Wechsler Adult Intelligence Scale[1]

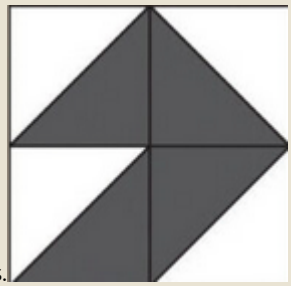
1. Adapted from Thorndike, R. L., & Hagen, E. P. (1997). Cognitive Abilities Test (Form 5): Research handbook. Chicago, IL: Riverside Publishing.

Verbal:

- **General information:** What day of the year is Canada day?
- **Arithmetic reasoning:** If eggs cost $6 a dozen, what does 1 egg cost?
- **Vocabulary:** Tell me the meaning of corrupt.
- **Comprehension:** Why do people buy fire insurance?
- **Digit span:**
    - Listen carefully, and when I am through, say the numbers right after me.
      7 3 4 1 8 6
    - Now I am going to say some more numbers, but I want you to say them backward:
      3 8 4 1 6

Visual:

- **Block design:** Using the four blocks, make one just like this.



- **Object assembly:** If these pieces are put together correctly, they make something. Go ahead and put them together as quickly as you can.



The intelligence tests that you may be most familiar with are **aptitude tests**, which are designed to measure one's ability to perform a given task, such as doing well in undergraduate, graduate, or post-graduate training. Canadian post-secondary institutions request official high school transcripts demonstrating minimum grade admission requirements, while most American colleges and universities require students to take the Scholastic Assessment Test (SAT) or the American College Test (ACT). Post-graduate schools in both countries sometimes require the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Medical College Admissions Test (MCAT), or the Law School Admission Test (LSAT). These tests are useful for selecting students because they predict success in the programs that they are designed for, particularly in the first year of the program (Kuncel, Hezlett, & Ones, 2010). These aptitude tests also measure, in part, intelligence. Meredith Frey and Douglas Detterman (2004) found that the SAT correlated highly (i.e., between about $r = .7$ and $r = .8$) with standard measures of intelligence.Intelligence tests are also used by industrial and organisational psychologists in the process of personnel selection. **Personnel selection** is the use of structured tests to select people who are likely to perform well at given jobs (Schmidt & Hunter, 1998). The psychologists begin by conducting a **job analysis** in which they determine what knowledge, skills, abilities, and personal characteristics (KSAPs) are required for a given job. This is normally accomplished by surveying or interviewing current workers and their supervisors. Based on the results of the job analysis, the psychologists choose selection methods that are most likely to be predictive of job performance. Measures include tests of cognitive and physical ability and job knowledge tests, as well as measures of IQ and personality.

Is intelligence nature or nurture?

Intelligence has both genetic and environmental causes, and these have been systematically studied through a large number of twin and adoption studies (Neisser et al., 1996; Plomin, 2003). These studies have found that between 40% and 80% of the variability in IQ is due to differences in genes, meaning that overall, genetics plays a bigger role than environment does in creating IQ differences among individuals (Plomin & Spinath, 2004). The IQs of identical twins correlate very highly, where $r = .86$, which is much higher than do the scores of fraternal twins who are less genetically similar, where $r = .60$, and the correlations between the IQs of parents and their biological children, where $r = .42$, is significantly greater than the correlation between parents and adopted children, where $r = .19$. The role of genetics gets stronger as children get older. The intelligence of very young children that are less than 3 years old does not predict adult intelligence, but by age 7 it does, and IQ scores remain very stable in adulthood (Deary, Whiteman, Starr, Whalley, & Fox, 2004).

There is also evidence for the role of nurture, indicating that individuals are not born with fixed, unchangeable levels of intelligence. Twins raised together in the same home have more similar IQs than do twins who are raised in different homes, and fraternal twins have more similar IQs than do non-twin siblings, which is likely due to the fact that they are treated more similarly than non-twin siblings are.

The fact that intelligence becomes more stable as we get older provides evidence that early environmental experiences matter more than later ones. Environmental factors also explain a greater proportion of the variance in intelligence for children from lower-class households than they do for children from upper-class households (Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003). This is because most upper-class households tend to provide a safe, nutritious, and supporting environment for children, whereas these factors are more variable in lower-class households. For example, upper-class households tend to be in areas with more security and police protection. They are also less likely to be in food deserts. Lower income neighbourhoods are more likely to have fewer options for buying food or may be in food deserts where there are no convenient places to buy food within walking distance.

Social and economic deprivation can adversely affect IQ. Children from households in poverty have lower IQs than do children from households with more resources even when other factors such as education, race, and parenting are controlled (Brooks-Gunn & Duncan, 1997). Poverty may lead to diets that are less nourishing or lacking in appropriate vitamins, and poor children may also be more likely to be exposed to toxins such as lead in drinking water, dust, or paint chips (Bellinger & Needleman, 2003). These factors can slow brain development and reduce intelligence.

If impoverished environments can impact intelligence, we might wonder whether enriched environments can improve it. Government-funded after-school programs such as Head Start are designed to help children learn. Head Start is a government initiative in the United States which is aimed at providing early childhood education, nutrition, and other services to low-income families. Research has found that attending such programs may increase intelligence for a short time, but these increases rarely last after the programs end (McLoyd, 1998; Perkins & Grotzer, 1997). Other studies suggest that Head Start and similar programs may improve emotional intelligence and reduce the likelihood that children will drop out of school or be held back a grade (Reynolds, Temple, Robertson, & Mann 2001).

Intelligence is improved by education; the number of years a person has spent in school correlates at about $r = .6$ with IQ (Ceci, 1991). In part, this correlation may be due to the fact that people with higher IQ scores enjoy taking classes more than people with low IQ scores, and thus they are more likely to stay in school. In large classes, teachers are not able to give enough of their time to students who do not perform well in academic subjects. This in turn leads to the students getting discouraged with school and academia in general. However, education also has a correlational effect on IQ. Comparisons between children who are

almost exactly the same age but who just do or just do not make a deadline for entering school in a given school year show that those who enter school a year earlier have higher IQ than those who have to wait until the next year to begin school (Baltes & Reinert, 1969; Ceci & Williams, 1997). Children's IQs tend to drop significantly during summer vacations (Huttenlocher, Levine, & Vevea, 1998), a finding that suggests that a longer school year, as is used in Europe and East Asia, is beneficial.

It is important to remember that the relative roles of nature and nurture can never be completely separated. A child who has higher than average intelligence will be treated differently than a child who has lower than average intelligence, and these differences in behaviours will likely amplify initial differences. This means that modest genetic differences can be multiplied into big differences over time.

Psychology in Everyday Life

Emotional intelligence

Although most psychologists have considered intelligence a cognitive ability, people also use their emotions to help them solve problems and relate effectively to others. While there are different models of emotional intelligence, the term encompasses the ability to accurately identify, assess, and understand emotions, both of oneself and others, and to effectively regulate one's own emotions (Ackley, 2016).

The idea of emotional intelligence is seen in Howard Gardner's interpersonal intelligence (the capacity to understand the emotions, intentions, motivations, and desires of other people) and intrapersonal intelligence (the capacity to understand oneself, including one's emotions). Public interest in, and research on, emotional intelligence became widely prevalent following the publication of Daniel Goleman's best-selling book, Working With Emotional Intelligence (1998).

One problem with emotional intelligence tests is that they often do not show a great deal of reliability or construct validity (Føllesdal & Hagtvet, 2009). Although it has been found that people with higher emotional intelligence are also healthier (Martins, Ramalho, & Morin, 2010), findings are mixed about whether emotional intelligence predicts life success, for instance, in job performance (Harms & Credé, 2010). Other researchers have questioned the construct validity of the measures, arguing that emotional intelligence really measures knowledge about what emotions are, but not necessarily how to use those emotions (Brody, 2004). These same researchers claim that emotional intelligence is actually a personality trait, a part of the general intelligence factor, or a skill that can be applied in some specific situations, for instance, academic and work situations (Landy, 2005).

Although measures of the ability to understand, experience, and manage emotions may not predict effective behaviours, another important aspect of emotional intelligence —emotion regulation — does. Emotion regulation refers to the ability to control and productively use one's emotions. Research has found that people who are less impulsive and better able to override their impulses to seek immediate gratification also have higher cognitive and social intelligence. They have better test scores, are rated by their friends as more socially adept, and cope with frustration and stress better than those with less skill at emotion regulation (Ayduk et al., 2000; Eigsti et al., 2006; Mischel & Ayduk, 2004).

Because emotional intelligence seems so important, many school systems have designed programs to teach it to their students. However, the effectiveness of these programs has not been rigorously tested, and we do not yet know whether emotional intelligence can be taught or if learning it would improve the quality of people's lives (Mayer & Cobb, 2000). Many businesses and corporations have an interest in emotional intelligence in relation to job performance, leadership, and flexibility (Ackley, 2016).

Intelligence Testing and the Eugenics Movement

In the first half of the 20th century, many psychologists, along with huge numbers of other influential people in society, including President Roosevelt, embraced the horrific field of eugenics. The eugenics movement was founded by an English scientist called Francis Galton, who misappropriated Charles Darwin's work on evolution and Gregor Mendel's work on heritable traits in plants and animals, by arguing that these ideas could be extended to human traits. Eugenicists believed that genes, not environment, determined intelligence (among other traits), and that people with low intelligence should be prevented from "spreading their genes". These beliefs were extremely widespread across Europe and the United States (US). Many of the Western psychologists involved in developing intelligence tests were eugenicists, including Spearman in the UK, and Terman in the US. As a result, intelligence testing was

weaponized as evidence of low intelligence among people with little formal education. This included women, people of colour, and people living in poverty (Guthrie, 1998). Eugenics was used to promote and justify social and economic inequalities in the US, the United Kingdom, and the countries that they colonized. The long-term consequences of eugenics-inspired oppressive socioeconomic policies still persist today.

In addition to his eugenicist beliefs, Spearman (1904) also popularised the idea that intelligence could be adequately measured by a single score that represented a person's general intelligence (Boake, 2002; Guthrie, 1998). Spearman justified this approach because he had found that people who were proficient in one intellectual domain, e.g., verbal skills, were often equally adept in other domains, such as quantitative reasoning (Biswas-Diener, 2018; Guthrie, 1998).

In the 1940s, Raymond Cattell proposed that intelligence consists of two major factors: crystallised intelligence and fluid intelligence (Cattell, 1963). Crystallised intelligence is characterised as the ability to retrieve knowledge related to your educational and life experiences. When you learn, remember, and recall information in your classes, you are using crystallised intelligence. Fluid intelligence on the other hand, encompasses the ability to cope with new situations, see complex relationships, and solve abstract problems (Cattell, 1963). More recent theories suggest that intelligence consists of multiple different domains that go beyond cognitive skills; a person may be strong in one, but not others (Gardner, 1983; Sternberg 1999). The first widely used intelligence test in the US was designed to measure general intelligence, and so minimised the strengths of people who were not good "all-rounders". The test was developed in 1916 by Lewis Terman, a eugenicist and a professor at Stanford University. Terman adapted the Binet-Simon Scale for use in the US and renamed it the Stanford-Binet scale. Scores on the Stanford-Binet scale were referred to as the intelligence quotient or IQ (Guthrie, 1998). Terman standardised the Stanford-Binet scale using data from 1000 children and 400 adults in the US (Guthrie, 1998), all of whom were white.

Standardisation is a commonly used procedure when developing psychological tests. Raw scores are converted so that they fall in a normal distribution, which is shaped like a "bell curve" to allow for easy comparisons between individuals (Biswas-Diener, 2018). It is therefore important that the scores are standardised using a large sample of people who are representative of the population. In the Stanford-Binet (and other subsequent IQ tests) the mean IQ score is set at 100. In the standardised sample, 68% of people have an IQ between 85 and 115, and 96% of people have an IQ of between 70 and 130. There are very few people at the extremes of the scale. You probably have taken at least one standardised aptitude test (like the SAT) in your life. The scores on these tests are standardised in a similar way, but the average score is set around 500 on each SAT subtest.

Excluding people of colour from the standardisation process was a serious flaw in Terman's Stanford-Binet intelligence test, as the standardised scores were not representative of the population (Guthrie, 1998). The test relied heavily on verbal skills and asked questions that reflected middle-class values, so children with little schooling were often misclassified as having low intelligence. The same issues that made the Stanford-Binet test culturally unfair for less educated children also plagued the adult intelligence tests that were developed for the army during the First World War (Guthrie, 1998).

In 1917, Yerkes (another eugenicist), Terman, and other psychologists from the American Psychological Association helped to design intelligence tests for the US army. These were used to determine work assignments for army recruits (Guthrie, 1998). Not only were the tests culturally biased, but the military psychologists who administered them were all white men; many of them were blatantly racist, which probably influenced their scoring (Guthrie, 1998). The army then released reports based on the test scores, stating that non-whites, Jews, and Eastern and Southern European immigrants were intellectu-

ally inferior to whites. Moreover, they reported that people with darker skins were less intelligent than light-skinned people (Guthrie, 1998). This misguided report was widely disseminated and was used to further justify and promote many harmful socioeconomic policies. In the US, interracial marriages were banned, and racial segregation was strongly enforced, to decrease the potential development of interracial relationships. Policies such as redlining (a discriminatory practice in which financial services are withheld from neighbourhoods that have significant numbers of racial and ethnic minorities) and racially segregating schools, increased wealth and resources for whites and reduced economic opportunities and educational resources for people of colour. The 1924 Immigration law severely restricted the admittance of Jews, Eastern and Southern Europeans, and people who were mentally ill, to the United States (Guthrie, 1998).

In keeping with eugenicist ideals, by 1944 40,000 people had been subjected to forced sterilisation in the United States, and 30 states had passed laws legalising this practice. Forced sterilisation targeted mostly poor Black women and immigrants and included people living in institutions for the mentally ill, people accused of crimes, and people with disabilities or chronic illnesses. Scandinavia and Canada also embraced forced sterilisation during the same general time period (Kevles, 1999). Adolf Hitler and other German eugenicists were inspired by the widespread ways that the US embraced white supremacy through its sterilisation and immigration laws. However, the policies that Germany subsequently created were even more extreme; they mandated killing young children with physical or mental disabilities. Eugenics was also used to justify the persecution and mass murders of six million Jews during the Holocaust (Guthrie, 1998). Sterilisations in the United States declined dramatically in the aftermath of the atrocities of the Holocaust and in the light of new studies showing that intelligence and mental illness are not solely determined by genes. However, even as laws began to change, the US still carried out about 22,000 more forced sterilisations across 27 states between 1943 and 1963. Some of these sterilisations occurred in some southern and mid-Western states shortly after World War II, when reproductive clinics began offering sterilisation as a method of birth control to young, mostly Black, poor women in rural areas, and to young native American women. Many of these sterilisations were coerced or done without the woman's consent (Reilly, 2015). It was not until the 60s and 70s that US sterilization laws were largely repealed (Sofair & Kaldjian, 2000; Suarez-Balcazar, 2022). However, reproductive injustice continues even today. In 2020, a nurse working for Immigration and Customs Enforcement (ICE) made it publicly known that several Latina women were coerced into having unnecessary hysterectomies during their detention by ICE (Suarez-Balcazar, 2022).

Eugenics became popular in Canada and the United States in the early 20th century and was supported by many prominent psychologists, including Sir Francis Galton (1822–1911). Dozens of universities offered courses in eugenics, and the topic was presented in most high school and university biology texts (Selden, 1999). Belief in the policies of eugenics led the Canadian legislatures in Alberta (1928) and British Columbia (1933) to pass sterilisation laws that led to the forced sterilisation of approximately 5000 people deemed to be "unfit." Those affected were mainly youth and women, and people of Indigenous or Metis identity were disproportionately targeted. This practice continued for several decades before being completely abandoned and the laws repealed. This dark chapter in Canadian history shows how intelligence testing has been used to justify political and racist ideologies.

Cognition Resources

DINESH RAMOO

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The reference list for this chapter has been excluded from this file to reduce page count. The full reference list can be viewed online at opentextbc.ca/psychologymtdi/chapter/cognition-chapter-resources/ and opentextbc.ca/psychologymtdi/chapter/intelligence-language-chapter-resources/.

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Language and Intelligence Resources

DINESH RAMOO

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CHAPTER 6. DEVELOPMENTAL PSYCHOLOGY

Ephrathah Hadgu

What is one thing that always goes up but never comes down? Our age! As we grow older, we undergo physical and cognitive development. This journey takes us through several key stages of life: infancy, early and middle childhood, adolescence, and early, middle, and late adulthood. Each stage presents its milestones, challenges, and changes. Developmental psychology is the field that studies these stages across the human lifespan, seeking to understand how and why we change over time. It also examines how early relationships (particularly our attachment to caregivers) and different parenting styles shape our development. In this chapter, we will explore theories proposed by influential developmental psychologists, including Jean Piaget, Erik Erikson, and Mary Ainsworth, among others.

The Beginning

JESSICA MOTHERWELL MCFARLANE

Story Part 1 – Children's So Called 'Errors' and Dr J's Perspective

A colleague told me this true story and gave me permission to share it. I have shared it in comic form and changed some details to make it anonymous and protect privacy.

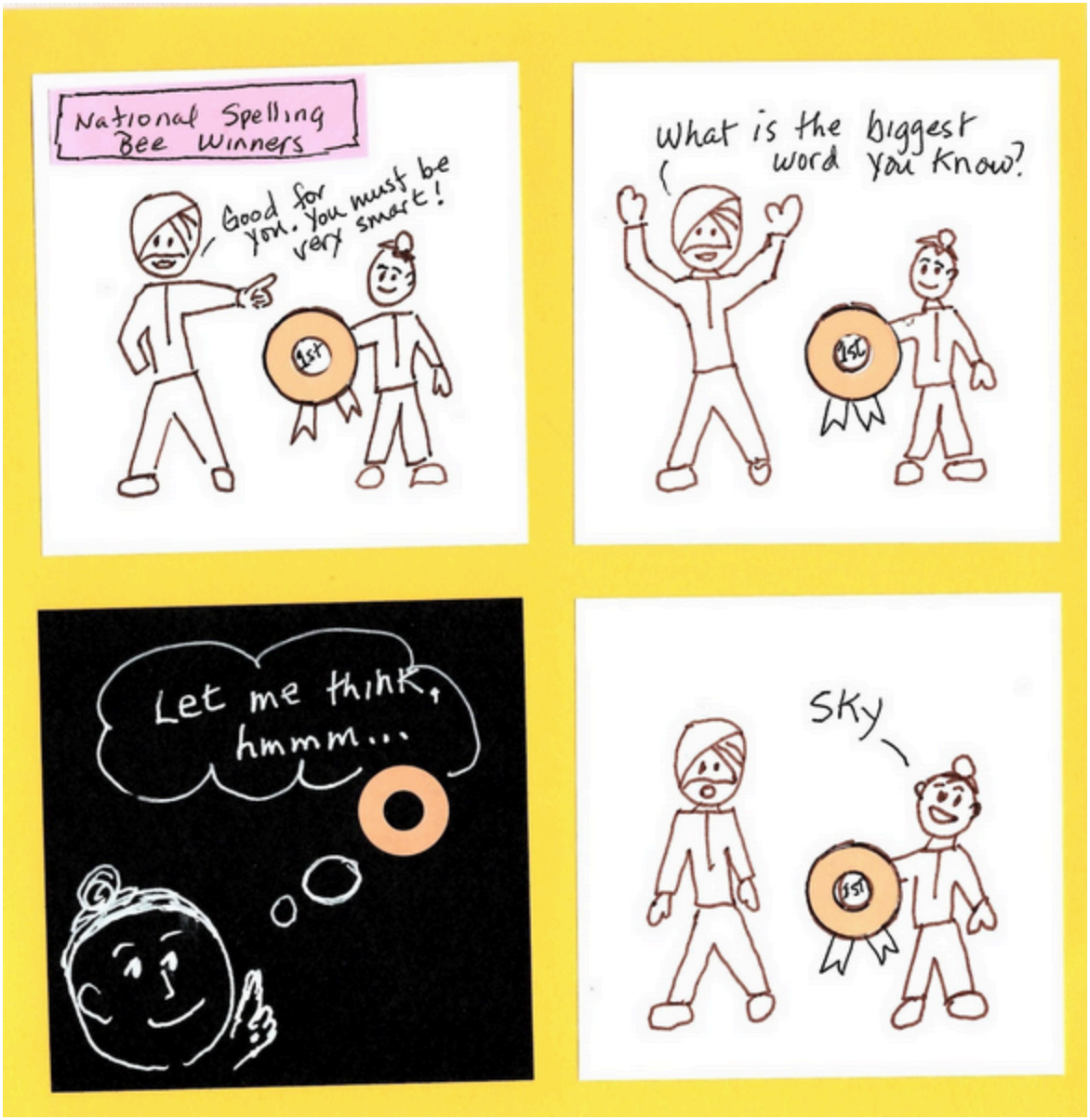


Figure LD.1. National Spelling Bee Winners. Alt. text: *A comic with four sections. Section 1. A child holds a 1st-place ribbon for a national spelling bee. An adult says, "Good for you. You must be very smart." Section 2. The adult asks, "What is the biggest word you know?" Section 3. The child thinks for a few moments. Section 4. The child responds, "Sky." The adult looks shocked.* ***Source:*** *National Spelling Bee Winners by Jessica Motherwell-McFarlane is licensed under a CC BY-NC-SA Licence.*

In this opening comic story, an adult wants to connect with a child who has shown great skill in a spelling bee. The adult asks: "What is the biggest word you know?" But what the adult really means is, "What is the *longest* word you know?" The child interprets the adult's question as, "What is the biggest *thing* you know?" This story reveals that the child is in a concrete operational stage of cognition and is not yet ready to imagine the actual question

the adult meant to ask. This child responds to the adult's literal meaning of the question. Guessing what the adult meant to ask would require the cognitive skill of formal operational thinking.

When Jean Piaget observed these apparent 'mistakes' or 'misunderstandings' that children make, he saw their responses as reflections of the child's stage of thinking. That is, the child's responses were not so much "errors" but more like sneak peeks into the workings of the child's mind at that given point in time and in their development.

Each person in this story reveals the limits of their imagination and the style of their thinking. The adult is clearly surprised by the child's answer, as they were expecting something different. When we are surprised by another person's unexpected answer, we have the opportunity to learn just as much about our own minds as theirs.

My take on this story. When we are surprised when 'children say the cutest things,' we also learn just as much about our own thinking, the limitations in our imagination, and the shortcomings in our ability to ask precise questions. When we are surprised by what someone says, it is likely that we have our own expectations — or biases — about how the question **should** be answered. Every time we are surprised by someone's response, we have an opportunity to think about our own cognitive processes and our preconceived ideas.

In a way, it is a form of "adultism" — or hubris — for us to label the child's answer as an 'error' or 'misunderstanding' and not at the same time question our own assumptions, failing to account for lived experiences and individual biases. Personally, I have learned that the greatest joy and biggest reward of being curious and asking many questions is that I can experience wonderful moments of surprise, confusion, and/or hilarity that reveal just as much about the limits or 'errors' of my mind as of the person I am in conversation with.

In this story, I find the child's answer, "sky", to be mystical and wise. Brilliant! A true 'mic drop' answer. I am grateful that I was given permission to share this story with you. Now, it is your turn to look at lifespan development with a fresh perspective and marvel at the many ways we change — and stay the same — as we journey through life.

Lifespan Developmental psychology is a scientific epic story of human growth from infancy to late adulthood. This chapter introduces the foundational concepts and research methods in developmental psychology, including naturalistic observation, case studies, and controlled experiments. We delve into what constitutes "normal" development and tackle pressing issues such as the continuous versus discontinuous nature of development, the interaction of nature and nurture, and the diversity of developmental pathways.

Our discussion extends to the steps, stages, phases, and seasons of lifespan development, providing a structured framework to understand the progression of human growth. We then transition to "Big Picture Models of Lifespan Development," where we explore the Indigenous Connectedness Framework and Bronfenbrenner's Ecological Systems Theory, offering insights into the relational, social, and environmental and systemic aspects of development.

We will then explore "Focused Perspectives on Lifespan Development," examining key studies and theories that have shaped our understanding of human development. This includes the famous doll experiment by Mamie and Kenneth Clark, Vygotsky's sociocultural theory of cognition, and Erikson's stages of psychosocial development. We also review Piaget's stages of cognitive development and delve into moral development through the lens of Kohlberg and Gilligan, alongside discussions on racial identity, feminist identity, and spiritual development.

We finish this chapter by exploring the stages of biological development from prenatal stages to adolescence, and the emerging adulthood phase. We give special attention to the impact of the Indian Residential School System on healthy development, highlighting the importance of understanding the impacts of harm and the vital role of resilience within developmental contexts.

Through this comprehensive overview, our goal is to give you a deep understanding of the nature of human development, encouraging a holistic and inclusive approach to studying the human lifespan.

Research Methods in Developmental Psychology

In a previous chapter we discussed a variety of research methods used by psychologists. Developmental psychologists use many of these approaches in order to better understand how individuals change mentally and physically over time. These methods include naturalistic observations, case studies, surveys, and experiments, among others. Here is a brief refresher of some of these research methods used by developmental psychologists.

Naturalistic Observation

Naturalistic observations involve observing behaviour in its natural context. A developmental psychologist might observe how children behave on a playground, at a daycare centre, or in the child's own home. While this research approach provides detailed information into how children behave in their natural settings, researchers also have very little control over the types and/or frequencies of displayed behaviour. One important, naturalistic study on the impacts of TV on children's development was conducted in British Columbia by Tannis MacBeth and her colleagues (Heilbronn & Williams, 1987). MacBeth's internationally famous work has even been made into a full-length graphic novel.

Case Study Methodology

In a **case study**, developmental psychologists collect a great deal of information from one individual in order to better understand physical and psychological changes over the individual's lifespan. This particular approach is an excellent way to better understand individuals who are exceptional in some way, but it is especially prone to researcher bias in interpretation, and it is difficult to generalise conclusions to the larger population.

Survey Method

The **survey method** asks individuals to self-report important information about their thoughts, experiences, and beliefs. This particular method can provide large amounts of information in relatively short amounts of time; however, validity of data collected in this way relies on honest self-reporting, and the data is relatively shallow when compared to the depth of information collected in a case study.

Controlled Experiments

Experiments involve significant control over extraneous (not relevant or related to the subject) variables and manipulation of the independent variable. As such, experimental research allows developmental psychologists to make causal statements about certain variables that are important for the developmental process. Because experimental research must occur in a controlled environment, researchers must be cautious about whether behaviours observed in the laboratory translate to an individual's natural environment.

What is "Normal" Development?

It is natural for us to ask, "what is normal development?" When we try to answer this question from an evidence-based approach, we discover that what is "normal" for children of a certain age varies by race, gender, culture, economic resource, access to health care, experiences with significant stressors, and so on. Historically, **normative psychologists** studied large numbers of children from predominantly WEIRD backgrounds (see definition in textbox) at various ages to attempts to establish norms (i.e., average ages) of when most children reach specific developmental milestones in each of the three domains (Gesell, 1933, 1939, 1940; Gesell & Ilg, 1946; Hall, 1904). By being mindful of the errors that can happen

when we over-generalise western norms, we can use these age-related averages as *imperfect* guidelines to compare children with same-age peers to determine the approximate ages at which they *may* reach specific normative events called developmental milestones (e.g., crawling, walking, writing, dressing, naming colours, speaking in sentences, and starting puberty).

Note: WEIRD stands for Western, Educated, Industrialized, Rich, and Democratic.
This term is used to describe the type of backgrounds that a lot of psychological research is based on. Historically, many studies have focused on people from countries or societies that are wealthy, have high levels of education, and democratic governments. The problem is that not everyone in the world lives in these kinds of places or has these experiences.

Issues in Developmental Psychology

In this chapter, we will explore various theoretical perspectives on human development that seek to explain how people change over time. Our discussions will cover key debates, such as the continuous or discontinuous nature of development, the universality or individuality of developmental pathways, and the interplay between genetics and environment. We will also delve into the pros and cons of a broad perspective versus focused details; understand the practical and therapeutic applications of lifespan theories; examine the disproportionate impact of discriminatory, social, environmental, and health factors on minorities' development; reflect on how challenges can be forces that foster growth; and acknowledge the need for improving research practices in lifespan studies.

Is Development Continuous or Discontinuous?

Continuous development is an additive or cumulative process, gradually improving on existing skills. For example, as a flower grows, we see millimetres added to its height day by day. Discontinuous development, in contrast, happens in distinct stages and occurs at specific times or ages, such as a butterfly's growth from egg to larva, pupa, and adult butterfly, respectively (Figure LD.2).

(a) A flower growing over time, (b) the lifecycle of a butterfly.

Figure LD.2. Continuous development. *The concept of continuous development can be visualized as a smooth slope of progression, whereas discontinuous development sees growth in more discrete stages. The difference between continuous and stage-based development.* ***Alt. text:*** *(a) A flower growing over time, (b) the lifecycle of a butterfly.* ***Source:*** *Cyanocorax adapted by Dinesh Ramoo is licensed under a CC0 (Creative Commons Zero) licence.*

Is There One Course of Development or Many?

Does child development follow a universal pattern, or is it individualized, shaped by each child's unique genetic makeup and environment? Some stage theorists predict that the course of development is universal, with growth occurring in both predictable continuous sequences and spurts of discontinuous growth. Yet we live in diverse contexts that have a unique effect on each of us. For example, researchers once believed that motor development follows one course for all children, regardless of culture. However, child care practices vary by culture, and different practices have been found to alter the timing of developmental milestones such as sitting, crawling, and walking (Karasik, Adolph, Tamis-LeMonda, & Bornstein, 2010).

For example, let's look at the Aché society in Paraguay. They spend a significant amount of time foraging in forests. While foraging, Aché mothers carry their young children, rarely putting them down, in order to protect them from getting hurt in the forest. Consequently, their children walk much later, at around 23 to 25 months old, in comparison to infants in Western cultures who begin to walk at around 12 months old. However, as Aché children become older, they are allowed more freedom to move about, and by about age 9, their motor skills surpass those of American children of the same age; 9-year-old Aché children are able to climb trees up to 25 feet tall and use machetes to chop their way through the forest (Kaplan & Dove, 1987). So, development can be influenced by different contexts, but the functions themselves are present in all societies (Figure LD.3).



(a) (b)

Figure LD.3. Children enjoying the beach. *All children across the world enjoy exploring sand, sunshine, and the sea.* ***Alt. text:*** *(a) Two children playing in the sand at a beach. (b) Children playing in the shallow water at the beach.* ***Source:*** *(a) Image by Michelle Raponi from Pixabay and (b) Image by Tania Dimas from Pixabay are used under the Pixabay Content Licence.*

How Do Nature and Nurture Influence Development?

To what extent do **nature** (biology and genetics) and **nurture** (environment and culture) contribute to development? We are all born with specific genetic traits inherited from our parents, such as eye colour, height, and certain personality traits. There are also important interactions between our genes and our environment; our unique experiences in our environment influence if and how particular traits are expressed, and at the same time, our genes influence how we interact with our environment (Diamond, 2009; Lobo, 2008). In the early years of psychology it was popular to debate Nature **or** Nurture. In contrast, this chapter will show that there is a reciprocal, back and forth interaction between nature and nurture as they both shape who we become, but the debate continues as to the relative contributions of each.

The Hard Choice Between Big Picture versus Focused Details

It is not possible to see all the ways in which we humans change, in every circumstance, in every social and environmental setting, and during every year of our lives, all at once. If we are to understand the patterns of human growth, we necessarily need to focus on one observable piece of the mystery — one part of the story of human change at a time. We need to create a model.

A **model** is a simplified, often visualized narrative or story that helps guide our observations and analyses as we actively seek out behaviours. A model could be a big-picture overview of human development in a holistic web of environmental, community, intergenerational, family, cultural, and spiritual interconnections — for example, Indigenous Interconnectedness Framework. A model could also be the highly interactive interdependent relations and dynamics at play with the human systems that surround an individual as they grow (e.g., Bronfenbrenner's Ecological Systems Theory).

In addition, a model can also be focused on the fine details of one human capacity (e.g., Piaget's stages of cognitive development, Kohlberg's stages of moral development, and Fowler's stages of spiritual development).

There is tension when we adopt any model, however. On the one hand, in a big-picture overview we may not see the intricacies afforded by focusing on the fine details. On the other hand, when we focus on a single human capacity or other more precise details, we may miss understanding how the big picture influences our interpretations. This tension is both a blessing and a challenge when we have to use models and create narratives about human development.

Social and Environmental and Health Factors Impact Minorities Harder

Developmental delays, significantly impeding (slowing down or stopping) healthy growth, can be caused by factors such as poverty, neglect, and racism, each introducing unique challenges that gradually undermine development and wellness. Poverty restricts access to essential resources, limiting opportunities for growth and negatively affecting academic achievement (Haushofer & Fehr, 2014; Kim & Rouse, 2011). Neglect, characterised by a lack of physical and emotional support from caregivers, leaves lasting scars that negatively affect emotional well-being and contribute to psychological disorders and cognitive impairments (Norman et al., 2012; Gilbert et al., 2009). Racism not only hinders educational advancement and increases academic disparities (gaps) but also adversely affects mental and physical

health, with the chronic stress from racial discrimination leading to biological wear and tear, known as **allostatic load**, thereby fostering long-term health disparities (Gershenson et al., 2016; Trent et al., 2019).

Counter-Intuitively, Challenges Can Stimulate More Growth than Calm

Growth and learning fundamentally come from our responses to challenge, conflict, or provocation. While it might seem intuitive to associate growth and learning with comfort and stability, many psychological and philosophical theories actually underscore the crucial role of conflict, challenge, and provocation in stimulating these processes (Dweck, 2006; Nietzsche, 1888; Csikszentmihalyi, 1990). If we are always comfortable and all our needs were always met, there would be no reason for us to grow or learn. Lifespan developmental scientists and therapists celebrate and dig deeper into our moments of challenge. For example, our sudden surprise while encountering something new, our experience of threat and fear, our wish for something more, our pain after a great loss, and our accommodating to our changing biology can all provoke our growth and learning. When philosopher Nietzsche said, "what does not kill me, makes me stronger," (Nietzsche, 1886/1998) he was summing up one of the paradoxes in our discipline — that positive change requires challenge and conflict as much, or more, than comfort and stability. Of course, to thrive as happy, healthy humans, we need to find a balance between challenge/conflict and comfort/stability (Ryff, 1989; Seligman & Csikszentmihalyi, 2000).

As we work through this chapter, it is important to start on common ground by understanding some basic terminology used within our field. Let's begin by defining the terms 'steps'/sequences,' 'stages', 'phases', and 'seasons' of lifespan development, which we will be using frequently throughout this chapter.

Steps, Stages, Phases, and Seasons of Lifespan Development

Outside of lifespan development, terms such as "steps/sequences," "stages," "phases," and "seasons" might be used interchangeably, but within the context of lifespan developmental science, these terms have significant differences in meaning.

Steps or Sequences

Steps or sequences (i.e., adding skill upon skill) often refer to specific, measurable tasks or actions within a larger process, that usually, but not always, need to be performed in a sequential order. For instance, in the realm of child development, the ability to walk is a crucial step that usually comes after crawling (Berger, 2014).

Stages

Stages (transformations) imply a broader view of development. They are typically associated with theory-based models of lifespan development such as stages of psychosocial (Erikson, 1950), cognitive (Piaget, 1952) and moral development (Kohlberg, 1981). Each stage represents a unique set of developmental tasks or conflicts that must be resolved before an individual can move to the next stage. Because there is a qualitative transformation, by definition, it is theoretically impossible to return to a prior stage (except in the case of brain injury). For example, once you are born, there is no going back into the womb.

Phases

Phases, in the context of development, are less strictly defined than steps/sequences and stages. Phases can be thought of as broader periods or epochs in an individual's life where certain characteristics, behaviours, or experiences are more prevalent (Neugarten, 1979).

Seasons

Seasons (recurring rhythms of change) in lifespan development represent cyclical, recurrent, or natural periods that capture the fluid and rhythmic progression of life. For example, our human life span can be described as the physical seasons of nature: Spring (birth), Summer (youth), Autumn (middle age), and Winter (elder years). This perspective underscores the continuous cycle of growth and transformation throughout the lifespan (Levinson, 1986; Hodge, Struthers, & Geishirt Cantrell, 2002).

These terms provide a framework for understanding both the continuous, discontinuous, and recurring patterns of human development, yet it is crucial to recognise that individual experiences can vary significantly and might not always adhere to these structured concepts (Lerner, 2006).

Conclusion

In concluding this section on developmental psychology's basics, we recognise that studying human development is both complex and intriguing. We have covered various research methods, the nature versus nurture debate, developmental stages, and the influence of societal and environmental factors. This examination reveals the diversity and complexity of human growth, enhancing our understanding of both ourselves and others. Moving forward, it's important to remember that developmental study goes beyond merely noting changes; it involves understanding the many experiences that shape and define us as we grow. With this knowledge, we can better understand patterns of growth, address life's challenges and achievements, and appreciate our interdependent connection to the broader world.

Focused Perspectives on Lifespan Development

JESSICA MOTHERWELL MCFARLANE

Doll Experiment

Mamie and Kenneth Clark's doll experiment in the 1940s made a pivotal contribution to our understanding of lifespan development, particularly in the context of racial bias and its influence on self-perception from an early age. This experiment was designed to explore the psychological impact of segregation on African-American children by presenting them with two dolls, identical except for their skin and hair colour, and asking the children to choose based on preference and the attribution of positive traits. The majority of children — both Black and white — preferred the white doll, associating it with positive characteristics. This preference indicated an early internalisation (inner sense of self) of racial bias and a negative self-perception among Black children, influenced by societal norms of racial discrimination.

The findings from this experiment underscore the profound effect of societal factors, like discrimination, on a child's self-esteem and self-image, illustrating how early experiences of bias can impact development and mental health throughout life. The Clarks' work emphasised the importance of the early environment in shaping an individual's development, highlighting the need for societal changes to address these biases.

Their study significantly influenced the Brown versus Board of Education Supreme Court case in 1954, which led to school desegregation in the US. It underscored the importance of inclusive environments for positive child development and influenced educational policies and environments for future generations.

The Clarks' experiment revealed the impact of societal factors on self and others' perception, informing interventions to support healthy development across the lifespan.

https://youtu.be/BceFXfC1aG4?si=D6W7YZ_R93wKkgBU

Vygotsky and the Sociocultural Construction of Cognition

Lev Vygotsky's sociocultural theory of development emphasises the significant role of culture and social interactions in shaping cognitive development. Central to his theory are three distinct zones that describe the steps of learning and development, which can be simplified to: "What I Cannot Do Yet", "What I Can Do With Help (Zone of Proximal Development)", and "What I Can Do By Myself (Zone of Achieved Development)". Let's look at each step.

Prior to entering the Zone of Development (What I Cannot Do Yet) there are tasks and concepts that lie beyond an individual's current capabilities and understanding. These represent areas of future learning and growth, highlighting the potential for development as foundational skills are strengthened and more complex tasks are approached.

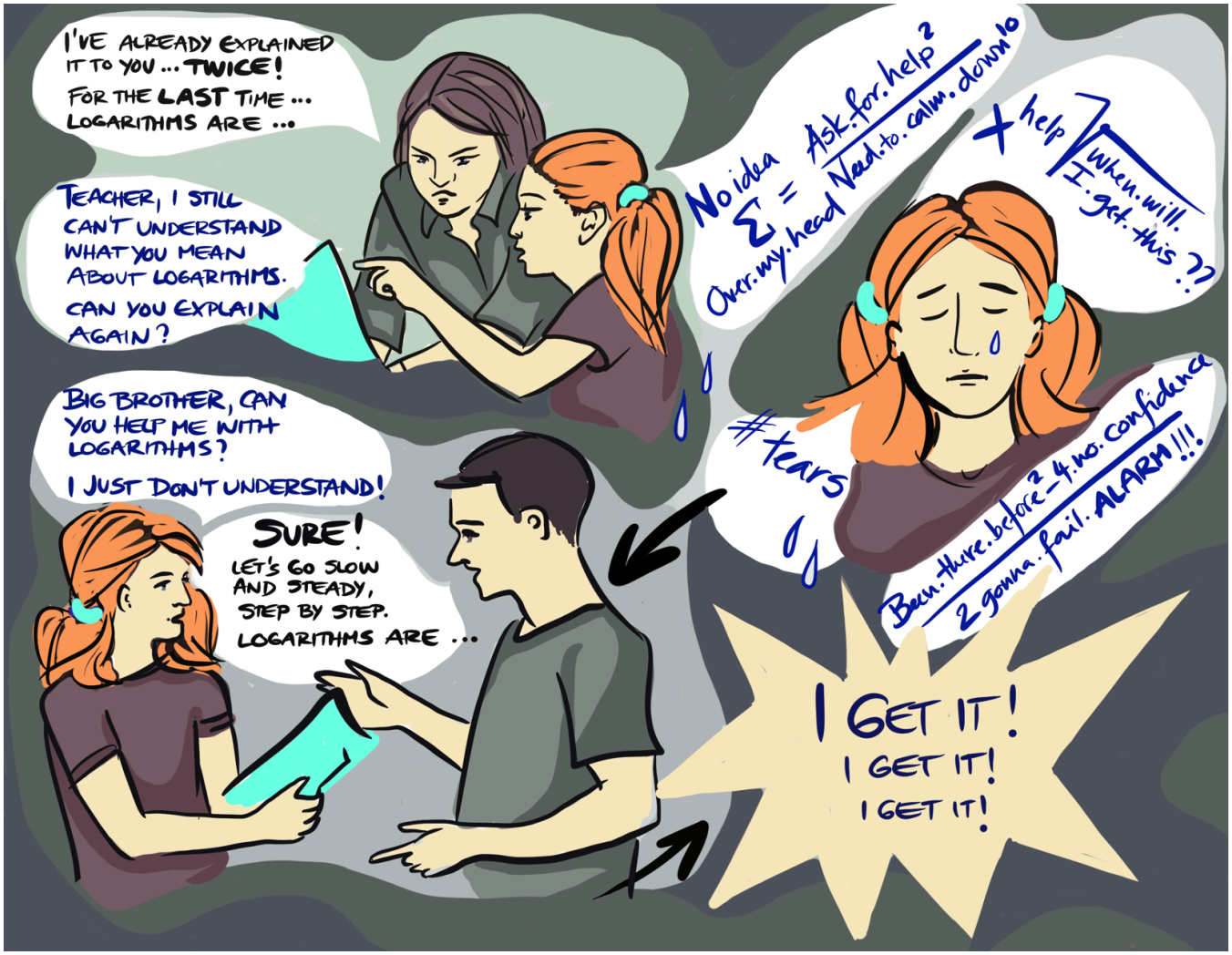


Figure LD.5. Scaffolding and the Zone of Proximal Development. Alt. text: *A comic shows a student struggling with logarithms until a patient explanation from her brother leads to understanding.* ***Source:*** *Scaffolding and the Zone of Proximal Development by Marie Bartlett is licensed under a CC BY 4.0 Licence.*

Zone of Proximal Development (What I Can Do With Help) is the core of Vygotsky's theory. This zone defines the difference between what a learner can achieve independently and what they can accomplish with guidance and encouragement from someone more knowledgeable, such as a teacher, parent, or peer. It's in this zone that the concept of scaffolding plays a crucial role. **Scaffolding** involves step by step, customized support provided by the more knowledgeable other, which is gradually withdrawn as the learner gains independence. Tasks within the zone of proximal development are slightly beyond the learner's current reach but are attainable with the appropriate support, facilitating significant learning and cognitive development.

Zone of Achieved Development (What I Can Do By Myself) encompasses the tasks and concepts an individual can perform or understand without any external assistance. This zone reflects the learner's current level of independent competence, showcasing the skills and knowledge they have already mastered. It serves as the foundation for future learning, as the skills acquired independently become the basis for tackling more challenging tasks within the Zone of Proximal Development.

By identifying these three learning zones, Vygotsky highlights how important mentors, Elders, and knowledgeable peers are to our ability to learn and grow. Through this framework, Vygotsky provides a comprehensive model for understanding how individuals progress from potential development to actualised skills and knowledge.

Psychosocial Development: Erikson



Figure LD.6. Erik Erikson. *Erik Erikson proposed the psychosocial theory of development. In each stage of Erikson's theory, there is a psychosocial task that we must master in order to feel a sense of competence.* ***Alt. text:*** *A photograph depicts Erik Erikson in his later years.* ***Source:*** *Public Domain image*.

Erik Erikson's (1902–1994) psychosocial development theory emphasises the social nature of our development. Erikson (1963) proposed that we are motivated by a need to achieve competence in certain areas of our lives. According to psychosocial theory, we experience eight stages of development over our lifespan, from infancy through late adulthood. At each stage, there is a conflict, or task, that we need to resolve. Successful completion of each developmental task results in a sense of competence and a healthy personality. Failure to master these tasks leads to feelings of inadequacy. Let's look at Erikson's eight stages of psychosocial development:

- **Infancy (birth to 12 months): Trust versus mistrust** is the core conflict, where responsive care fosters trust in infants while neglect leads to mistrust. Infants are dependent upon their caregivers, so caregivers who are responsive and sensitive to their infant's needs help their baby to develop a sense of trust; their baby will see the world as a safe, predictable place. Unresponsive caregivers who do not meet their baby's needs can engender feelings of anxiety, fear, and mistrust; their baby may see the world as unpredictable.
- **Toddlerhood (1–3 years):** The stage of **autonomy versus shame and doubt**, where toddlers learn independence through choices, enhancing autonomy; over-restriction fosters doubt. This is the "I do it" stage.
- **Preschool (3–6 years): Initiative versus guilt**, where children develop self-confidence and purpose through initiating activities; excessive criticism leads to guilt. Those who do will develop self-confidence and feel a sense of purpose.
- **Elementary School (7–11 years): Industry versus inferiority**, where children build pride and accomplishment through skills and activities; failure to match peers can cause feelings of inferiority. They either develop a sense of pride and accomplishment in their schoolwork, sports, social activities, and family life, or they feel inferior and inadequate when they don't measure up.
- **Adolescence (12–18 years): Identity versus role confusion**, focusing on developing a strong sense of self; failure results in confusion about identity and future roles. Adolescents struggle with questions such as "Who am I?" and "What do I want to do with my life?" Along the way, most adolescents try on many different selves to see which ones fit. Adolescents who are successful at this stage have a strong sense of identity and are able to remain true to their beliefs and values in the face of problems and other people's perspectives. Others might feel unsure of their identity and confused about the future.
- **Early Adulthood (20s to early 40s): Intimacy versus isolation**, where forming intimate relationships is key; failure leads to isolation. After we have developed a sense of self in adolescence, we are ready to share our life with others. Erikson said that we must have a strong sense of self before developing intimate relationships with others.
- **Middle Adulthood (40s to mid-60s): Generativity versus stagnation**, involving

contributing to others' development; failure results in a sense of stagnation. Generativity involves finding your life's work and contributing to the development of others, through activities such as volunteering, mentoring, and raising children.

- **Late Adulthood (mid-60s onward): Integrity versus despair**, where reflecting on life achievements can lead to satisfaction; failure may result in regret and despair. People in late adulthood reflect on their lives and feel either a sense of satisfaction or a sense of failure. People who feel proud of their accomplishments have a sense of integrity, and they can look back on their lives with few regrets. However, people who are not successful at this stage may feel as if their lives have been wasted.

Table LD.1. Erikson's stages of psychosocial development

Stage	Age (years)	Developmental Task	Description
1	0–1	Trust versus mistrust	Develop trust (or mistrust) that basic needs, such as nourishment and affection, will be met.
2	1–3	Autonomy versus shame/doubt	Develop a sense of independence in many tasks.
3	3–6	Initiative versus guilt	Take initiative on some activities; may develop guilt when unsuccessful or boundaries overstepped.
4	7–11	Industry versus inferiority	Develop self-confidence in abilities when competent or sense of inferiority when not.
5	12–18	Identity versus confusion	Experiment with and develop identity and roles.
6	19–29	Intimacy versus isolation	Establish intimacy and relationships with others.
7	30–64	Generativity versus stagnation	Contribute to society and be part of a family.
8	65–	Integrity versus despair	Assess and make sense of life and meaning of contributions.

Table Source: Erikson, E. H. (1950). Erikson's stages of psychosocial development. In Childhood and society (pp. 247-274). W. W. Norton & Company.

Stages of Cognitive Development: Piaget

Jean Piaget (1896–1980) is another stage theorist who studied childhood development (Figure LD.7). Instead of approaching development from a psychosocial perspective, Piaget focused on children's cognitive growth. He believed that thinking is a central aspect of development and that children are naturally inquisitive. However, he said that children do not think and reason like adults (Piaget, 1930, 1932). His theory of cognitive development suggests that our cognitive abilities develop through specific stages, which is an example of the discontinuity of development, i.e., as we progress to a new stage, there is a distinct and irreversible shift in how we think and reason.



Figure LD.7. Piaget. *Jean Piaget spent over 50 years studying children and how their minds develop.* ***Alt. text:*** *A photograph depicts Jean Piaget in his later years.* ***Source:*** *Public Domain image*

Piaget said that children develop schemata to help them understand the world. **Schemata** are concepts (mental models) that are used to help us categorise and interpret information. By the time children have reached adulthood, they have created schemata for almost

everything. When children learn new information, they adjust their schemata through two processes: assimilation and accommodation. First, they assimilate new information or experiences in terms of their current schemata: **assimilation is** when they take in information that is comparable to what they already know; **accommodation** describes when they change their schemata based on new information. This process continues as children interact with their environment.

For example, 2-year-old Majd learned the schema for dogs because his family has a Labrador Retriever. When Majd sees other dogs in his picture books, he says to his parents, "Dog!" So Majd has **assimilated** them into his schema for dogs. One day, Majd sees a sheep for the first time and says to his parent, "Dog!" Having a basic schema that a dog is an animal with four legs and fur, Majd thinks all furry, four-legged creatures are dogs. When Majd's parent tells him that the animal he sees is a sheep, not a dog, Majd must **accommodate** his schema for dogs to include more information based on his new experiences. Majd's schema for dog was too broad, since not all furry, four-legged creatures are dogs. He now modifies his schema for dogs and forms a new one for sheep.

Like Erikson, Piaget thought that development unfolds in a series of stages approximately associated with age ranges. He proposed a theory of cognitive development that unfolds in four stages: sensorimotor, pre-operational, concrete operational, and formal operational (Table LD.2).

Table LD.2. Piaget's Stages of Cognitive Development

Age (years)	Stage	Description	Developmental issues
0–2	Sensorimotor	World experienced through senses and actions.	Object permanence; Stranger anxiety
2–6	Preoperational	Use words and images to represent things, but lack logical reasoning.	Pretend play; Egocentrism; Language development
7–11	Concrete operational	Understand concrete events and analogies logically; perform arithmetical operations	Conservation; Mathematical transformations
12–	Formal operational	Formal operations; Utilise abstract reasoning	Abstract logic; Moral reasoning

Table source: Piaget, J. (2001). Piaget's stages of cognitive development. In B. Inhelder, H. H. Chipman, & C. Zwingmann (Eds.), The essential Piaget (pp. 241-246). Basic Books.

Stage 1 – Sensorimotor Stage

The first stage is the sensorimotor stage, which lasts from birth to about 2 years old.

- During this stage, children learn about the world through their senses and motor behaviour.
- Young children put objects in their mouths to see if the items are edible, and once they can grasp objects, they may shake or bang them to see if they make sounds.
- Between 5 and 8 months old, the child develops **object permanence**, which is the understanding that even if something is out of sight, it still exists (Bogartz, Shinskey, & Schilling, 2000). According to Piaget, young infants do not remember an object after it has been removed from sight. Piaget studied infants' reactions when a toy was first shown to an infant and then hidden under a blanket. Infants who had already developed object permanence would reach for the hidden toy, indicating that they knew it still existed, whereas infants who had not developed object permanence would appear confused.

In Piaget's view, around the same time children develop object permanence, they also begin to exhibit stranger anxiety, which is a fear of unfamiliar people. Babies may demonstrate this by crying and turning away from a stranger, by clinging to a caregiver, or by attempting to reach their arms toward familiar faces such as parents. Stranger anxiety results when a child is unable to assimilate the stranger into an existing schema; therefore, the child can't predict what their experience with that stranger will be like, which results in a fear response.

Stage 2 – Preoperational Stage

Piaget's second stage is the preoperational stage, which is from approximately 2 to 7 years old. In this stage, children can:

- Use symbols to represent words, images, and ideas, which is why children in this stage engage in pretend play.
- Use language in the preoperational stage, but they cannot understand adult logic or mentally manipulate information (the term **operational** refers to logical manipulation of information, so children at this stage are considered to be preoperational). Children's logic is based on their own personal knowledge of the world so far, rather than on conventional knowledge.
- Cannot perform mental operations because they have not developed an understanding of conservation, which is the idea that even if you change the

appearance of something, it is still equal in size as long as nothing has been removed or added.

Stage 3 – Concrete Operational Stage

Piaget's third stage is the concrete operational stage, which occurs from about 7 to 11 years old. In this stage, children can:

- Think logically about real (concrete) events; they have a firm grasp on the use of numbers and start to employ memory strategies;
- Perform mathematical operations and understand transformations, such as the fact that addition is the opposite of subtraction, and multiplication is the opposite of division; and
- Master the concept of conservation: even if something changes shape, its mass, volume, and number stay the same.

Children in the concrete operational stage also understand the principle of **reversibility**, which means that objects can be changed and then returned back to their original form or condition. Take, for example, water that you poured into the short, wide glass; you can pour that same volume of water from the short, wide glass into a new thin, tall glass and still have the same amount (minus a couple of drops).

Stage 4 – Formal Operational Stage

The fourth, and last, stage in Piaget's theory is the formal operational stage, which is from about age 11 to adulthood. Children in the formal operational stage can:

- Deal with abstract ideas and hypothetical situations; this is because they tend to think more flexibly and creatively;
- Use abstract thinking to problem-solve, look at alternative solutions, and test these solutions.

Stage 5 – Beyond Formal Operational Thought

As with other major contributors of theories of development, several of Piaget's ideas have come under criticism; several contemporary studies support a model of development that is more continuous than Piaget's discrete stages (Courage & Howe, 2002; Siegler, 2005, 2006). Many others suggest that children reach cognitive milestones earlier than Piaget describes (Baillargeon, 2004; de Hevia & Spelke, 2010).

According to Piaget, the highest level of cognitive development is formal operational thought, which develops between 11 and 20 years old. However, many developmental psychologists disagree with Piaget, suggesting a fifth stage of cognitive development, known as the postformal stage (Basseches, 1984; Commons & Bresette, 2006; Sinnott, 1998).

In postformal thinking, decisions are made based on situations and circumstances, and logic is integrated with emotion as adults develop principles that depend on contexts. One way that we can see the difference between an adult in postformal thought and an adolescent in formal operations is in terms of how they handle emotionally charged issues.

Watch this video: **Tricky Topics: Piaget's Developmental Stages (9 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=909#oembed-1***

"Tricky Topics: Piaget's Developmental Stages" video by FirstYearPsych Dalhousie is licensed under the Standard YouTube Licence.

Moral Development: Kohlberg and Gilligan

Kohlberg's Stages of Moral Development

A major task, beginning in childhood and continuing into adolescence, is distinguishing right from wrong. Lawrence Kohlberg (1927–1987) attempted to extend Piaget's ideas about stages of cognitive development to moral development, suggesting that morality, too, was developed over a series of stages throughout life. To develop this theory, Kohlberg posed moral dilemmas to people of all ages and placed them in particular stages based upon analysis of their answers.

Kohlberg divided moral development into three main levels: pre-conventional, conventional, and post-conventional, each reflecting a different way of thinking about morals and ethics.

Watch this video: **Kohlberg's 6 Stages of Moral Development (7 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=909#oembed-2***

"Kohlberg's 6 Stages of Moral Development" video by Sprouts is licensed under the Standard YouTube Licence.

Pre-conventional level

At the pre-conventional level, there is an understanding of morality based on consequences and personal benefits. This is the initial stage of moral development, primarily seen in children.

- **Stage 1: Obedience and punishment orientation ("Do right to avoid trouble").** At this stage, children see rules as fixed and absolute. They obey rules not because they understand them, but because they fear punishment. For example, a child may refrain from stealing a toy because they fear being reprimanded or punished.
- **Stage 2: Individualism and exchange ("What's in it for me?").** Here, children realise that different individuals have different viewpoints. They start to consider what's in it for them. Rules are followed if they align with their immediate personal interest. For instance, a child might do a chore in exchange for a reward.

Conventional level

At the conventional level, moral decisions are based on societal norms (staying within social and cultural conventions) and the desire to maintain order and good relationships. This level is typical in adolescence and adulthood.

- **Stage 3: Good interpersonal relationships ("Be a good person").** At this stage, people strive for social approval and good relationships. They try to be "good" by living up to social expectations and roles. For example, a worker might go the extra mile on a task

not because they think it's right, but because they want to be seen as a good employee.
- **Stage 4: Maintaining the social order ("Law and order").** People start to consider society as a whole. They recognise the importance of obeying laws and respect authority for maintaining social order. An example is a citizen paying taxes not just because it's the law, but because they understand the role of taxes in societal functioning.

Post-conventional level

At the post-conventional level, there is a questioning of authority and societal norms (going beyond social and cultural conventions) and decisions based on personal principles of justice and human rights.

- **Stage 5: Social contract and individual rights ("Questioning authority").** Here, people understand that while rules and laws exist for the good of the majority, there are times when those laws can work against the rights of some individuals. They begin to account for different values, opinions, and beliefs. For instance, someone may support civil disobedience to challenge laws they see as unjust.
- **Stage 6: Universal principles ("Moral compass").** At this stage, people have developed their own set of moral guidelines which may or may not align with societal laws. These principles are abstract and ethical, not concrete rules. They're upheld regardless of official rules and laws and applied universally. An example might be a person who believes in and practices non-violence, even when it's legally permissible or advantageous to be violent.

It's important to note that Kohlberg believed individuals could only progress through these stages in the order listed, and that moral understanding is linked to cognitive development. However, not everyone reaches the post-conventional level; some people stop at earlier stages and spend their whole lives there. Critics have argued that Kohlberg's stages are overly focused on justice and don't sufficiently incorporate other important moral values, such as compassion and care.

Table LD.3. Kohlberg's Stages of Moral Development

Level	Stage	Description
Pre-Conventional	1: Obedience and Punishment Orientation	Children see rules as fixed and absolute, obeying to avoid punishment.
Pre-Conventional	2: Individualism and Exchange	Children start to see that different individuals have different viewpoints, following rules if it aligns with their interests.
Conventional	3: Good Interpersonal Relationships	People strive for social approval and good relationships, trying to be 'good' by living up to expectations.
Conventional	4: Maintaining the Social Order	People consider society as a whole, recognising the importance of laws and authority for social order.
Post-Conventional	5: Social Contract and Individual Rights	People understand that laws exist for the majority's good, but can challenge them if they infringe on individual rights.
Post-Conventional	6: Universal Principles	People follow their own set of moral guidelines, which may not align with societal laws, based on universal principles.

Table Source: Kohlberg, L. (1971). Kohlberg's stages of moral development. In W. C. Crain (Ed.), Theories of Development (pp. 118-136). Pearson Education.

Carol Gilligan and the Ethic of Care

Using this framework, Kohlberg erroneously claimed that more males than females reach higher stages and that females seem to be deficient in their moral reasoning abilities (1969). Carol Gilligan, who worked with Kohlberg, challenged his framework (Gilligan, 1982). Kohlberg studied predominantly upper-middle class, white males and Gilligan pointed out the obvious bias inherent in basing a theory on such a narrowly defined group of people. Using female participants, she redefined Kohlberg's stages to allow moral problems to be considered from different perspectives.

Although an improvement over Kohlberg's theories, the dilemma-based tasks used by Gilligan assessed moral reasoning, which is different from moral behaviour. Sometimes what we say we'd do in a situation ("talk the talk") is not what we actually do ("walk the walk"). So, how exactly does one define moral behaviour? The definition of what makes a "good person" has long been the subject of philosophical debate and is unlikely to reach consensus anytime soon. As a tool for measuring moral development, neither Kohlberg's nor

Gilligan's dilemmas are feasible in young children, who do not have the language comprehension required for these tests. In fact, Kohlberg lumped all children under the age of 10 in the same level of moral development.

A more evidence-based approach is to measure specific components of morality which are easier to define, like **prosocial** behaviour, defined as any behaviour done with the intention of benefiting someone else. This includes acts such as helping, consoling, and sharing, and can be assessed using simple behavioural tests. For example, participants can be asked to allocate resources to themselves and others under different conditions. Research using these simpler tasks has revealed that helping behaviour and sharing are evident in children as young as 2 years old, and that the nature of these prosocial behaviours changes over the course of development (Warneken & Tomasello, 2006; Williams et al., 2014).

One 2019 study compared rates at which infants demonstrated **prosocial behaviours** (i.e., caring for others) across a range of three different ages: 16-, 19-, and 24-months-old. To do this, infants were placed in a situation where a researcher, using verbal communication and body language, indicated that they needed help with a basic task, such as finding a hidden toy. They then recorded the infants' prosocial behaviour according to three different categories: instrumental helping (such as offering the researcher a different object), comforting (such as hugging the upset researcher), and indirect helping (such as asking another adult in the room for help). The study found that the 24-month old children were significantly more likely to demonstrate prosocial behaviours than the 16- and 19-month-olds, particularly when it came to comforting. This suggests that the second year of life is an extremely important period in the development of this important component of morality (Holvoet, et al. 2019).

This approach remedies some of the problems with Kohlberg's studies, in that he didn't define specific "good" or "bad" behaviours. Rather he assumed that his own ideas about good versus bad behaviour were true, and incorporated these assumptions into the design of his studies. Therefore, the outcomes of Kohlberg's studies were strongly influenced by his culturally-informed ideas about morality. Instead focusing on one aspect of morality, like prosocial behaviour (described above), it allows researchers to assess developmental changes without judging this aspect as morally good or bad. This approach also ensures that judgements about what constitutes "good" behaviour doesn't colour the scientific data being collected or the design of the studies being done.

Conclusion

In concluding our look at “Focused Perspectives on Lifespan Development,” we’ve examined a range of theories and concepts that enhance our understanding of human development. We’ve discussed intersectionality, power, and diverse viewpoints, along with Vygotsky’s sociocultural theory and the impact of technology on young people. This section highlighted various factors that shape development.

Each topic has shown how individuals interact with their surroundings, emphasising the role of context, culture, and social dynamics in development. Through various analyses, we’ve observed how both challenges and opportunities enrich human development across the lifespan.

Moving forward, we recognise development as a multifaceted process, shaped by social, cultural, and psychological factors. This section has provided the tools to critically understand and appreciate human development’s complexity, promoting a comprehensive and inclusive view of the developmental journey from infancy to adulthood.

Ages, Stages, and Milestones of Development

JESSICA MOTHERWELL MCFARLANE

Infancy Through Childhood

The average newborn weighs approximately 7.5 pounds. Although small, a newborn is not completely helpless because their reflexes and sensory capacities help them interact with the environment from the moment of birth. All healthy babies are born with newborn reflexes: inborn automatic responses to specific forms of stimulation. Reflexes help the newborn survive until they're capable of more complex behaviours; these reflexes are crucial to survival. They are present in babies whose brains are developing normally and usually disappear around 4–5 months old.

Let's Take a Look at Some of These Newborn Reflexes

The **rooting reflex** is the newborn's response to anything that touches their cheek; when you stroke a baby's cheek, they naturally turn their head in that direction and begin to suck. The **sucking reflex** is the automatic, unlearned, sucking motions that infants do with their mouths. You can observe the **grasping reflex** if you put your finger into a newborn's hand, they automatically grasp anything that touches their palms.

The **Moro reflex** is the newborn's response when a baby feels like they are falling. The baby spreads their arms, pulls them back in, and then (usually) cries. How do you think these reflexes promote survival in the first months of life?

Watch this video, created by the Inter-Tribal Council of Michigan, describing and showing newborn reflexes, to learn more.

Watch this video: **Newborn Reflexes: The Power of Your Newborn (5 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=920#oembed-1***

“Newborn Reflexes: The Power of Your Newborn” video by Inter-Tribal Council of Michigan is licensed under the Standard YouTube Licence.

What Can Young Infants See, Hear, and Smell?

Newborn infants’ sensory abilities are significant, but their senses are not yet fully developed. Many of a newborn’s innate preferences facilitate interaction with caregivers and other humans. Although vision is their least developed sense, newborns already show a preference for faces. Babies who are just a few days old also prefer human voices; they will listen to voices longer than sounds that do not involve speech (Vouloumanos & Werker, 2004). They seem to prefer the voice of the parent in whose womb the baby developed over a stranger’s voice (Mills & Melhuish, 1974). 3-week-old babies were given pacifiers that played a recording of the pregnant parent’s voice and of a stranger’s voice. When the infants heard their parent’s voice, they sucked more strongly at the pacifier (Mills & Melhuish, 1974).

Newborns also have a strong sense of smell. Newborn babies can distinguish the smell of the parent who was pregnant from that of others. 1-week-old babies who were being breastfed were placed between two gauze pads. One gauze pad was from the bra of a nursing parent who was a stranger, and the other gauze pad was from the bra of the infant’s own nursing parent. More than two-thirds of the week-old babies turned toward the gauze pad with their own nursing parent’s scent (MacFarlane (1978).

Physical Development

During infancy, toddlerhood, and early childhood, the body’s physical development is rapid. On average, newborns weigh between 5 and 10 pounds. By the age of 2, this weight will have quadrupled, with most 2-year-olds weighing between 20 and 40 pounds (WHO Multicentre Growth Reference Study Group, 2006). Growth slows between 4 and 6 years old. During this time children gain 5–7 pounds and grow about 2–3 inches per year.



Figure LD.10. Physical development. *Children experience rapid physical changes through infancy and early childhood.* ***Alt. text:*** *A collage of four photographs depicting babies is shown. From left to right they get progressively older. The far left photograph is a bundled up sleeping newborn. To the right is a picture of a toddler. To the right is a child sitting outside. To the far right is a child on a swing set.* ***Source:*** *Image by Tú Nguyễn from Pixabay, Image by b13923790 from Pixabay, Image by Alisa Dyson from Pixabay and Image by hansdakfamilyministry from Pixabay are used under the Pixabay Content Licence.*

The nervous system continues to grow and develop after birth; each neural pathway forms thousands of new connections during infancy and toddlerhood. This period of rapid neural growth is called **blooming**. The blooming period of neural growth is then followed by a period of **pruning**, where neural connections are reduced. It is thought that pruning allows the brain to function more efficiently, allowing for mastery of more complex skills (Hutchinson, 2011). Blooming occurs during the first few years of life, and pruning continues through childhood and into adolescence in various areas of the brain.

The size of our brains increases rapidly.

- The brain of a 2-year-old is 55% of its adult size, and by the age of 6 the brain is about 90% of its adult size (Tanner, 1978).
- During early childhood (ages 3–6), the frontal lobes grow rapidly. The frontal lobes are associated with planning, reasoning, memory, and impulse control.
- Through the elementary school years, the frontal, temporal, occipital, and parietal lobes all grow in size.
- The brain growth spurts experienced in childhood tend to follow Piaget's sequence of cognitive development, so that significant changes in neural functioning are associated with cognitive advances (Kolb & Whishaw, 2009; Overman, Bachevalier, Turner, & Peuster, 1992).

Movement

Motor development occurs in an orderly sequence as infants move from reflexive reactions (e.g., sucking and rooting) to more advanced motor functioning.

Motor skills refer to our ability to move our bodies and manipulate objects. Fine motor skills focus on the muscles in our fingers, toes, and eyes, and enable coordination of small actions (e.g., grasping a toy, writing with a pencil, and using a spoon). **Gross motor skills** focus on large muscle groups that control our arms and legs and involve larger movements (e.g., balancing, running, and jumping). As motor skills develop, there are certain developmental milestones that young children typically achieve at certain age ranges (Table LD.5). An example of a developmental milestone is sitting. On average, most babies sit alone at 7 months old. Sitting involves both coordination and muscle strength, and 90 percent of babies achieve this milestone between 5 and 9 months old. Babies on average are able to hold up their head at 6 weeks old, and 90 percent of babies achieve this between 3 weeks and 4 months old.

Caregivers should be concerned about a child who is displaying delays on several milestones, since some developmental delays can be identified and addressed through early intervention.

Table LD.5. Developmental milestones, ages 2–5 years

Age (years)	Physical	Personal/Social	Language	Cognitive
2	Kicks a ball; walks up and down stairs	Plays alongside other children; copies adults	Points to objects when named; puts 2–4 words together in a sentence	Sorts shapes and colours; follows 2-step instructions
3	Climbs and runs; pedals tricycle	Takes turns; expresses many emotions; dresses self	Names familiar things; uses pronouns	Plays make believe; works toys with parts (levers, handles)
4	Catches balls; uses scissors	Prefers social play to solo play; knows likes and interests	Knows songs and rhymes by memory	Names colours and numbers; begins writing letters
5	Hops and swings; uses fork and spoon	Distinguishes real from pretend; likes to please friends	Speaks clearly; uses full sentences	Counts to 10 or higher; prints some letters and copies basic shapes

Cognitive Development

In addition to rapid physical growth, young children also exhibit significant development of their cognitive abilities. Piaget thought that a child's ability to understand objects, such as learning that a rattle makes a noise when shaken, is a cognitive skill that develops slowly as a child matures and interacts with the environment.

Today, developmental psychologists think Piaget was incorrect about that. Researchers have found that even very young children understand physical properties of objects long before they have direct experience with those objects (Baillargeon, 1987; Baillargeon, Li, Gertner, & Wu, 2011). For example, children as young as 3 months old demonstrated knowledge of the properties of objects that they had only viewed and did not have prior experience with them.

In one study, 3-month-old infants were shown a truck rolling down a track and behind a screen. The box, which appeared solid but was actually hollow, was placed next to the track. The truck rolled past the box as would be expected. Then the box was placed on the track to block the path of the truck. When the truck was rolled down the track this time, it continued unimpeded. The infants spent significantly more time looking at this impossible event (Figure LD.11). Baillargeon (1987) concluded that the infants knew that solid objects cannot pass through each other.

Baillargeon's findings suggest that very young children have an understanding of objects and how they work, which Piaget (1954) would have said is beyond their cognitive abilities due to their limited experiences in the world.

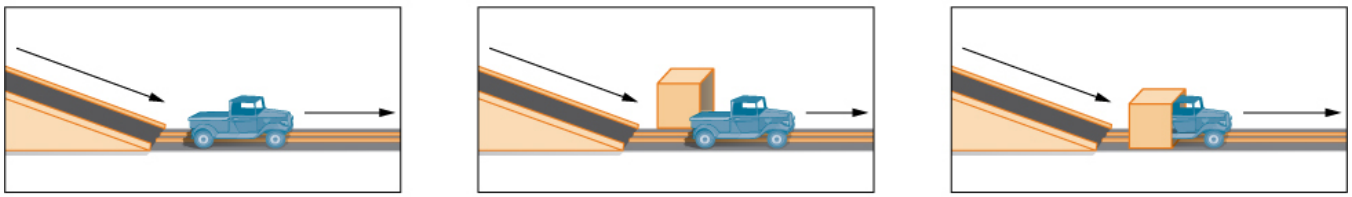


Figure LD.11. Baillargeon's study. *In Baillargeon's study, infants observed a truck (a) roll down an unobstructed track, (b) roll down an unobstructed track with an obstruction (box) beside it, and (c) roll down and pass through what appeared to be an obstruction.* ***Alt. text:*** *A three-part diagram shows a toy truck traveling along a track. The first image shows the truck unobstructed. The second image shows a box in the background. The third image shows the truck going through an obstruction.*
Source: *Figure 9.11 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Like physical milestones, there are also cognitive milestones children typically reach at certain ages. For example, infants shake their head "no" around 6–9 months, and they respond to verbal requests to do things like "wave bye-bye" or "blow a kiss" around 9–12 months.

Remember Piaget's ideas about object permanence? We can expect children to grasp the concept that objects continue to exist even when they are not in sight by around 8 months old. Because toddlers (i.e., 12–24 months old) have mastered object permanence, they enjoy games like hide and seek, and they realise that when someone leaves the room they will come back (Loop, 2013). Toddlers also point to pictures in books and look in appropriate places when you ask them to find objects.

Preschool-age children (i.e., 3–5 years old) also make steady progress in cognitive development. Not only can they count, name colours, and tell you their name and age, but they can also make some decisions on their own, such as choosing an outfit to wear. Preschool-age children understand basic time concepts and sequencing (e.g., before and after), and they can predict what will happen next in a story. They also begin to enjoy the use of humour in stories. Because they can think symbolically, they enjoy pretend play and inventing elaborate characters and scenarios. One of the most common examples of their cognitive growth is their blossoming curiosity. Preschool-age children love to ask "Why?"

An important cognitive change occurs in children this age. Recall that Piaget described 2–3 year olds as egocentric, meaning that they do not have an awareness of others' points of view. Between 3 and 5 years old, children come to understand that people have thoughts, feelings, and beliefs that are different from their own. This is known as theory-of-mind (TOM). Children can use this skill to tease others, persuade their parents to purchase a candy bar, or understand why a sibling might be angry. When children develop TOM, they can recognise that others have false beliefs (Dennett, 1987; Callaghan et al., 2005).

Watch this video outlining the basics of Theory of Mind and showing young children engaging in a classic 'false belief' or ToM activity – the 'Sally-Anne' test.

Watch this video: **Theory of Mind (4 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=920#oembed-2***

"Theory of Mind" video by BrainFacts.org is licensed under the Standard YouTube Licence.

Cognitive skills continue to expand in middle and late childhood (6–11 years old):

- The child's thought processes become more logical and organised when dealing with concrete information.
- The child understands concepts such as the past, present, and future, giving them the ability to plan and work toward goals.
- The child can process complex ideas such as addition and subtraction and cause-and-effect relationships.



Figure LD.12. Soccer player. Alt. text: *a cartoon drawing of a girl kicking a ball.* ***Source:*** *Soccer player by Marie Bartlett is licensed under a CC BY 4.0 Licence.*

Language Development

One well-researched aspect of cognitive development is language acquisition. The order in which children learn language structures is consistent across children and cultures (Hatch, 1983).

- Starting before birth, babies begin to develop language and communication skills.
- At birth, babies apparently recognise the voice of their birth parent, and can discriminate between the language(s) spoken by their birth parent and foreign languages, and they show preferences for faces that are moving in synchrony with audible language (Blossom & Morgan, 2006; Pickens, 1994; Spelke & Cortelyou, 1981).
- Children communicate information through gesturing long before they speak, and there is some evidence that gesture usage predicts subsequent language development (Iverson & Goldin-Meadow, 2005).
- Babies begin to coo almost immediately. **Cooing** is a one-syllable combination of a consonant and a vowel sound (e.g., coo or ba).
- Babies replicate sounds from their own languages. A baby whose parents speak French will coo in a different tone than a baby whose parents speak Spanish or Urdu.

After cooing, the baby starts to babble. **Babbling** begins with repeating a syllable, such as ma-ma, da-da, or ba-ba.

- When a baby is about 12 months old, we expect them to say their first word for meaning, and to start combining words for meaning at about 18 months.
- At about 2 years old, a toddler uses between 50 and 200 words; by 3 years old they have a vocabulary of up to 1,000 words and can speak in sentences.

During the early childhood years, children's vocabulary increases at a rapid pace. This is sometimes referred to as the "**vocabulary spurt**" and has been claimed to involve an expansion in vocabulary at a rate of 10–20 new words per week.

- Recent research may indicate that while some children experience these spurts, it is far from universal (as discussed in Ganger & Brent, 2004).
- 5-year-olds understand about 6,000 words, speak 2,000 words, and can define words and question their meanings. They can rhyme and name the days of the week.
- Seven-year-olds speak fluently and use slang and clichés (Stork & Widdowson, 1974).

You can read more about the development of language in the Intelligence and Language chapter.

Attachment

Psychosocial development happens as children build relationships, interact with others, and learn to handle their emotions. A key part of social and emotional growth is forming strong attachments, especially in infancy. Attachment refers to a deep emotional connection with others, typically between a child and their caregiver. This bond is crucial and forms more easily in the early years, indicating a sensitive period for emotional development. Developmental psychologists explore important questions about this process, such as: How do bonds between parents and infants develop? What impact does neglect have on these bonds? Why do children form different types of attachments?

Researchers John Bowlby and Mary Ainsworth conducted studies designed to answer these questions. In the 1950s, Bowlby developed the concept of attachment theory. He defined attachment as the affectional bond that an infant forms with the parent who birthed them (Bowlby, 1969). An infant must form this bond with a primary caregiver in order to have normal social and emotional development. In addition, Bowlby proposed that this attachment bond is very powerful and continues throughout life. He used the concept of **secure base** to define a healthy attachment between parent and child (Bowlby, 1988). A secure base is a parental presence that gives the child a sense of safety as they explore their surroundings.

Bowlby said that two things are needed for a healthy attachment:

1. The caregiver must be responsive to the child's physical, social, and emotional needs.
2. The caregiver and child must engage in mutually enjoyable interactions (Bowlby, 1969) (Figure LD.13).



Figure LD.13. Mutually enjoyable interactions. *Mutually enjoyable interactions promote the parent-infant bond.* ***Alt. text:*** *A man holds a baby in the air.* ***Source:*** *Image by balouriarajesh from Pixabay.*

While Bowlby thought attachment was an all-or-nothing process, Mary Ainsworth's (1970) research showed otherwise. Ainsworth wanted to know if children differ in the ways they bond, and if so, why. To find the answers, she used the *Strange Situation* procedure to study attachment between parents and their infants (Ainsworth & Bell, 1970). In the Strange Situation, the primary caregiver and child (age 12-18 months) are placed in a room together. There are toys in the room, and the caregiver and child spend some time alone in the room. After the child has had time to explore their surroundings, a stranger enters the room. The caregiver then leaves the baby with the stranger. After a few minutes, the caregiver returns to comfort their child.

Based on how the infants/toddlers responded to the separation and reunion, Ainsworth identified three types of parent-child attachments: secure, avoidant, and ambivalent (aka. "resistant") (Ainsworth & Bell, 1970). A fourth style, known as disorganised attachment, was later described (Main & Solomon, 1990).

Secure attachment

- Most common type of attachment.

- Toddler prefers their parent (the attachment figure) over a stranger.
- Toddler uses the attachment figure as a secure base to explore the environment.
- Toddler seeks out parent in times of stress.
- Children are distressed when caregivers leave the room in the Strange Situation experiment but happy upon their return.
- Caregivers are sensitive and responsive to their needs.

Avoidant attachment

- Child is unresponsive to the parent.
- Child does not use the parent as a secure base.
- Child does not appear to care if the parent leaves.
- Child reacts to the parent the same way they react to a stranger.
- Child is slow to show a positive reaction when the parent returns.

Ambivalent (or Resistant) attachment

- Children show clingy behaviour but may reject attachment figure's attempts to interact.
- Children do not explore the toys in the room due to fear.
- Children become extremely disturbed and angry with the parent during separation in the Strange Situation.
- Children are difficult to comfort when the parent returns.

Disorganised attachment

- Children behave oddly or inconsistently in the Strange Situation, such as freezing, running around erratically, or trying to run away when the caregiver returns.
- Is most often seen in children who have been abused – which disrupts a child's ability to regulate their emotions (Main & Solomon, 1990).



Figure LD.14. Secure attachment. *In secure attachment, the parent provides a secure base for the toddler, allowing them to securely explore their environment.* ***Alt. text:*** *A photograph shows a person squatting down next to a small child who is standing up.* ***Source:*** *Figure 9.14 by Kerry Ceszyk as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

While Ainsworth's research has found support in subsequent studies, it has also met criticism. Some researchers have pointed out that a child's temperament may have a strong influence on attachment (Gervai, 2009; Harris, 2009), and others have noted that attachment varies from culture to culture, a factor not accounted for in Ainsworth's research (Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000; van Ijzendoorn & Sagi-Schwartz, 2008).

The next video explains and shows the process involved with the strange situation test, originally developed by Ainsworth.

Watch this video: **The Strange Situation | Mary Ainsworth, 1969 | Developmental Psychology (4.5 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=920#oembed-3***

"The Strange Situation | Mary Ainsworth, 1969 | Developmental Psychology" video by Psychology Unlocked is licensed under the Standard YouTube Licence.

Just as attachment is the main psychosocial milestone of infancy, the primary psychosocial milestone of childhood is the development of a positive sense of self. How does self-awareness develop? If you place a baby in front of a mirror, they will reach out to touch their

image, thinking it is another baby. However, by about 18 months a toddler will recognise that the person in the mirror is them. How do we know this? In a well-known experiment, a researcher placed a red dot of paint on children's noses before putting them in front of a mirror (Amsterdam, 1972). Commonly known as the **mirror test**, this behaviour is demonstrated by humans and a few other species and is considered evidence of self-recognition (Archer, 1992).

At 18 months old they would touch their own noses during the mirror test when they saw the paint, surprised to see a spot on their faces. By 24–36 months old children can name and/or point to themselves in pictures, clearly indicating self-recognition. Children from 2–4 years old display a great increase in social behaviour once they have established a self-concept. They enjoy playing with other children, but they have difficulty sharing their possessions. Through play children practice performing gender roles (Chick, Heilman-Houser, & Hunter, 2002). By 4 years old, children can cooperate with other children, share when asked, and separate from parents with little anxiety. Children at this age also exhibit autonomy, initiate tasks, and carry out plans. =When children experience success in these areas, it contributes to a positive sense of self.

Once children reach 6 years old, they can identify themselves in terms of group memberships: "I'm a first grader!". School-age children compare themselves to their peers and discover that they are competent in some areas and less so in others (recall Erikson's task of industry versus inferiority). At this age, children recognise their own personality traits as well as some other traits they would like to have.

Development of a positive self-concept is important to healthy development. Children with a positive self-concept tend to be, more confident, do better in school, act more independently, and are more willing to try new activities (Maccoby, 1980; Ferrer & Fugate, 2003). Formation of a positive self-concept begins in Erikson's toddlerhood stage, when children establish autonomy and become confident in their abilities. Development of self-concept continues in elementary school, when children compare themselves to others. When the comparison is favourable, children feel a sense of competence and are motivated to work harder and accomplish more. Self-concept is re-evaluated in Erikson's adolescence stage, as teens form an identity. They internalise the messages they have received regarding their strengths and weaknesses, keeping some messages and rejecting others. Adolescents who have achieved identity formation are capable of contributing positively to society (Erikson, 1968).

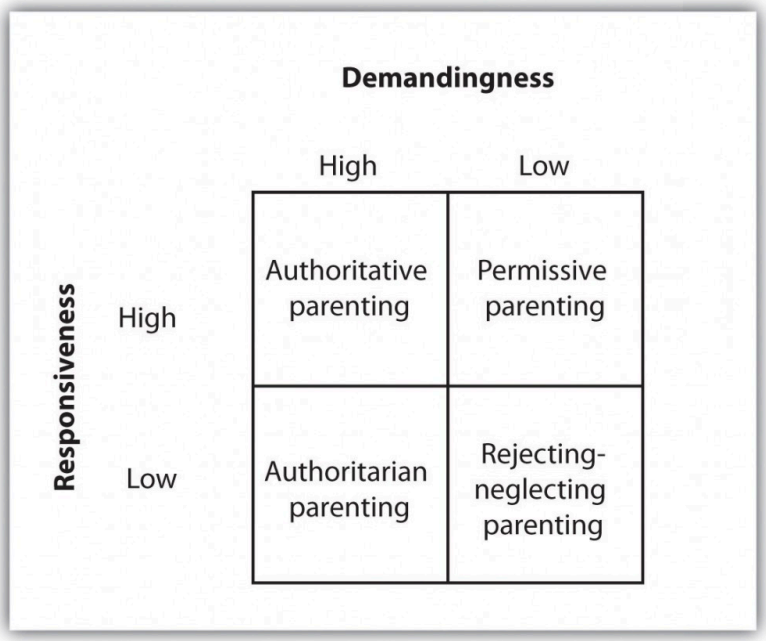
One behavioural aspect that contributes to children's developing sense of self-identity is play. Children spend a significant portion of their day playing; preschoolers often spend most of the day engaged in some sort of play activity. Play is an important aspect of social and cognitive development, as it makes social learning something children desire to engage in. Play also provides the space for children to begin practicing social skills, such

as humour, which has been found to influence peer acceptance and perceived social competence. It has even been argued that play is an essential element in the acquisition of language and concept meaning.

Given the integral role of play in children's lives, it becomes evident that activities such as play are not merely for entertainment but are pivotal in the development of self-concept, motivation, learning, and the establishment of secure relationships. Through play, children not only engage in essential social and cognitive development but also explore and affirm their identities, preferences, and abilities. This exploration is crucial for fostering a positive self-concept, which in turn supports confidence, independence, and a willingness to embrace new experiences. As children navigate through various stages of development, from recognising themselves in mirrors to identifying with group memberships and evaluating their competencies, play serves as a constant, enriching backdrop that enhances their understanding of themselves and their place in the world.

Parent-Child Relationship

As the child grows, parents take on one of four types of **parenting styles** — *parental behaviours that determine the nature of parent-child interactions* and that guide their interaction with the child. These styles depend on whether the parent is more or less *demanding* and more or less *responsive* to the child. **Authoritarian parents** are *demanding but not responsive*. They impose rules and expect obedience, tending to give orders ("Eat your food!") and enforcing their commands with rewards and punishment, without providing any explanation of where the rules came from except "Because I said so!" **Permissive parents**, on the other hand, tend to *make few demands and give little punishment, but they are responsive in the sense that they generally allow their children to make their own rules*. **Authoritative parents** are *demanding* ("You must be home by curfew"), *but they are also responsive to the needs and opinions of the child* ("Let's discuss what an appropriate curfew might be"). They set rules and enforce them, but they also explain and discuss the reasons behind the rules. Finally, **rejecting-neglecting parents** are *undemanding and unresponsive overall*.



Parenting styles can be divided into four types, based on the combination of demandingness and responsiveness. The authoritative style, characterized by both responsiveness and also demandingness, is the most effective.

Many studies of children and their parents, using different methods, measures, and samples, have reached the same conclusion — namely, that authoritative parenting, in comparison to the other three styles, is associated with a wide range of psychological and social advantages for children. Parents who use the authoritative style, with its combination of demands on the children as well as responsiveness to the children's needs, have kids who show better psychological adjustment, school performance, and psychosocial maturity compared with the kids of parents who use the other styles (Baumrind, 1996; Grolnick & Ryan, 1989).

Adolescence

Brain Development

The adolescent brain also remains under development. Up until puberty, brain cells continue to bloom in the frontal region. Adolescents engage in increased risk-taking behaviours and emotional outbursts, possibly because the frontal lobes of their brains are still

developing (Figure LD.14). Recall that this area is responsible for judgment, impulse control, and planning, and it is still maturing into early adulthood (Casey, Tottenham, Liston, & Durston, 2005).

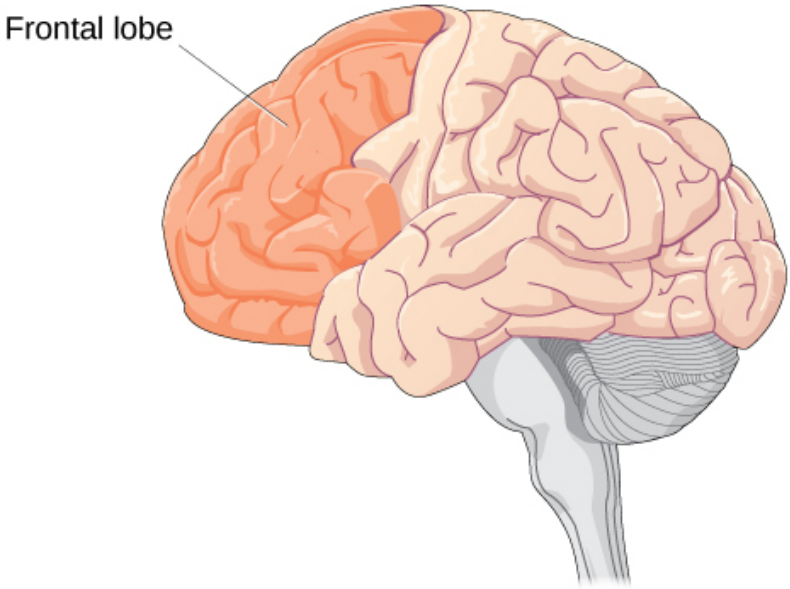


Figure LD.15. Brain development. *Brain growth continues into the early 20s. The development of the frontal lobe, in particular, is important during this stage. Figure 9.16 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Watch this video: **Tricky Topics: Myelination of the Prefrontal Cortex (4 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=920#oembed-4***

"Tricky Topics: Myelination of the Prefrontal Cortex" video by FirstYearPsych Dalhousie is licensed under the Standard YouTube Licence.

Cognitive Development

More complex thinking abilities emerge during adolescence. Some researchers suggest that this is due to increases in processing speed and efficiency rather than as the result of an increase in mental capacity; in other words, due to improvements in existing skills rather

than development of new ones (Bjorkland, 1987; Case, 1985). During adolescence, teenagers move beyond concrete thinking and become capable of abstract thought. Recall that Piaget refers to this stage as formal operational thought. Teen thinking is also characterised by the ability to consider multiple points of view, imagine hypothetical situations, debate ideas and opinions (e.g., politics, religion, and justice), and form new ideas (Figure LD.16). In addition, it's not uncommon for adolescents to question authority or challenge established societal norms.

Cognitive empathy, also known as theory-of-mind (which we discussed earlier with regard to egocentrism), relates to the ability to take the perspective of others and feel concern for others (Shamay-Tsoory, Tomer, & Aharon-Peretz, 2005). Cognitive empathy begins to increase in adolescence and is an important component of social problem-solving and conflict avoidance.



Figure LD.16. Problem solving. *More complex thinking abilities emerge during adolescence. Some researchers suggest that this is due to increases in processing speed and efficiency rather than as the result of an increase in mental capacity; in other words, due to improvements in existing skills rather than development of new ones (Bjorkland, 1987; Case, 1985).* ***Alt. text****: Two construction workers work through a problem.* ***Source:*** *Problem solving by Marie Bartlett is licensed under a CC BY 4.0 Licence.*

Psychosocial Development

Adolescents continue to refine their sense of self as they relate to others. Erikson referred to the task of the adolescent as one of identity versus role confusion. Thus, in Erikson's view, an adolescent's main questions are "Who am I?" and "Who do I want to be?" Some adolescents

adopt the values and roles that their parents expect of them. Other teens develop identities that are in opposition to their parents but align with a peer group. This is common as peer relationships become a central focus in adolescents' lives.

As adolescents work to form their identities, they pull away from their parents, and the peer group becomes very important (Shanahan, McHale, Osgood, & Crouter, 2007). Despite spending less time with their parents, most teens report positive feelings toward them (Moore, Guzman, Hair, Lippman, & Garrett, 2004). Warm and healthy parent-child relationships have been associated with positive child outcomes, such as better grades and fewer school behaviour problems, in the United States as well as in other countries (Hair et al., 2005). It appears that most teens don't experience adolescent storm and stress to the degree once famously suggested by G. Stanley Hall, a pioneer in the study of adolescent development. Only small numbers of teens have major conflicts with their parents (Steinberg & Morris, 2001), and most disagreements are minor. For example, in a study of over 1,800 parents of adolescents from various cultural and ethnic groups, Barber (1994) found that conflicts occurred over day-to-day issues such as homework, money, curfews, clothing, chores, and friends. These types of arguments tend to decrease as teens develop (Galambos & Almeida, 1992).

There is emerging research on the adolescent brain. Galvan, Hare, Voss, Glover, and Casey (2007) examined its role in risk-taking behaviour. They used fMRI to assess the readings' relationship to risk-taking, risk perception, and impulsivity. The researchers found that there was no correlation between brain activity in the neural reward centre and impulsivity or risk perception. However, activity in that part of the brain was correlated with taking risks. In other words, risk-taking adolescents experienced brain activity in the reward centre. The idea, however, that adolescents are more impulsive than other demographics was challenged in their research, which included children and adults.

Emerging Adult (Ages 18 to 29)

Let's now consider the relatively new-to-psychology concept of "emerging adulthood". This developmental stage covers psychological, social, and spiritual development between ages 18 and 29. Jeffrey Arnett, a psychology researcher, proposed this distinct phase in human development (Arnett, 2000). The emergence of this developmental stage can be attributed to various societal shifts, such as later ages of marriage and parenthood and extended periods spent in higher education (Arnett, 2000). Our understanding of emerging adulthood and its impact on later life stages is still developing.

This Emerging Adult stage acts as a developmental crucible where patterns are formed that can shape a person's entire life path. It acts as a developmental crucible where patterns are formed that can shape a person's entire life trajectory (Arnett, 2000). Behaviours, values, relationships, and more are moulded during this time.

There are five primary characteristics that define this developmental stage: identity exploration, instability, self-focus, feeling 'in-between', and possibilities. Identity exploration stands at the centre, with the other four elements extending from it. This exploration stage involves emerging adults navigating new identities around love, work, and worldview, influencing their long-term life directions and commitments (Arnett, 2000).

1. **Identity Exploration:** This is when young adults explore different aspects of who they are, trying out various roles, beliefs, and career paths to find what fits them best. It's a time of questioning and discovering oneself in areas like love, work, and personal beliefs.
2. **Instability:** This refers to the changes and uncertainties in life during emerging adulthood, such as moving frequently, changing jobs, or experiencing shifts in relationships. It's a period marked by transitions and a lack of permanence in various aspects of life.
3. **Self-focus:** During this stage, individuals focus more on themselves as they make decisions that will shape their future. It's a time of independence, where there's less concern about others' expectations and more emphasis on personal growth and self-discovery.
4. **Feeling 'In-Between':** This is the sensation of being caught between adolescence and full-fledged adulthood. Emerging adults often feel they are no longer teenagers but not yet fully adults, navigating a middle ground as they work towards adult responsibilities and independence.
5. **Possibilities:** This characteristic highlights the optimism and sense of opportunity prevalent in emerging adulthood. It's a time when individuals feel that many paths are open to them, and they can envision numerous potential futures, filled with hope for achieving their dreams.

In conclusion, emerging adulthood is a relatively modern societal phenomenon in response to delaying parenthood and extended years in higher education. Arnett argues that emerging adulthood is an integral and unique phase in human development. It is a period where lifelong patterns are set, identities are explored, and significant transitions are made, ultimately shaping an individual's future life trajectory (Arnett, 2000). While the emerging adult stage is useful, it is problematic that it is built upon young adults living in the gap before having a family (individualistic and exclusionary of people who raise children in their early 20s) and the requirement of staying in higher education (elitist and expensive) for a longer period.

Technology's Impact on the Development of Children and Youth

The impact of technology on the development of children and youth is significant, touching on various aspects of their lives. This summary provides a general overview of how television, cell phones, social media, and video games affect young people.

Television

Television has both positive and negative effects on children. Educational programs, like "Sesame Street", can promote learning and improve academic skills (Linebarger & Walker, 2005). However, watching too much TV can cut into reading time, which leads to lower reading scores and attention problems in children (Williams, 1986). This means that when children spend a lot of time watching TV, they might not do as well in school or might have trouble focusing. Also, watching violent TV shows is linked to an increase in aggressive behaviours under some circumstances (Anderson et al., 2001).

Cell Phones

Cell Phones are everywhere and are used by children and teenagers for talking, texting, and going online. They can be useful for staying in touch with friends and family and for learning. But, using cell phones too much can distract users from homework and lead to stress (Lepp et al., 2015). For young people who feel left out or different, cell phones can offer support through social networks. However, since cell phones are a major way that children and youth access social media, these devices can also be a way for people who bully to target young phone users (Hinduja & Patchin, 2010).

Social Media

Social Media platforms like Instagram and Snapchat allow children and teenagers to express themselves, share photos, and connect with friends. These platforms can be especially important for young people who feel marginalised, giving them a space to find others with

similar experiences (Craig & McInroy, 2014). But, spending a lot of time on social media is linked to feeling anxious, depressed, and lonely (Twenge et al., 2018). This is because constant comparison with others online can make young people feel bad about themselves.

Video Games

Video Games can be fun and can also teach problem-solving skills. However, games with violent content might make children more likely to act aggressively (Anderson et al., 2010). The world of video games often lacks diversity, which means that not all children see themselves represented in the games they play. This can make some feel left out or stereotyped (Williams et al., 2009). Games that include different kinds of characters and stories can help make gaming a more positive experience for everyone.

In summary, technology can help children learn and stay connected, but it also has downsides like distraction, stress, and exposure to harmful content. It's important for children to have a balanced approach to using technology. This means enjoying the benefits of technology while also being aware of the risks and knowing how to manage them. Parents, teachers, and caregivers can help by setting limits on screen time, talking about what children are watching or playing, and encouraging them to spend time offline too.

When Harm Impacts Healthy Development: The Impact of the Indian Residential School System

Content Disclosure: *This section contains discussions on the psychological and physiological impacts of stress, with a focus on the historical trauma experienced by Indigenous communities, particularly related to Indian Residential Schools. It includes descriptions of trauma, cultural genocide, and abuse, which may be distressing or triggering for some readers. The content is presented with a trauma-informed approach and includes both scientific terminology and plain language explanations. Please consider your comfort level with these topics before reading.*

Childhood and adolescence are life stages pivotal to a person's developmental maturation (Cabral & Patel, 2020; Cassidy & Shaver, 2018; White et al., 2017). Experiences such as adversity, loss, trauma, and/or maltreatment have been linked to feelings of anxiety and depression

(Hovens et al., 2015; Jurena et al., 2020) as well as issues with attachment in older adult relationships (Cohen et al., 2012; Lo et al., 2017), issues in development (Sege et al., 2017), and other health problems (Asselmann et al., 2018; Nelson et al., 2020; Rojo-Wissar et al., 2021).

Since confederation (1867), the Canadian federal government has continued to forcefully attempt total assimilation of Indigenous Peoples into "Euro-Canadian culture and society" (Truth and Reconciliation Commission [TRC], 2015). One of the ways in which the government attempted to do this was through the Indian Residential School (IRS) system (TRC, 2015). The IRS system in Canada has often been referred to as a series of concentration camps (TRC, 2015) or "boarding schools"used to house Indigenous children. Unlawful and immoral acts perpetuated in the IRSs have been termed "cultural genocide" at the international level (TRC, 2015; United Nations Declaration on the Rights of Indigenous Peoples [UNDRIP], 2007).

Impact on Attachment

From 1876 to 1996, the Canadian government took hundreds of thousands of Indigenous children, some as young as 4, from their families and placed them in residential schools (IRSs) (TRC, 2015). If Indigenous parents or family members tried to stop the police from taking their children, they could be jailed or even killed (Bombay et al., 2014ab; Facing History and Ourselves, 2021; TRC, 2015). At these schools, children were often forced to change their appearance drastically and were not allowed to use their names or speak their native languages. Instead, they were given numbers and punished if they spoke their own language, which for many was the only language they knew (TRC, 2015). Being separated from family under such stressful conditions can cause long-term health issues. Research shows that short-term separations can harm health later in life (Räikkönen et al., 2011), and longer separations increase the risk of depression (Bohman et al., 2017; Coffino, 2009) and anxiety (Bryant et al., 2017; Lähdepuro et al., 2019).

Intergenerational Impacts

Federal, institutional and academic inquiries into the IRS system continue to highlight various atrocities that many IRS Survivors experienced, such as spiritual, verbal, emotional, physical and sexual assault, abuse and violence (TRC, 2015). Trauma of this magnitude continues to impact not only the Survivors, but their children, grandchildren, and other relatives (Bombay et al., 2014ab; Bombay et al., 2014ab; Lehrner & Yehuda, 2018). For example, Indigenous

children of IRS Survivors are more likely to have poor psychological health because of the IRS impacts on their parents' psychosocial functioning and health (Bombay et al., 2011; 2014ab; 2018; Elias et al., 2012).

Biopsychosocial Framework

The Biopsychosocial Framework shows how our health is influenced by a mix of biological, psychological, and social factors. It's a tool that helps health professionals understand why certain physical or mental health problems happen (Karunamuni et al., 2020). This approach reveals that the education provided by many residential schools was substandard, with poor teaching, inadequate resources, and a high level of racism (Barnes & Josefowitz, 2019; TRC, 2015). As a result, many survivors left school without the necessary academic skills, such as language proficiency, and were often unprepared for work as adults (Miller, 1996; TRC, 2015; Barnes et al., 2006). The deep trauma from their experiences at these schools has led many survivors to face challenges with their mental and physical health, their ability to connect with Indigenous cultural practices and communities, and their overall well-being (Barnes & Josefowitz, 2019; Ogle et al., 2013; Miller, 1996; TRC, 2015; Vachon et al., 2015).

You can read more about the effects of trauma and stress in the chapter on Well-being.

Cultural Resilience

While Indigenous Peoples in Canada continue to face premeditated colonial assimilation tactics, such as the child welfare crisis or "modern day IRS system" (Ma et al., 2019; McMillan, 2021; Mitchell, 2019), resilience among Indigenous populations in Canada continues to be researched (Bombay et al., 2010; 2011; Paul et al., 2022). To date, various facets of cultural identity among Indigenous populations in Canada, such as the sense of belonging to a cultural community, provide protection against the negative effects of colonization (Bombay et al., 2014ab; First Nations Health Authority, 2019; Paul et al., 2022). While it has been suggested that Indigenous culture helps to improve and maintain good health and happiness for Indigenous individuals, continued research is needed to better understand precisely how these cultural wisdoms and practices can be used in care models that are most suitable for and respectful of Indigenous People.

Summary

In our exploration of “Ages, Stages, and Milestones of Development”, we have studied human growth from the earliest moments of conception to the phase of emerging adulthood. This section has highlighted the biological, cognitive, and psychosocial transformations that occur, each stage building upon the last to shape the complex individuals we become. By examining attachment, self-concept, and the unique challenges of adolescence, we’ve gained a holistic understanding of the developmental process. It is also important to be mindful of how technologies such as TV, cell phones, social media, and video games can benefit and interfere with healthy development.

The profound impact of the Indian Residential School system on Indigenous communities underscores the importance of understanding how adverse experiences shape developmental pathways. Childhood and adolescence are critical stages for building healthy attachments and self-concepts, but trauma and loss can significantly hinder this process.

Our lifespan involves many developmental pathways, from prenatal factors to societal impacts, that contribute to our physical, emotional, mental, social, and spiritual growth. Rather than being solely negative influences in our lives, developmental challenges and setbacks can inspire us to look for solutions, build resilience, and open us up to new learning experiences, enriching our journey through life’s varied stages and seasons.

Big Picture Models of Lifespan Development

JESSICA MOTHERWELL MCFARLANE

Indigenous Connectedness Framework

The *Indigenous Connectedness Framework* explores Indigenous lifespan development within Indigenous communities, emphasising the role of intergenerational, family, community, environmental, and spiritual connections in wellbeing. It underlines cultural values, knowledge sharing, and collective identity in nurturing individuals and communities. There are five major domains that shape a child's relational identity.

- **Intergenerational connectedness** underscores the value of being part of a continuous history and the duty towards future generations. It helps children understand their roots and develop a strong sense of identity linked to their ancestors, enhancing a collective sense of duty and interconnectedness.
- **Family connectedness** extends to a wide network of biological and spiritual relationships, key to cultural identity and value transmission. It focuses on extended family, especially grandparents imparting knowledge and traditions, reinforcing a sense of belonging and mutual support within the community.
- **Community connectedness** involves social groups providing a sense of belonging and shaping both individual and collective identities. Through shared celebrations, ceremonies, and communal activities, these connections reinforce community cohesion and support the holistic development of its members.
- **Environmental connectedness** acknowledges the profound and inseparable relationship between Indigenous Peoples and their natural surroundings. This physical and spiritual bond, underscoring the land's significance in cultural identity and wellbeing, and teaching children the importance of living in harmony with nature.
- **Spiritual connectedness** weaves together the various threads of connectedness, integrating mind, body, and spirit in cultural practices and ceremonies. This level of connectedness fosters a deep sense of unity with all beings and the natural world, promoting a collective wellbeing and respect for life's interdependence.

"Spiritual" refers to a connection beyond the physical, involving inner feelings, beliefs, and a sense of belonging to something greater. It encompasses unity with mind, body, spirit, and a bond with the world, including people, nature, and possibly a higher power.

A spiritual connection brings with it an appreciation of the interdependence of all life and a duty to respect the delicate balance of life.

The *Indigenous Connectedness Framework* offers a holistic perspective on lifespan development within Indigenous communities. By understanding the interactions among intergenerational, family, community, environmental, and spiritual connections, we appreciate the richness of Indigenous cultures and the profound impact of interconnectedness on individuals' lives. This framework highlights the significance of cultural values, knowledge transmission, and the fostering of collective identity for the wellbeing of Indigenous communities.

Bronfenbrenner's Ecological Systems Theory

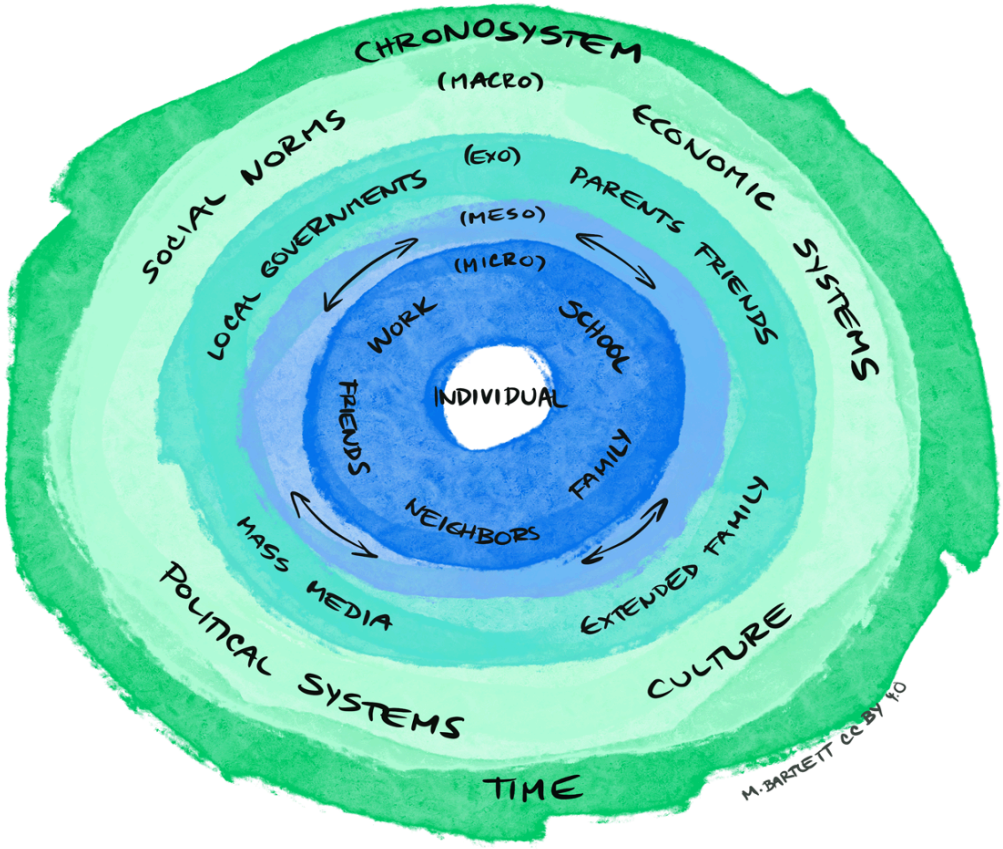


Figure LD.4. Bronfenbrenner's Ecological Systems Theory. *[Image Description]* ***Source:*** *Bronfenbrenner's Ecological Systems Theory by Marie Bartlett is licensed under a CC BY 4.0 Licence.*

Urie Bronfenbrenner's Ecological Systems Theory provides a framework for understanding human development by illustrating how various environmental systems influence growth throughout a person's life. This theory identifies five key systems:

- **Microsystem — "Me and My Crew"**: Directly surrounds the individual, incorporating immediate relationships and activities, such as interactions and interdependence with family, school, and peers. A change in the family, like a divorce, can affect a child's academic performance and peer relationships.
- **Mesosystem — "Web of Relation:"**: Encompasses the connections between the microsystems, highlighting how different areas of a person's life interact, like the relationship between a child's educators and their parents. Positive mesosystem

interactions can enhance a child's feeling of security and support.

- **Exosystem — "Invisible Impact"**: Consists of broader social settings that indirectly influence the individual, including parental workplaces and community services. Changes in this layer, such as a parent's job loss, can indirectly impact the child's microsystem by altering family dynamics or financial stability.
- **Macrosystem — "Cultural Code"**: Reflects the overarching cultural values, laws, and societal norms that shape an individual's development. Cultural expectations around milestones like marriage can influence personal goals and societal participation, affecting one's self-esteem and life choices.
- **Chronosystem — "Time's Tango"**: Incorporates the dimension of time, recognising the impact of life transitions and societal changes on an individual's development. It includes both external events, such as historical changes, and internal changes, like physiological aging, highlighting how timing affects development.

Bronfenbrenner's theory emphasises the dynamic interactions between these systems and their collective impact on an individual's development, underscoring the interconnected nature of human experiences that shape growth from childhood to adulthood.

Conclusion

As we wrap up our exploration of the Big Picture models of lifespan development, we need to remember that development involves interconnected personal, social, historical, and environmental influences as shown in the Indigenous Connectedness Framework and Bronfenbrenner's Ecological Systems Theory. These models challenge us to think beyond conventional boundaries, encouraging a more inclusive and comprehensive understanding of human development.

Image Descriptions

Figure LD.4. Bronfenbrenner's Ecological Systems Theory image description: A concentric circle diagram with three levels of circles, as well as text outside of that.

Innermost circle: Individual

2nd circle: (Micro)

- Work
- School
- Friends
- Neighbours
- Family

Third circle (Meso):

Fourth circle (Exo):

- Local Governments
- Parents
- Friends
- Extended Family
- Mass Media

Fifth circle (Macro):

- Social norms
- Economic Systems
- Culture
- Political Systems

Sixth/outermost circle:

- Chronosystem
- Time

[Return to Figure LD.4]

Late Adulthood: Aging, Retiring, and Bereavement

CHARLES STANGOR AND JENNIFER WALINGA

We have seen that, over the course of their lives, most individuals are able to develop secure attachments; reason cognitively, socially, and morally; and create families and find appropriate careers. Eventually, however, as people enter into their 60s and beyond, the aging process leads to faster changes in our physical, cognitive, and social capabilities and needs, and life begins to come to its natural conclusion, resulting in *the final life stage, beginning in the 60s*, known as **late adulthood**.

Despite the fact that the body and mind are slowing, most older adults nevertheless maintain an active lifestyle, remain as happy as they were when younger — or are happier — and increasingly value their social connections with family and friends (Angner, Ray, Saag, & Allison, 2009). Kennedy, Mather, and Carstensen (2004) found that people's memories of their lives became more positive with age, and Myers and Diener (1996) found that older adults tended to speak more positively about events in their lives, particularly their relationships with friends and family, than did younger adults.

Cognitive Changes During Aging

The changes associated with aging do not affect everyone in the same way, and they do not necessarily interfere with a healthy life. Former Beatles drummer Ringo Starr celebrated his 70th birthday in 2010 by playing at Radio City Music Hall, and Rolling Stones singer Mick Jagger (who once supposedly said, "I'd rather be dead than singing 'Satisfaction' at 45") continues to perform even as he turned 70 in 2013. The golfer Tom Watson almost won the 2010 British Open golf tournament at the age of 59, playing against competitors in their 20s and 30s. And people such as the financier Warren Buffett; Jim Pattison, a prominent Vancouver philanthropist; Hazel McCallion, mayor of Mississauga in Ontario for over 35 years; and actress Betty White, all in their 80s or 90s, all enjoy highly productive and energetic lives.

Researchers are beginning to better understand the factors that allow some people to age better than others. For one, research has found that the people who are best able to adjust well to changing situations early in life are also able to better adjust later in life (Rubin, 2007; Sroufe, Collins, Egeland, & Carlson, 2009). Perceptions also matter. People who believe

that the elderly are sick, vulnerable, and grumpy often act according to such beliefs (Nemmers, 2005), and Levy, Slade, Kunkel, and Kasl (2002) found that the elderly who had more positive perceptions about aging also lived longer.

Research on the influence of cultural values and beliefs on aging attitudes has been dominated by comparisons between Eastern/Asian versus Western cultures. This belief is inspired by the idea that Asian societies are influenced by Confucian values of filial piety and the practice of ancestor worship, which are thought to promote positive views of aging and high esteem for older adults (Davis, 1983; Ho, 1994; Sher, 1984). Western societies, in contrast, were thought to be youth-oriented and to hold more negative views about the aging process and the elderly (Palmore, 1975). Empirical evidence for the proposed East-West differences is scarce. Although some studies have found support for the notion that aging attitudes are more positive in Asian as compared to Western cultures (Levy & Langer, 1994; Tan, Zhang, & Fan, 2004), others report effects in the opposite direction (Giles et al., 2000; Harwood et al., 2001; Sharps, Price-Sharps, & Hanson, 1998; Zhou, 2007), or fail to find any marked cultural differences (Boduroglu, Yoon, Luo, & Park, 2006; Ryan, Jin, Anas, & Luh, 2004).

Whereas it was once believed that almost all older adults suffered from a generalized memory loss, research now indicates that healthy older adults actually experience only some particular types of memory deficits, while other types of memory remain relatively intact or may even improve with age. Older adults do seem to process information more slowly — it may take them longer to evaluate information and to understand language, and it takes them longer, on average, than it does younger people, to recall a word that they know, even though they are perfectly able to recognize the word once they see it (Burke, Shafto, Craik, & Salthouse, 2008). Older adults also have more difficulty inhibiting and controlling their attention (Persad, Abeles, Zacks, & Denburg, 2002), making them, for example, more likely to talk about topics that are not relevant to the topic at hand when conversing (Pushkar et al., 2000).

But slower processing and less accurate executive control do not always mean worse memory, or even worse intelligence. Perhaps the elderly are slower in part because they simply have more knowledge. Indeed, older adults have more **crystallized intelligence** — that is, *general knowledge about the world, as reflected in semantic knowledge, vocabulary, and language*. As a result, adults generally outperform younger people on measures of history, geography, and even on crossword puzzles, where this information is useful (Salthouse, 2004). It is this superior knowledge combined with a slower and more complete processing style, along with a more sophisticated understanding of the workings of the world around them, that gives the elderly the advantage of wisdom over the advantages of **fluid intelligence** — *the ability to think and acquire information quickly and abstractly* — which favour the young (Baltes, Staudinger, & Lindenberger, 1999; Scheibe, Kunzmann, & Baltes, 2009).

The differential changes in crystallized versus fluid intelligence help explain why the elderly do not necessarily show poorer performance on tasks that also require experience (i.e., crystallized intelligence), although they show poorer memory overall. A young chess player may think more quickly, for instance, but a more experienced chess player has more knowledge to draw on. Older adults are also more effective at understanding the nuances of social interactions than younger adults are, in part because they have more experience in relationships (Blanchard-Fields, Mienaltowski, & Seay, 2007).

Social Changes During Aging: Retiring Effectively

Because of increased life expectancy in the 21st century, elderly people can expect to spend approximately a quarter of their lives in retirement. Leaving one's career is a major life change and can be a time when people experience anxiety, depression, and other negative changes in the self-concept and in self-identity. On the other hand, retirement may also serve as an opportunity for a positive transition from work and career roles to stronger family and community member roles, and the latter may have a variety of positive outcomes for the individual. Retirement may be a relief for people who have worked in boring or physically demanding jobs, particularly if they have other outlets for stimulation and expressing self-identity.

Psychologist Mo Wang (2007) observed the well-being of 2,060 people between the ages of 51 and 61 over an eight-year period and made the following recommendations to make the retirement phase a positive one:

1. Continue to work part-time past retirement in order to ease into retirement status slowly.
2. Plan for retirement — this is a good idea financially, but also making plans to incorporate other kinds of work or hobbies into post-employment life makes sense.
3. Retire with someone — if the retiree is still married, it is a good idea to retire at the same time as a spouse, so that people can continue to work part-time and follow a retirement plan together.
4. Have a happy marriage — people with marital problems tend to find retirement more stressful because they do not have a positive home life to return to and can no longer seek refuge in long working hours. Couples that work on their marriages can make their retirements a lot easier.
5. Take care of physical and financial health — a sound financial plan and good physical health can ensure a healthy, peaceful retirement.
6. Retire early from a stressful job — people who stay in stressful jobs for fear that they will lose their pensions or won't be able to find work somewhere else feel trapped. Toxic

environments can take a severe emotional toll on an employee. Leaving an unsatisfying job early may make retirement a relief.
7. Retire "on time" — retiring too early or too late can cause people to feel "out of sync" or to feel they have not achieved their goals.

Whereas these seven tips are helpful for a smooth transition to retirement, Wang also notes that people tend to be adaptable, and that no matter how they do it, retirees will eventually adjust to their new lifestyles.

Death, Dying, and Bereavement

Living includes dealing with our own and our loved ones' mortality. In her book *On Death and Dying* (1997), Elisabeth Kübler-Ross describes five phases of grief through which people pass in grappling with the knowledge that they or someone close to them is dying:

1. **Denial:** "I feel fine." "This can't be happening; not to me."
2. **Anger:** "Why me? It's not fair!" "How can this happen to me?" "Who is to blame?"
3. **Bargaining:** "Just let me live to see my children graduate." "I'd do anything for a few more years." "I'd give my life savings if..."
4. **Depression:** "I'm so sad, why bother with anything?" "I'm going to die. What's the point?" "I miss my loved ones — why go on?"
5. **Acceptance:** "I know my time has come; it's almost my time."

Despite Kübler-Ross's popularity, there are a growing number of critics of her theory who argue that her five-stage sequence is too constraining because attitudes toward death and dying have been found to vary greatly across cultures and religions, and these variations make the process of dying different according to culture (Bonanno, 2009). As an example, Japanese Americans restrain their grief (Corr, Nabe, & Corr, 2009) so as not to burden other people with their pain. By contrast, Jews observe a seven-day, publicly announced mourning period. In some cultures the elderly are more likely to be living and coping alone, or perhaps only with their spouse, whereas in other cultures, such as the Hispanic culture, the elderly are more likely to be living with their sons and daughters and other relatives, and this social support may create a better quality of life for them (Diaz-Cabello, 2004).

Margaret Stroebe and her colleagues (2008) found that although most people adjusted to the loss of a loved one without seeking professional treatment, many had an increased risk of mortality, particularly within the early weeks and months after the loss. These researchers also found that people going through the grieving process suffered more physical and psychological symptoms and illnesses and used more medical services.

The health of survivors during the end of life is influenced by factors such as circumstances surrounding the loved one's death, individual personalities, and ways of coping. People serving as caretakers to partners or other family members who are ill frequently experience a great deal of stress themselves, making the dying process even more stressful. Despite the trauma of the loss of a loved one, people do recover and are able to continue with effective lives. Grief intervention programs can go a long way in helping people cope during the bereavement period (Neimeyer, Holland, Currier, & Mehta, 2008).

Chapter Resources

JESSICA MOTHERWELL MCFARLANE

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The reference list for this chapter has been excluded from this file to reduce page count. Part of the full reference list can be viewed online at opentextbc.ca/psychologymtdi/chapter/development-chapter-resources/. The reference list for the Aging chapter can be viewed online at https://nobaproject.com/modules/aging.

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CHAPTER 7. SOCIAL PSYCHOLOGY

Elisa Niunin

Humans are social creatures. We open doors for people we have never met, we are more friendly to people we consider similar to us, and we tend to conform to the groups we are in. But why do we do that? And does everyone behave the same? These are questions that center around the study of social psychology. The way we think and feel about others highly influences how we behave around them. Things such as stereotypes, attitudes, and conformity shape how people act. If you see someone more often, even if it is just in passing, you are more likely to like them. Not only that, but the way others behave with us also influences how we think and feel. If someone asks you for a huge favor that you refuse to do, then follows it up with a smaller favor, you are more likely to accept to do the smaller favor. Social psychology also revolves around how we behave in groups. Social facilitation, groupthink, and group polarization are social phenomena that explain why, sometimes, you do things in groups that you otherwise would not have done alone. This chapter will explore many of these topics and enlighten you about why we might behave in unexpected ways in different social situations.

Making Sense of Ourselves and Others

AMELIA LIANGZI SHI

Social cognition refers to the process of understanding what people are thinking and feeling, and why they do the things they do. It helps us make sense of social situations, like why someone might be happy or sad, and how we can interact with others in a way that makes sense to them. One important aspect of social cognition involves forming impressions of other people. Making these judgments quickly and accurately guides our behaviour and helps us to interact appropriately with others. Understanding why someone may treat us unfairly allows us to address and resolve issues; figuring out how to positively influence people's attitudes can contribute to making the world a better place.

Perceiving Others

Our initial judgments of others are based in large part on what we see. Although it may seem inappropriate or shallow, we are strongly influenced by the physical features of other people — particularly their gender, race, age, and our perception of their physical attractiveness. In many cases physical attractiveness is the most important determinant of our initial liking for other people (Walster et al., 1966). Infants who are only a year old prefer to look at faces that adults consider to be attractive than at those considered to be unattractive (Langlois et al., 1991). Evolutionary psychologists have argued that our belief that "what is beautiful is also good" may be because we use attractiveness as a cue for health; people whom we find more attractive may also have been healthier, evolutionarily (Zebrowitz et al., 2003). Psychologists have identified three physical indicators of health:

- **Youth.** Leslie Zebrowitz and colleagues (1991, 2009) have found that people who have baby faces are seen as more attractive than people who are not baby-faced. The baby-face features include large, round, and widely spaced eyes, a small nose and chin, prominent cheekbones, and a large forehead.
- **Symmetry.** People with symmetrical faces are perceived as healthier than asymmetrical faces. However, facial asymmetry does not seem to be related to their actual health (Rhodes et al., 2001).
- **Averageness.** Although you might think that we would prefer faces that are unusual or

unique, in fact the opposite is true. Judith Langlois and Lori Roggman (1990) showed university students the faces of men and women. The faces were composites made up of the average of 2, 4, 8, 16, or 32 faces. The researchers found that the more faces that were averaged into the stimulus, the more attractive it was judged.

People across different cultures tend to like faces that look young, symmetrical, and average. However, each culture might also have its own ideas about what makes a face attractive. For example, in modern Western cultures, people prefer those who have little excess fat (Crandall et al., 2009). Other cultures do not show such a strong preference for thinness (Sugiyama, 2005). The need to be thin to be attractive is particularly strong for women. The desire to maintain a low body weight can lead to low self-esteem, eating disorders, and other health-impairing behaviours. However, the norm of thinness has not always been in place; the preference for women with slender, masculine, and athletic looks has become stronger over the past 50 years.

Stereotypes, Prejudice, and Discrimination

We frequently use people's appearances to form our judgments about them and to determine our responses to them. The tendency to attribute personality characteristics to people on the basis of their external appearance or their social group memberships is known as **stereotyping**. Our stereotypes about physically attractive people lead us to see them as more dominant, sexually warm, mentally healthy, intelligent, and socially skilled than we perceive physically unattractive people (Langlois et al., 2000). The physically attractive are more successful on job interviews (Hosoda et al., 2003). They even receive lighter sentences in court judgments than their less attractive counterparts (Zebrowitz & McDonald, 1991). In addition to stereotypes about physical attractiveness, we also regularly stereotype people on the basis of their group membership.

Prejudice is a negative attitude and feeling toward an individual based solely on their membership in a particular social group. Can you think of a prejudiced attitude you have held toward a group of people? How did your prejudice develop? Prejudice often begins with overgeneralising a stereotype, where we apply a stereotype to everyone in that group. For example, someone holding prejudiced attitudes toward older adults, may believe that older adults are slow and incompetent (Cuddy et al., 2005), even though many individuals of advanced age are in fact lively and intelligent. Another example of a well-known stereotype involves beliefs about racial differences among athletes. Black male athletes are often believed to be more athletic, yet less intelligent, than their white male counterparts (Hodge

et al., 2008). These beliefs persist despite a number of high-profile examples to the contrary. Sadly, such beliefs often influence how these athletes are treated by others and how they view themselves and their own capabilities.

Some stereotypes may be accurate in part. Research has found, for instance, that attractive people are actually more sociable, more popular, and less lonely than less attractive individuals (Langlois et al., 2000). Consistent with the stereotype that women are "emotional," women are, on average, considered to be more empathic and tuned in to the emotions of others than men are (Hall & Mast, 2008). Group differences in personality traits may occur, in part, because people act toward others on the basis of their stereotypes, creating a self-fulfilling prophecy. A **self-fulfilling prophecy** occurs when our expectations about the personality characteristics of others lead us to behave toward those others in ways that make those beliefs come true. If I believe a stereotype that attractive people are friendly, then I may act in a friendly way toward people who are attractive. This friendly behaviour may be reciprocated by the attractive person, and if many other people also engage in the same positive behaviours with the person, in the long run they may actually become friendlier.

Sometimes people will act on their prejudiced attitudes toward a group of people. **Discrimination** is negative action toward an individual as a result of holding negative beliefs (stereotypes) and negative attitudes (prejudice) about a particular group. People often treat the target of their prejudice poorly, for example, excluding older adults from their circle of friends due to the prejudice described above. In the late 1880s, Mary Whiton Calkins, a psychologist, faced gender discrimination. Even though Harvard, where she studied, didn't accept women, she got special permission to attend graduate seminars. She excelled in her studies under the renowned psychologist William James, meeting all the PhD requirements and earning praise as "one of the strongest professors of psychology in this country" by psychologist Hugo Münsterberg. Unfortunately, Harvard denied Calkins a PhD solely because she was a woman (Harvard University, 2019). Have you ever been the target of discrimination? If so, how did this negative treatment make you feel?

Table SL.1. The characteristics of stereotypes, prejudice, and discrimination

Item	Function	Connection	Example
Stereotype	Cognitive; thoughts about people	Overgeneralised beliefs about people may lead to prejudice	"Toronto Maple Leafs fans are arrogant and obnoxious."
Prejudice	Affective; feelings about people	Feelings may influence treatment of others, leading to discrimination.	"I hate Leafs fans; they make me angry."
Discrimination	Behaviour; treatment of others	Holding stereotypes and harbouring prejudice may lead to excluding, avoiding, and biased treatment of group members.	"I would never hire nor become friends with a person if I knew they were a Leafs fan."

Even if attractive people are on average friendlier than unattractive people, not all attractive people are friendlier than all unattractive people. Even if women are, on average, more emotional than men, not all men are less emotional than all women. Social psychologists believe that it is better to treat people as individuals, rather than rely on our stereotypes and prejudices, because stereotyping and prejudice are always unfair and often inaccurate. Furthermore, many of our stereotypes and prejudices occur outside of our awareness, to the extent that we do not even know that we are using them. You might want to test your own stereotypes and prejudices by completing the **Implicit Association Test**. It contributes to the study of unconscious stereotyping in areas like religion, disability, gender, sexuality, weight, race, age, and others.

Common types of prejudice in modern society

We may spot different forms of prejudice and discrimination. Below are some common types of prejudice in modern society.

- **Racism.** Racism exists for many racial and ethnic groups. For example, Black people are significantly more likely to have their vehicles searched during traffic stops than White people, particularly when Black people are driving in predominantly White neighbourhoods, a phenomenon often termed "DWB" or "driving while Black" (Rojek, Rosenfeld, & Decker, 2012). Mexican Americans and other Latino groups also are targets of racism from the police and other members of the community. For example, when purchasing items with a personal check, Latino shoppers are more likely than white shoppers to be asked to show formal identification (Dovidio et al., 2010).
- **Sexism.** Common forms of sexism in modern society include gender role expectations.

For example, women are expected to be friendly, passive, and nurturing. Women often are disliked for violating their gender role. Women are less likely to be hired or promoted in male-dominated professions (Ceci & Williams, 2011). Research by Laurie Rudman (1998) finds that when female job applicants self-promote, they are likely to be viewed as competent, but they may be disliked and are less likely to be hired because they violated gender expectations for modesty. Have you ever experienced or witnessed sexism? Think about your family members' jobs or careers. Why do you think there are differences in the jobs women and men have, such as more women nurses but more male surgeons (Betz, 2008)?

- **Ageism.** Think of expectations you hold for older adults. How could someone's expectations influence the feelings they hold toward individuals from older age groups? In some cultures, like Indigenous, Asian, Latino, and African American cultures, it's a tradition to treat older adults with respect and honour. However, a common ageist attitude toward older adults is that they are incompetent, less attractive, physically weak, and slow. E-Shien Chang and colleagues (2020) studied ageism over a 40-year-plus period from various countries. Their results suggest that when you are over 50, you will more likely be denied access to health services and work opportunities. Ageism can also occur toward younger adults. Does society expect younger adults to be immature and irresponsible? Michelle Raymer and colleagues (2017) examined ageism against younger workers. They discovered that older workers tend to have negative views of younger workers, thinking they have more work-related issues like incompetence.
- **Homophobia.** Homophobia is a widespread prejudice that is tolerated by many people (Herek, 2009). Negative feelings often result in discrimination, such as the exclusion of lesbian, gay, bisexual, transgender, and queer (LBGTQ+) people from social groups and the avoidance of LGBTQ+ neighbours and co-workers. This discrimination also extends to employers deliberately declining to hire qualified LGBTQ+ job applicants. Have you experienced or witnessed homophobia? If so, what stereotypes, prejudiced attitudes, and discrimination were evident?

Overcoming stereotypes and prejudice

We may be evolutionarily disposed to stereotyping. Because our primitive ancestors needed to accurately separate members of their own kin group from those of others, categorising people into "us" (i.e., the ingroup) and "them" (i.e., the outgroup) was useful and even necessary (Neuberg et al., 2010). We might use stereotypes, but it doesn't mean we should. Stereotypes, prejudice, and discrimination can make it hard for some to contribute to society. In Canada, it's a legal requirement to overcome prejudices, according to the Canadian Charter of Rights and Freedoms of 1982.

Prejudice can be reduced. Some people are more likely to confront and control their stereotypes and prejudices whereas others apply them more freely (Czopp et al., 2006). We can lessen stereotypes and prejudices by making friends with people from different groups and practicing not using stereotypes, and through education (Hewstone, 1996). For example, intergroup contact has been found to reduce prejudice, but contact by itself is not enough (Pettigrew & Tropp, 2006). Groups should experience real chances to collaborate on goals and activities they both find important (Molina, et al., 2016). The shift from an "us versus them" to a "we" thinking requires mutual trust and empathy.

Making Causal Attributions of Behaviour

Attribution refers to the process of trying to determine the causes of people's behaviour. If Frank hits Joe, we might wonder if Frank is naturally aggressive or if perhaps Joe had provoked him. If Leslie leaves a big tip for the waitress, we might wonder if she is a generous person or if the service was particularly excellent.

Sometimes we may decide that the behaviour was caused primarily by the person; this is called making a **dispositional attribution**. At other times, we may determine that the behaviour was caused primarily by the situation; this is called making a **situational attribution**. Ultimately, we may decide that the behaviour was caused by both the person and the situation.

While people are pretty good at explaining their own and others' behaviour, they are far from perfect. We often make a mistake when judging ourselves by thinking positively about the reasons behind our actions. This is called **self-serving bias**. Suppose you did well on a test. You will probably attribute that success to personal causes (e.g., "I'm smart" or "I studied really hard"). But if you do poorly on the test, you are more likely to make situational attributions (e.g., "The test was hard" or "I had bad luck").

Another common mistake is called the **fundamental attribution error**. It occurs when we try to attribute other people's behaviour. Instead of considering the situation, we quickly think it's about their personality. For example, we are more likely to say, "Leslie left a big tip, so she must be generous" than "Leslie left a big tip, but perhaps that was because the service was really excellent." An important moral about perceiving others applies here: we should not be too quick to judge other people. It's common to think poor people are lazy or that harsh words mean someone is unfriendly. But these attributions may overemphasise the role of the person and increase the tendency to blame the victim (Tennen & Affleck, 1990). Sometimes people are lazy and rude, but these people may also be influenced by the

situation in which they find themselves. Poor people may find it more difficult to get work and education because of the environment they grow up in. People may say rude things because they are feeling threatened or are in pain.



Figure SL.1. Fundamental attribution error. *The fundamental attribution error is the tendency to make personal attributions (e.g., poor people are lazy) for the behaviours of others, even where situational factors such as poor education and growing up in poverty might be better explanations.*
Alt. text: *Two photographs show unhoused people sleeping on the street.*
Source: *Homeless Man by Matthew Woitunski is used under a CC BY 3.0 Licence; Homeless New York 2008 by JMSuarez is used under a CC BY 2.0 Licence.*

When you find yourself making strong dispositional attributions for the behaviours of others, stop and think more carefully. Would you want other people to make personal attributions for your behaviour in the same situation, or would you prefer that they more fully consider the situation surrounding your behaviour? Are you perhaps making the fundamental attribution error?

Research shows cultural differences in attributions. In individualistic cultures like the US and the UK, people tend to make the fundamental attribution error. They focus on individual achievement and autonomy, thinking a person's disposition is the main reason for their behaviour. By contrast, in collectivistic cultures like the east Asian countries, the focus is on the group more than on the individual (Nisbett et al., 2001). They tend to take into account both situational and cultural influences on behaviour. Therefore, people from collectivistic cultures are less likely to commit the fundamental attribution error (Triandis, 2001).



(a) (b)

Figure SL.2. Collectivist cultures*. People from collectivistic cultures, such as some Asian cultures, are more likely to emphasize relationships with others than to focus primarily on the individual. Activities such as (a) preparing a meal, or (b) playing a game engage people in a group.* ***Alt. text:*** *Two photographs show groups of people: a family preparing a meal, and a group of women playing mahjong.* ***Source:*** *Figure 12.4 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modifications of the following works: credit (a) modification of Danau Tamblingan, family picnic by Arian Zwegers; and (b) modification of China Tuanshan – women playing Mahjongg by Anja Disseldorp which are both licensed under a CC BY 2.0 Licence.*

Changing Attitudes

Attitudes refer to our relatively enduring evaluations of people and things. Attitudes are important because they frequently predict behaviour. If we know that a person has a more positive attitude toward Frosted Flakes than toward Cheerios, then we will naturally predict that they will buy more Frosted Flakes when grocery shopping. Because attitudes often predict behaviour, people who wish to change behaviour frequently try to change attitudes through the use of persuasive communications.

There are two main routes that play a role in delivering a persuasive message: central and peripheral.

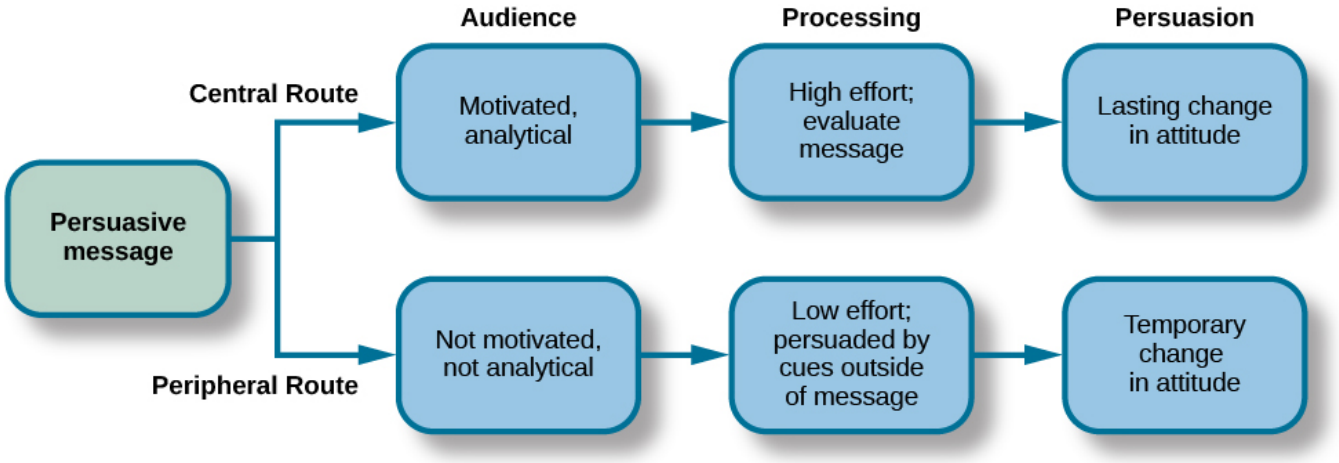

Figure SL.3. Persuasion paths. *Persuasion can take one of two paths, and the durability of the end result depends on the path.Figure 12.15 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Central Route

The **central route** is logic driven and uses data and facts to convince people of an argument's worthiness. For example, a car company seeking to persuade you to purchase their model will emphasise the car's safety features and fuel economy. This is a direct route to persuasion that focuses on the quality of the information. In order for the central route of persuasion to be effective in changing attitudes, the argument must be strong and, if successful, will result in lasting attitude change. The central route to persuasion works best when the audience is analytical and willing to engage in processing the information. From an advertiser's perspective, what products would best be sold using the central route to persuasion? What audience would most likely be influenced to buy the product? One example is buying a computer. It is likely that small business owners might especially be influenced by the focus on the computer's qualities and features such as processing speed and memory capacity.

Peripheral Route

The **peripheral route** is an indirect route that uses peripheral cues to associate a positive feeling with the message. Instead of focusing on the facts and a product's quality, the peripheral route relies on association with positive characteristics such as celebrity endorsement. For example, having a popular athlete advertise athletic shoes is a common method used to encourage young adults to purchase the shoes. This route to attitude change does

not require much effort or information processing. This method of persuasion may promote positivity toward the message or product, but it typically results in less permanent attitude change. The audience does not need to be analytical or motivated to process the message. In fact, a peripheral route to persuasion may not even be noticed by the audience, for example in the strategy of product placement. **Product placement** refers to putting a product with a clear brand name or brand identity in a TV show or movie to promote the product. For example, one season of the reality series American Idol prominently showed the panel of judges drinking out of cups that displayed the Coca-Cola logo. What other products would best be sold using the peripheral route to persuasion? Another example is clothing: A retailer may focus on celebrities that are wearing the same style of clothing.

Successful Persuasion Strategies

Researchers have tested many persuasion strategies that are effective in selling products and changing people's attitude and behaviours. One effective strategy is the **foot-in-the-door technique**. First, the persuader gets a person to agree to a small request, only to later ask for a larger favour. The foot-in-the-door technique was demonstrated in a study by Freedman and Fraser (1966) in which participants who agreed to post a small sign in their yard or sign a petition were more likely to agree to put a large sign in their yard than people who declined the first request.



(a) (b)

Figure SL.4. Foot-in-the-Door technique. *With the foot-in-the-door technique, getting someone to agree to a small request such as (a) wearing a campaign button can make them more likely to agree to a larger request, such as (b) putting campaign signs in their yard.* ***Alt. text:*** *Photograph A shows a campaign button. Photograph B shows a yard filled with numerous signs.* ***Source:*** *(a) Vote Obama 08 by Mykl Roventine is licensed under a CC BY-NC-SA 2.0 licence. (b) hope-ium" by "shutterblog" is licensed under a CC BY 2.0 Licence.*

A variation of foot-in-the-door is called **low-balling technique**. The persuader starts with a favourable request. After the audience agrees, they reveal some unfavourable details or additional conditions. Cialdini et al. (1978) demonstrated the effect of low-balling in a class of first-year psychology students. He asked them to participate in a study on cognition, and that they would meet at 7:00 in the morning. Asked directly, only 1/4 of the students were willing to participate. When the meeting time wasn't initially mentioned, more than half of the students agreed to participate. Later, when they were informed about the early time, most students who had already agreed didn't change their minds.

Alternatively, the persuader may start with a large request that will certainly be turned down, then present a smaller, more feasible request (which is the true request). People tend to agree to the second, smaller request. This is called **door-in-the-face technique**. Cialdini et al (1975) asked college students if they were willing to supervise a group of teenagers on a day trip to the zoo. When directly asked, over 80% refused. However, when they began with a challenging request, asking for a commitment of two years where nobody agreed, the real request came next, seeming much more reasonable compared to the first one. As a result, half of the students agreed to supervise the zoo trip.

One difficulty of persuasion is that attitudes do not always predict the actual behaviour. Behaviours are more likely to be consistent with attitudes when the social situation in which the behaviour occurs is similar to the situation in which the attitude is expressed (Ajzen, 1991). Imagine the case of Magritte, a 16-year-old high school student, who tells her parents that she hates the idea of smoking cigarettes. How sure are you that Magritte's attitude will predict her behaviour? Would you be willing to bet that she'd never try smoking when she's out with her friends? The problem here is that Magritte's attitude is being expressed in one social situation (i.e., when she is with her parents) whereas the behaviour (i.e., trying a cigarette) would occur in a very different social situation (i.e., when she is out with her friends). Magritte's friends might be able to convince her to try smoking by applying peer pressure.

You might expect that our attitudes predict what we do, but it can be surprising that what we do can also affect our attitudes. It makes sense that if I like Frosted Flakes I'll buy them, because my positive attitude toward the product influences my behaviour. However, my attitude toward Frosted Flakes may also become more positive if I decide — for whatever reason — to buy some.

Behaviours influence attitudes, in part, through the process of self-perception. **Self-perception** occurs when we use our own behaviour as a guide to help us determine our own thoughts and feelings (Bem, 1972). In one demonstration of the power of self-perception, Gary Wells and Richard Petty (1980) assigned their research participants to shake their heads either up and down or side to side as they read newspaper editorials. The participants who had shaken their heads up and down later agreed with the content of the editorials more than the people who had shaken them side to side. In other words, the participants used their own head-shaking behaviours to determine their attitudes about the editorials.

Persuaders may use the principles of self-perception to change attitudes. Imagine someone decides to cut back on drinking. Instead of saying, "I'm quitting forever," they might start by saying, "I'm going to take a break for a week." As they successfully avoid drinking for that week, they begin to see themselves as someone who can control their drinking. This positive self-perception may encourage them to extend the break, eventually leading to a longer-term decision to quit drinking altogether.

Behaviour also influences our attitudes through a more emotional process known as cognitive dissonance. **Cognitive dissonance** refers to the discomfort we feel when we act in ways that we think are wrong (Festinger, 1957). If we feel that we have wasted our time or acted against our own moral principles, we experience dissonance and may change our attitudes about the behaviour to reduce this discomfort. In one demonstration of the power of cognitive dissonance, Elliot Aronson and Judson Mills (1959) studied whether the discomfort from an initiation process could explain how committed students felt to a group. Female university students volunteered for a psychology of sex discussion group. Some were told to do an embarrassing initiation (reading explicit content in public), while others were spared. Later, everyone listened to a dull group conversation. The results showed that those with the embarrassing initiation reported liking the group more. The effort creates dissonant cognitions (e.g., "I did all this work to join the group"), which are then justified by creating more consonant ones (e.g., "Okay, this group is really pretty fun").

Generally speaking, when people put in more effort, they become more committed. When we put in effort for something — an initiation, a big purchase price, or even some of our precious time — we will likely end up liking the activity more than we would have if the effort had been less; not doing so would lead us to experience the unpleasant feelings of dissonance. After we buy a product, we convince ourselves that we made the right choice because the product is excellent. If we hurt someone else's feelings, we may even decide that they are bad people who deserve our negative behaviour. To escape from feeling poorly about themselves, people may believe that "If I had it all to do over again, I would not change anything important."

Behaving in the Presence of Others

AMELIA LIANGZI SHI

People today still spend a great deal of time in groups. We study together in groups, we work together on production lines, and we decide the fates of others in courtroom juries. Group work can be beneficial. During a complex surgery, a team works together so effectively that the outcome wouldn't be possible if each person worked alone. However, group performance is almost never as good as we would expect, given the number of individuals in the group. In some cases, it might be worse than what one or more group members could achieve alone. What factors determine whether we work better or worse in front of others, or as a group? In this chapter, we will learn the factors that increase and decrease group productivity, and how our behaviours are influenced by peers and authority figures.



Figure SL.5. Working groups. *Working groups are used to perform tasks and make decisions, but are they effective?* ***Alt. text:*** *On the left, this picture shows doctors in an operating room; on the right, this picture shows people in a staff meeting.* ***Source:*** *Operating Room by John Crawford is in the Public Domain; Revision 3's Friday Afternoon Staff Meeting by Robert Scoble is used under a CC BY 2.0 Licence.*

Social Facilitation and Social Loafing

In an early social psychological study, Norman Triplett (1898) found that bicycle racers who were competing with other bicyclers on the same track rode significantly faster than bicyclers who were racing alone. This led Triplett to hypothesize that people perform tasks better when there are other people present than they do when they are alone. The tendency to perform tasks better or faster in the presence of others is known as **social facilitation**.

However, it seems that the conclusion that being with others increases performance is not entirely true. Perhaps you remember an experience when you performed a task (e.g., playing the piano, shooting basketball free throws, giving a public presentation) very well alone but poorly with, or in front of, others. The tendency to perform tasks more poorly or more slowly in the presence of others is known as **social inhibition**.

Robert Zajonc (1965) explained the phenomena using the idea of physiological arousal. When we're with others, we feel more aroused than when we're alone. When the task to be performed is relatively easy, or if the individual has learned to perform the task very well (e.g., riding a bike), the increase in arousal caused by the presence of others will create social facilitation. On the other hand, when the task is difficult or not well learned (e.g., giving a public speech), the increase in arousal will hinder performance.

A great deal of experimental research has now confirmed these predictions. A meta-analysis by Charles Bond and Linda Titus (1983), which looked at the results of over 200 studies using over 20,000 research participants, found that the presence of others significantly increased the performance on simple tasks and decreased the performance on complex tasks.

Other factors have been proposed to account for social facilitation and social inhibition. For example, we are particularly influenced by others when we perceive that the others are evaluating us or competing with us. Strube and colleagues' (1981) findings support this idea. In their study, the presence of spectators increased joggers' speed only when the spectators were facing the joggers, so that the spectators could see the joggers and assess their performance. The presence of others did not influence joggers' performance when the joggers were facing in the other direction and thus could not see them.

A common group process loss is **social loafing**, where members may not contribute as much as they should. In one of the earliest social psychology experiments, Max Ringelmann (1913; reported in Kravitz & Martin, 1986) had men pull on ropes, either individually or in groups. While larger groups pulled harder than one person, there was also a significant loss. Groups of three men pulled at only 85% of their expected capability, and groups of eight pulled at just 37%. This kind of loss, where group productivity drops as the group size increases, happens on many tasks.

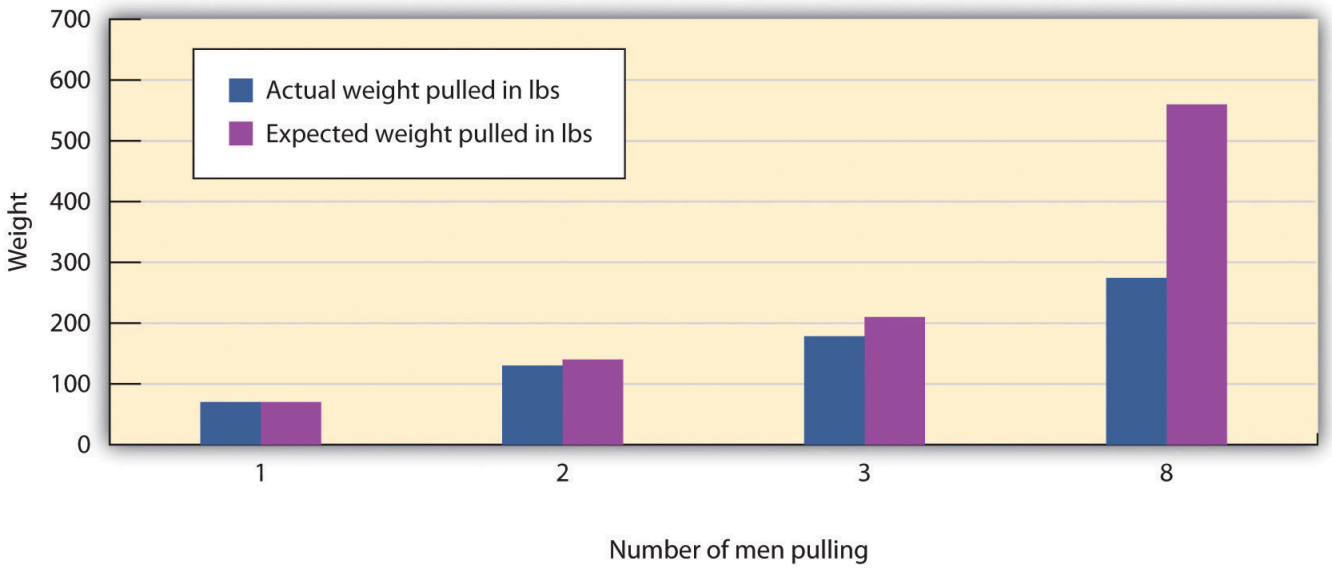

Figure SL.6. Social loafing. *Group process loss in Ringelmann's (1913) study. Although more men pulled harder on a rope than fewer men did, there was a significant process loss in comparison to what would have been expected on the basis of their individual performances. [Image Description]*
Source: *Figure 7.15 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Groupthink and Group Polarization

Group process losses can also occur when group members conform to each other rather than expressing their own divergent ideas. **Groupthink** occurs when a group, even if its members are smart and capable, ends up making a poor decision, as a result of a flawed group process and strong peer pressures. Groupthink is more likely to occur (a) when members feel a strong group identity (e.g., the Stanley Cup riots of 1994 and 2011 in Vancouver), (b) when there is a strong and directive leader, (c) when the group needs to make an important decision quickly, and (d) when the group is prevented from making a fully informed decision (e.g., members have no access to additional information). Groups suffering from groupthink become unwilling to seek out contradictory information and group members do not express contradictory opinions. The group begins to see itself as extremely valuable and important, highly capable of making high-quality decisions, and invulnerable. The group members begin to feel that they are superior and do not need to seek outside information. Such a situation is conducive to terrible decision making. Groupthink was involved in a number of well-known and important, but very poor, decisions made by government and business groups, including the crashes of two Space Shuttle missions in 1986 and 2003.

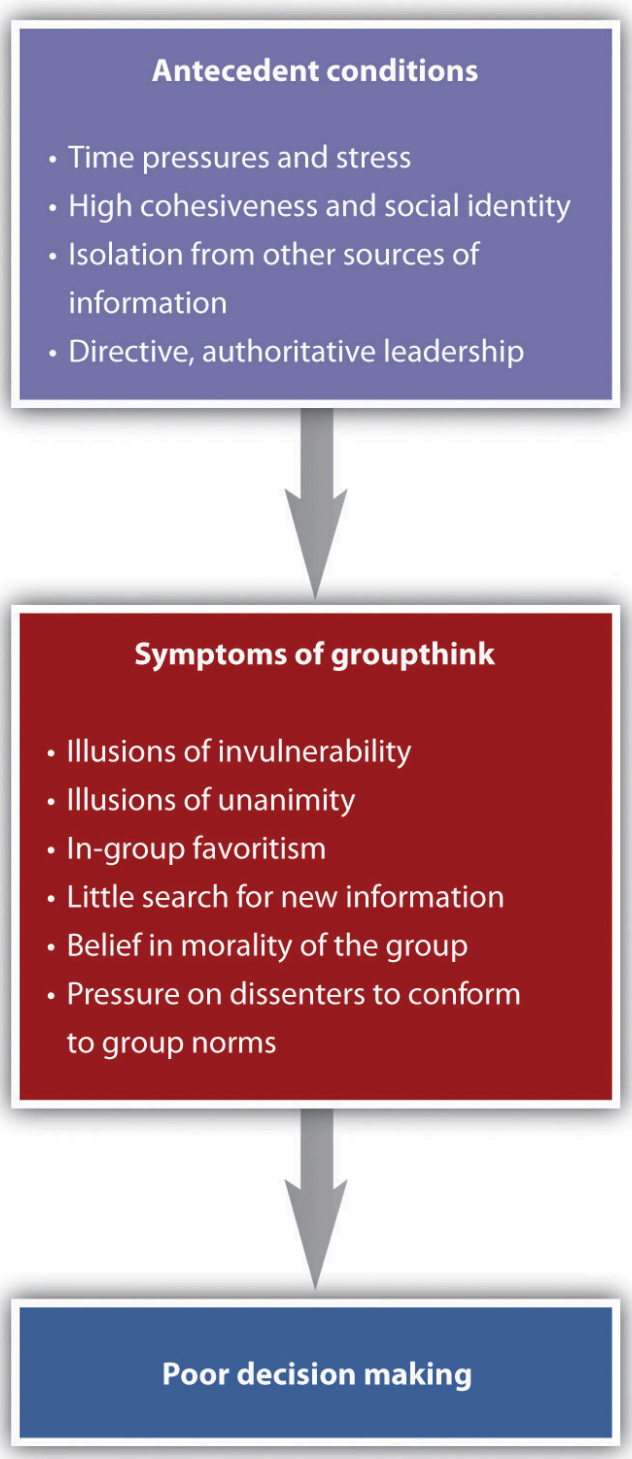

Figure SL.7. Groupthink. *Causes and outcomes of groupthink. [Image Description]* ***Source:*** *Figure 7.16 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Another phenomenon that occurs within group settings is group polarization. **Group polarization** occurs when a group's original attitude gets stronger after they talk about their opinions. That is, if a group initially favours a certain viewpoint, after discussion the group consensus is likely a stronger endorsement of that viewpoint. Conversely, if the group was initially opposed to a viewpoint, group discussion would likely lead to stronger opposition. Group polarization explains many actions taken by groups that would not be undertaken by individuals alone. For example, group polarization might be the reason for the strong political divisions that are very common in today's society. Because people often choose news sources that match their own political beliefs, they don't often come across different viewpoints. This makes their own views stronger over time and can lead to prejudice and discrimination towards people with different political ideas (Iyengar & Westwood, 2015).

Working in groups has both positive and negative outcomes. On the positive side, it's smart to use groups for decisions because they can achieve more together than one person can alone. Besides, once a group decides on something, it's often easier to get others to follow because people think decisions by groups are fairer. However, groups often face problems that make them less effective. Group members often do not realise that the process losses are occurring around them. For example, people in brainstorming groups may feel they've been more productive than they would have been if they were working alone, even if the group didn't do very well (Nijstad et al., 2006). The tendency for group members to overvalue the productivity of the groups they work in is known as **the illusion of group productivity**. Group members hear many ideas, making it seem like the group is doing great. Also, the sense of group belongingness makes members believe the group is strong and doing well. We can use some techniques to increase process gains and reduce process losses. Table SL.2 summarises some of these techniques.

Table SL.2. The Illusion of Group Productivity. Techniques that can be used to improve group performance.

Technique	Example
Provide rewards for performance	Rewarding employees and team members with bonuses will increase their effort toward the group goal. People will also work harder in groups when they feel that they are contributing to the group goal rather than when they feel that their contributions are not important.
Keep group member contributions identifiable	If they feel that their contributions to the group are known and potentially seen positively by the other group members, group members will work harder than they will if their contributions are summed into the group total and thus unknown (Szymanski & Harkins, 1987).
Maintain equity	Workers who feel that their rewards are proportional to their efforts in the group will be happier and work harder than workers who feel that they are underpaid (Geurts et al., 1994)
Keep groups small	Larger groups are more likely to suffer from coordination problems and social loafing. The most effective working groups are of relatively small size — about four or five members.
Create positive group norms	Group performance is increased when the group members care about the ability of the group to do a good job. On the other hand, some groups develop norms that prohibit members from working to their full potential and thus encourage loafing.
Improve information sharing	Leaders must work to be sure that each member of the group is encouraged to present the information that they have in group discussions. One approach to increasing full discussion of the issues is to have the group break up into smaller subgroups for discussion.
Allow plenty of time	Groups need time to reach consensus, and allowing plenty of time will help keep the group from coming to premature consensus and making an unwise choice. Time to consider the issues fully also allows the group to gain new knowledge by seeking information and analysis from outside experts.
Set specific and attainable goals	Groups that set specific, difficult, yet attainable goals (e.g., “improve sales by 10% over the next six months”) are more effective than groups that are given goals that are not very clear (e.g., “let’s sell as much as we can!”) (Locke & Latham, 2006).

Conformity and Obedience

When we decide on what courses to enroll in by asking for advice from our friends, change our behaviours as a result of the ideas that we hear from others, or binge drink because our friends are doing it, we are engaging in conformity. **Conformity** refers to a change in behaviour that occurs as the result of the presence of the other people around us. We conform for two reasons: **informational conformity**, thinking others have good information and wanting to gain knowledge, and **normative conformity**, wanting to be liked. The typical outcome of conformity is that our behaviours become more similar to those of others around us. However, some situations create more conformity than others. Table SL.3 summarises some of the factors that contribute to conformity.

Table SL.3. Variables that increase conformity.

Variable	Description	Example
Number in majority	As the number of people who are engaging in a behaviour increases, the tendency to conform to those people also increases.	People are more likely to stop and look up in the air when many, rather than few, people are also looking up (Milgram et al., 1969).
Unanimity	Conformity reduces greatly when any one person deviates from the norm.	In line-matching research, when any one person gave a different answer, conformity was eliminated (Asch, 1955).
Status and authority	People who have higher status, such as those in authority, create more conformity.	Conformity in obedience studies was greatly reduced when the person giving the command to shock was described as an "ordinary man" rather than a scientist at Yale University (Milgram, 1974).

At times, conformity occurs in a relatively spontaneous and unconscious way. Robert Cialdini and colleagues (1990) found that university students were more likely to throw litter on the ground themselves when they had just seen another person throw some paper on the ground. Clara Michelle Cheng and Tanya Chartrand (2003) found that people unconsciously mimicked the behaviours of others, such as by rubbing their face or shaking their foot.

Muzafer Sherif (1936) studied how norms develop in ambiguous situations. In one experiment, college students were in a dark room with a single light point. They had to say how much the light seemed to move each time it turned on. The apparent movement happens due to eye movements. Each person in the group spoke their answer aloud in a different random order. Sherif discovered a conformity effect. Over time, group members' responses became more similar, and after four days, they settled on a common norm. When interviewed later, participants said they didn't realise they were conforming.

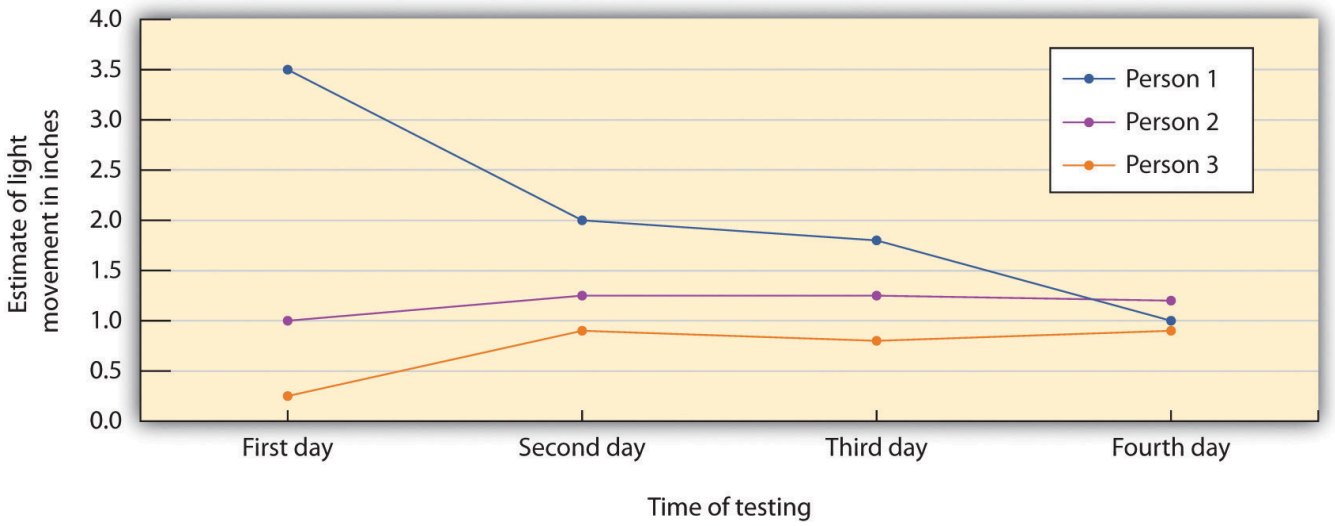

Figure SL.8. Conformity effect. *The participants in Sherif's (1936) study had different beliefs about the light movements on the first day. As they shared their beliefs with other group members over several days, a common group norm developed.* ***Alt. text:*** *Chart of conformity study showing that over four days, participants' estimates of light movement became increasingly similar, with differences shrinking from over 3.0 inches on day one to under 0.5 on day four.* ***Source:*** *Figure 7.17 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

In the research of Solomon Asch (1955), male university students participated in what they thought was a test of visual abilities. Seated in front of a board with visual stimuli, they had 18 trials. Each trial presented two cards, and participants had to compare a single line on the standard card with three lines on the test card (Figure SL.12). The judgments that group members were asked to make were not ambiguous at all. Yet, their results still showed a strong conformity effect. The group answered aloud, proceeding from one end to the other. Unbeknownst to the real participant, other members were experimental confederates. A **confederate** is not a genuine participant but plays a specific role as directed by the researchers. On some trials, all confederates purposely chose the wrong answer. For example, even though the correct answer was Line 1, they would all say it was Line 2. Thus, when it became the participant's turn to answer, they could either give the clearly correct answer or conform to the incorrect responses of the confederates. About 76% of the 123 men gave at least one incorrect response, showing the power of conformity. However, 24% never conformed, and only 5% conformed on all 12 critical trials. The following YouTube link provides a demonstration of Asch's line studies.

Watch this video: **The Asch Line Study – Conformity Experiment (6 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=1037#oembed-1***

"The Asch Line Study – Conformity Experiment" video by Practical Psychology is licensed under the Standard YouTube Licence.

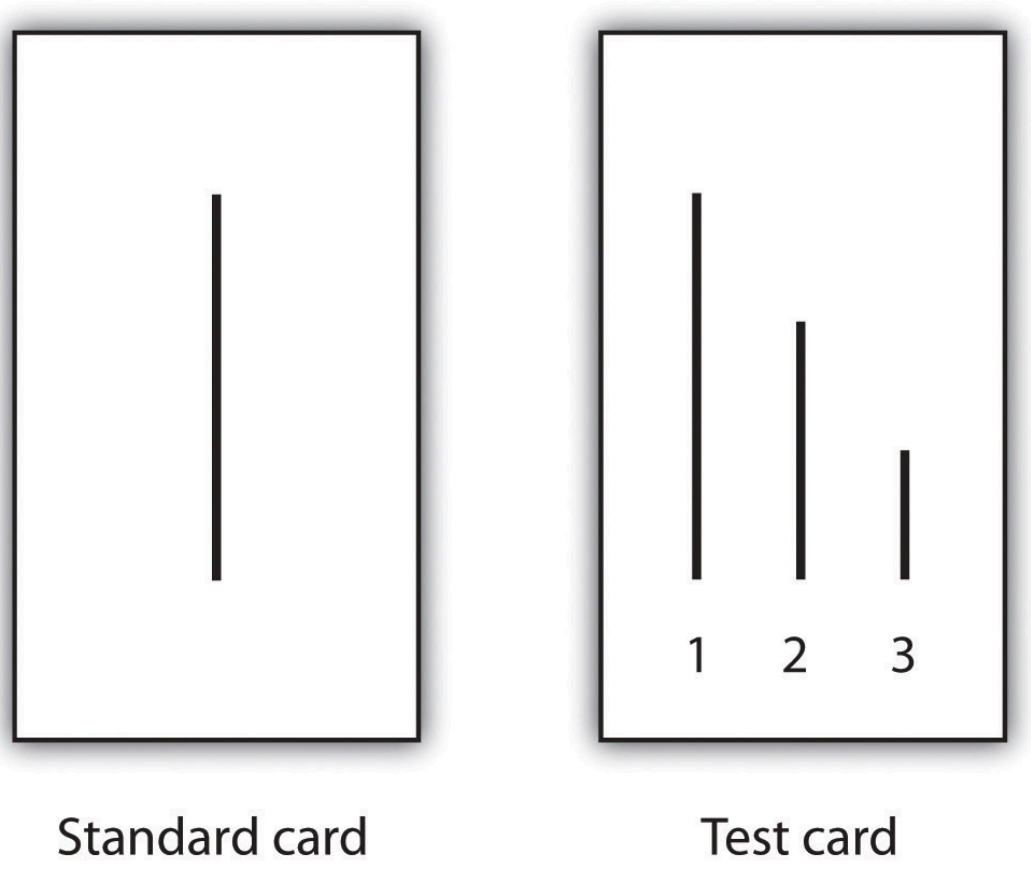

Figure SL.9. Asch's Line Study. *In Asch's (1955) study, the standard card has a single line that was to be judged, and the test card has three lines that varied in length between about 5 and 25 centimetres.* ***Alt. text:*** *On the left, this diagram shows a standard card with a single line on it; on the right, this diagram shows a test card with three lines on it of differing heights.* ***Source:*** *Figure 7.11 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Stanley Milgram's (1974) studies explored **obedience**, the tendency to conform to authority. He designed a test to see whether people would listen to someone acting like an authority figure, even if it meant doing harm to others. He recruited men (and, in one of his studies, women) from diverse backgrounds through newspaper ads. Participants met a "fellow participant," who was actually a confederate working with the experimenter. Participants were told that the research aimed to study punishment effects on learning. One of them would be the teacher, and the other the learner. They were each given a slip of paper, asked to open it, and indicate what it said. Both were labeled as "teachers," ensuring the real participant was always the teacher. The learner was taken to a shock room and strapped to an electrode. The teacher's task was to read word pairs, with the learner remembering which words went together. For example, if the word pair was "blue sofa," the teacher would say the word "blue"

on the testing trials, and the learner would have to indicate which of four possible words — “house,” “sofa,” “cat,” or “carpet” — was the correct answer by pressing one of four buttons in front of them. Before they started the experiment, the teacher first received a mild shock to demonstrate that the shocks really were painful. The participant read words to the learner, then started the test. The learner sat in another room. The experimenter, standing behind the teacher, told them to give shocks to the learner for each mistake. The shock level increased with every mistake, making each shock stronger.

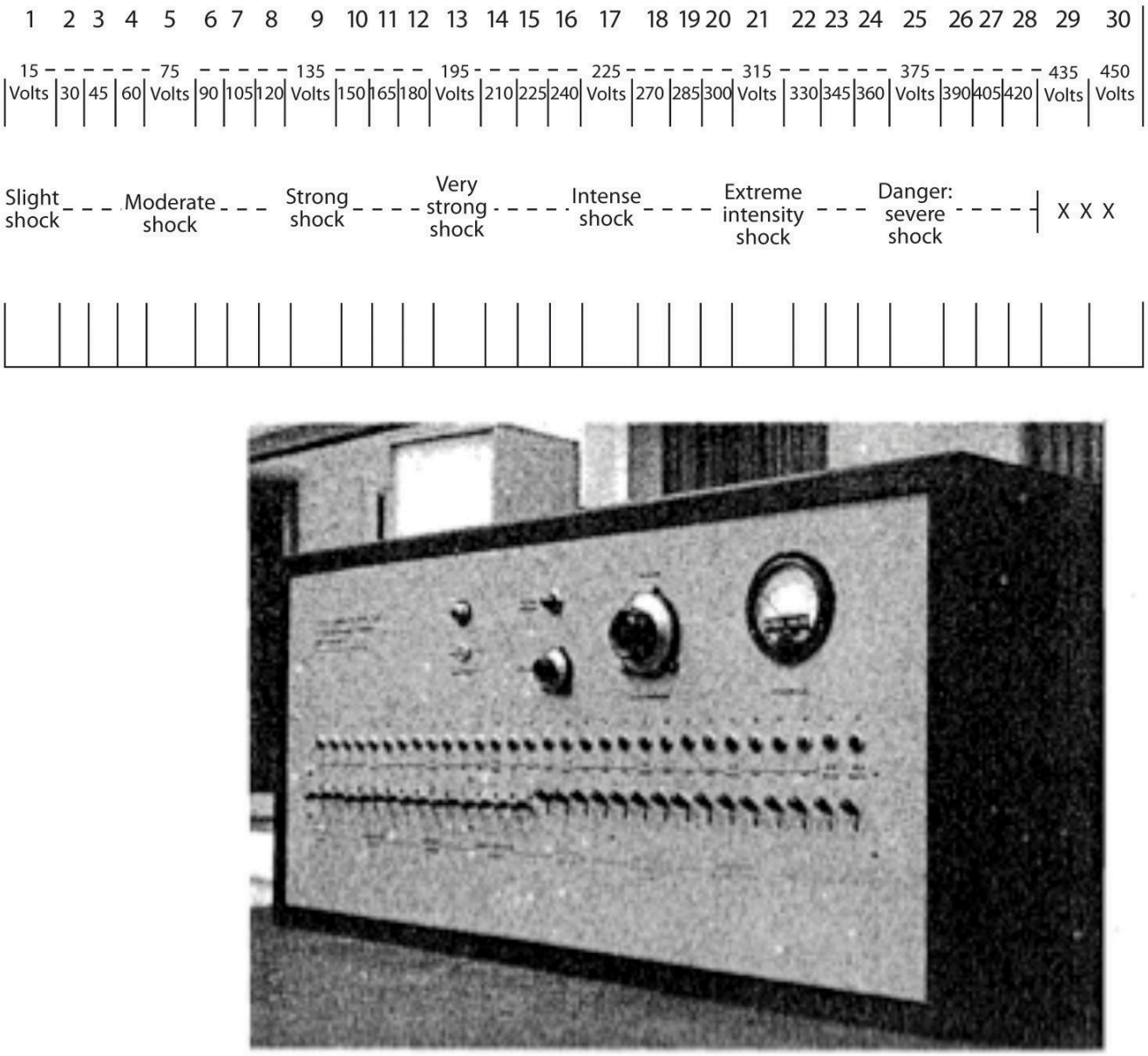

Figure SL.10. Obedience. *The shock machine used in Milgram's (1974) experiments on obedience. The shocks at 315 volts and above are marked as "danger: severe shock."* ***Alt. text:*** *Above, a chart shows a scale describing the the strengh of a shock at a given voltage; below, this picture shows an old electrical control panel.* ***Source:*** *Figure 7.12 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Once the learner (the confederate) was alone in the other room, he unstrapped himself from the shock machine and brought out a tape recorder that he used to play a prerecorded series of responses that the teacher could hear through the wall of the room. The teacher

heard the learner say "ugh!" after the first few shocks. After the next few mistakes, when the shock level reached 150 volts (V), the learner was heard to exclaim, "Let me out of here. I have heart trouble!" When the shock hit around 270 volts, the learner's protests got stronger. After 300 volts, the learner said they wouldn't answer any more questions. From 330 V and up, the learner was silent. The experimenter responded to participants' questions, if any, with a scripted response indicating that they should continue reading the questions and applying increasing shock when the learner made a mistake or did not respond.

The results of Milgram's research were quite shocking. Although some participants refused to continue after about 150 V despite the insistence of the experimenter's demands, 65% of the participants gave the shock to the learner all the way up to the 450 V maximum. Note that the shock at this level was marked as "danger: severe shock" and no response had been heard from the participant for several trials. In other words, over half of the participants shocked another person to death.

In case you are thinking that such high levels of obedience would not be observed in today's modern culture, there is evidence that they would. Milgram's findings were almost exactly replicated, using men and women from a wide variety of ethnic groups, in a study conducted in the first decade of this century at Santa Clara University (Burger, 2009). In this replication of the Milgram experiment, 67% of the men and 73% of the women agreed to administer increasingly painful electric shocks when an authority figure ordered them to do so. The participants in this study were not, however, allowed to go beyond the 150 V shock switch.

While it might seem like Burger's and Milgram's experiments show that people are naturally bad and willing to harm others, the behaviour is more about the social situation than the people themselves. When Milgram created variations on his original procedure, he found that conformity was significantly reduced (a) when people were allowed to freely choose their shock level, (b) when the experimenter communicated by phone from another room, and (c) when they noticed another teacher refuse to give the shock.

Further argument of the power of role expectations was given in the infamous Stanford Prison Experiment. Philip Zimbardo and colleagues (Haney et al., 1973; Zimbardo, n.d.) designed a study that randomly assigned male university students to the roles of prisoner or guard in a simulated prison located in the basement of a building at Stanford University. The study was set to run for two weeks. The "prisoners" were picked up at home by real police officers and subjected to a variety of humiliating procedures designed to replicate real-life arrest procedures. The "guards" were given uniforms, nightsticks, and mirror sunglasses and were encouraged to act out their roles authentically. Within a short period of time, the prisoners began to experience mental and physical distress, while some of the guards became punitive and cruel. The study had to be ended in only six days.

The Stanford Prison Experiment results have been widely reported for nearly 50 years as evidence that situational requirements can be powerful in eliciting behaviour that is out of character. However, a recent investigation by Le Texier (2019) has challenged these conclusions. For example, the prison guards in fact were given specific instructions about the treatment of the prisoners. The guards considered themselves research assistants and did not know that they were also subjects. The prisoners were not allowed to leave at the beginning. Given the importance of the Stanford Prison Experiment in psychology, it is surprising that Le Texier's (2019) review is the first to do a thorough examination of all of the archival material. The Stanford Prison Experiment is a good example for showing how biased research can lead to unjustified conclusions. You are encouraged to visit the **Stanford Prison Experiment website**, and then to read Le Texier's re-examination of its conclusions.

Conformity typically occurs as an impact of the majority. However, there are cases in which the minority is able to create conformity. For example, Charlan Nemeth and Julianne Kwan's (1987) research shows that exposure to dissenting minority viewpoints can positively impact decision-making. It is a good thing that minorities can be influential; otherwise, the world would be pretty boring indeed.

The research that we have discussed to this point suggests a powerful conformity effect, but it is not always the case that we blindly conform. Sometimes people don't conform, especially when they think someone is trying to control them. If they believe their freedom is at risk but can still push back, they might feel strongly against the desires of the influencer. This resistance is called **psychological reactance** (Brehm, 1966). James Pennebaker and Deborah Sanders (1976) attempted to get people to stop writing graffiti on the walls of campus restrooms. In the first group of restrooms, they put a sign that read, "Do not write on these walls under any circumstances" whereas in the second group they placed a sign that simply said, "Please don't write on these walls." Two weeks later, the researchers returned to the restrooms to see if the signs had made a difference. They found that there was significantly less graffiti in the second group of restrooms than in the first one. Reactance represents a desire to restore freedom that is being threatened. A child who feels that their parents are forcing them to eat asparagus may react with a strong refusal to touch the plate. An adult who feels that they are being pressured by a car salesperson might feel the same way and leave the showroom entirely.

Image Descriptions

Figure SL.6. Social Loafing image description:

Number of men pulling	Actual weight pulled	Expected weight pulled
1	80 pounds	80 pounds
2	140 pounds	145 pounds
3	180 pounds	205 pounds
8	275 pounds	560 pounds

[Return to Figure SL.8]

Figure SL.7. Groupthink image description: A flowchart that identifies the flow of the causes and outcomes of groupthink.

1. Antecedent conditions
    - Time pressures and stress
    - High cohesiveness and social identity
    - Isolation from other sources of informatioin
    - Directive, authoritative leadership
2. Symptoms of groupthink
    - Illusions of invulnerability
    - Illusions of unanimity
    - In-group favouritism
    - Little search for new information
    - Belief in morality of the group
    - Pressure on dissenters to conform to group norms
3. Poor decision making *[Return to Figure SL.9]*

Image Attributions

Figure SL.5. ***Operating Room*** by John Crawford is in the **Public Domain**; ***Revision 3's Friday Afternoon Staff Meeting*** by **Robert Scoble** is used under a **CC BY 2.0 Licence**.

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Interacting with Others

AMELIA LIANGZI SHI

As humans, we've gained a range of social skills that help us connect with others effectively. Building connections with people, forming relationships, is a crucial part of our lives. We naturally tend to be supportive and lend a helping hand, even when it means making sacrifices for ourselves. However, there are times when we might find ourselves in situations where aggression becomes a response, depending on the circumstances. In this chapter, we'll explore these aspects — relationships, helping, and aggression — to better understand the dynamics of interacting with others.

Forming Relationships

One of the most important tasks faced by humans is to develop successful relationships with others. These relationships can be casual, like acquaintanceships and friendships. They can also be more serious, like long-term intimate and romantic relationships, such as in a marriage. It is useful to know what psychologists have learned about the principles of liking and loving.



Figure SL.11. Interpersonal attraction. *Intimate relationships are characterised by responsiveness, disclosure, intimacy, equity, and passion.* ***Alt. text:*** *Three couples each close to each other in affectionate embrace.* ***Source:*** *From left to right: Photo by Helena Lopes is licensed under the Pexels Licence; photo by Tim Samuel is licensed under the Pexels Licence; photo by Steshka Willems is licensed under the Pexels Licence.*

One important factor is a perceived **similarity** in values and beliefs between the partners (Davis & Rusbult, 2001). Similarity is important for relationships, both because it is more convenient (e.g., it's easier if both partners like to ski or go to the movies than if only one does) and because similarity supports our values (e.g., I can feel better about myself and my choice of activities if I see that you also enjoy doing the same things that I do).

Liking is also enhanced by **self-disclosure**, which is the tendency to communicate frequently without worrying about getting into trouble, and in an accepting and empathetic manner. Friends are friends because we can talk to them openly about our needs and goals and because they listen to and respond to our needs. When the partners in a relationship feel that they are close, and when they indicate that the relationship is based on caring, warmth, acceptance, and social support, we can say that the relationship is intimate (Reis & Aron, 2008). For the relationship to endure, self-disclosure must be reciprocal. If I open up to you about the concerns that are important to me, I expect you to do the same in return.

Another important determinant of liking is **proximity**, which is the extent to which people are physically near us. You are more likely to develop friendships with people who are nearby, such as those who live in your dorm, or those who just happen to sit nearer to you in the classrooms (Back et al., 2008).

Proximity has its effect on liking through the principle of **mere exposure** — the tendency to prefer stimuli (e.g., a person or an object) that we have seen more frequently. Richard Moreland and Scott Beach (1992) studied mere exposure by having female confederates attend a large lecture class of over 100 students 0, 5, 10, or 15 times during a semester. At the end of the term, the other students in the class were shown pictures of the confederates and asked to indicate both if they recognised them and also how much they liked them. The number of times the confederates had attended class did not influence the other students' ability to recognise them, but it did influence their liking for them.

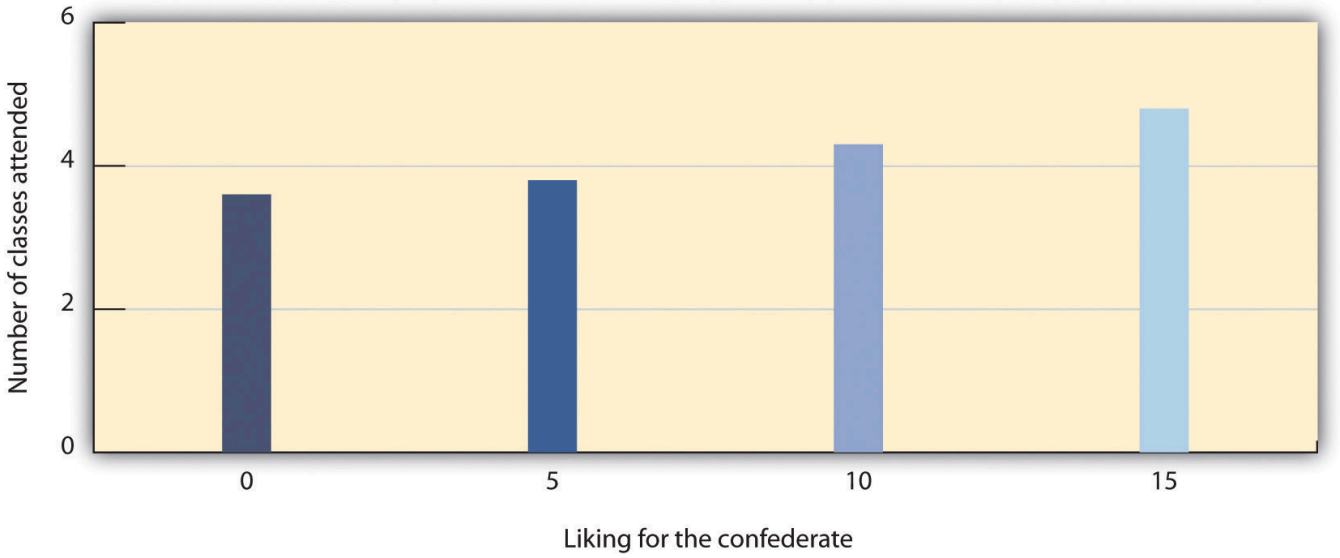

Figure SL.12. Mere exposure. *Moreland and Beach (1992) had female confederates visit classrooms 0, 5, 10, or 15 times over the course of a semester. Then, the students rated their liking of the confederates. As predicted by the principles of mere exposure, confederates who had attended class more often were also liked more.* ***Alt. Text:*** *This chart shows the number of classes attended by the female confederates compared to how well liked they were by the students. The more classes the female confederate attended the more well-liked they were by the students.* ***Source:*** *Figure 7.4 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

The effect of mere exposure is powerful in a wide variety of situations. Infants tend to smile at a photograph of someone they have seen before more than they smile at a photograph of someone they are seeing for the first time (Brooks-Gunn & Lewis, 1981). People like mirror-image pictures of their faces more than the direct image that others see, but their friends prefer non-mirror-image pictures (Mita et al., 1977). This happens because people are used to seeing their own face in a mirror.

Mere exposure may well have an evolutionary basis. We have an innate fear of the unknown, but as things become more familiar, they seem less threatening and dangerous (Freitas et al., 2005), and thus produce more positive affect (Harmon-Jones & Allen, 2001). In addition, familiar people become more likely to be seen as part of the ingroup rather than the outgroup, and this may lead us to like them more. Leslie Zebrowitz and colleagues (2007) point out that we like people of our own racial group, in part because we perceive them as similar to us.

In the most successful relationships, the two people begin to see themselves as a single unit. Arthur Aron and colleagues (1992) assessed the role of closeness in relationships using the *Inclusion of Other in the Self Scale* (Figure SL.18). You can take this measure yourself for some different people that you know, like your family members, friends, or significant other. The measure is simple to interpret. If the circles that show you and the other person overlap a lot, it means your relationship is close. But if the circles have less overlap, it means your rela-

tionship is not as close. Although this closeness measure is very simple, Aron and colleagues (1991, 1995) discovered that it can predict people's satisfaction with their close relationships and couples' tendency to stay together.

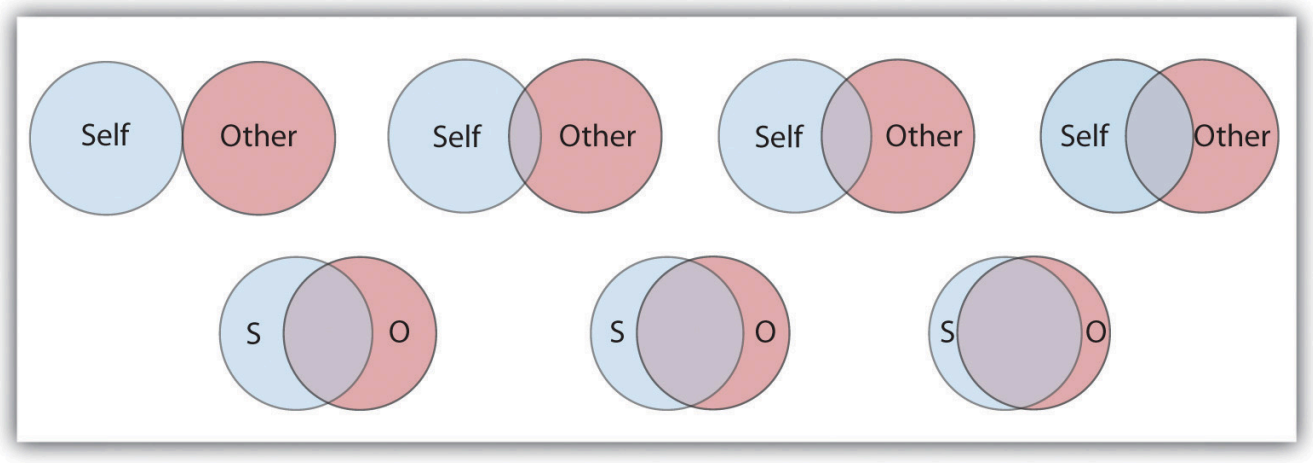

Figure SL.13. The inclusion of other in the self scale. *The Inclusion of Other in the Self Scale is used to determine how close two partners feel to each other. The respondent simply circles which of the seven figures they feel best characterises the relationship (Aron et al., 1992).* ***Alt. text:*** *These Venn diagrams show seven degrees of relation between the Self and the Other. Each Venn diagram increases in the amount of overlap between teh two circles.* ***Source:*** *Figure 7.5 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Sometimes intimacy lies in the growing interdependence between partners as they navigate shared responsibilities in managing a household, raising children, and caring for elderly parents. The partners increasingly turn to each other for help in coordinating activities, remembering dates and appointments, and accomplishing tasks. Relationships are close, in part, because the couple becomes highly interdependent, relying on each other to meet important goals. In relationships where partners get along well, they naturally feel committed to each other. **Commitment** refers to the feelings and actions that keep partners working together to maintain the relationship. Partners who are really committed to each other are less interested in other people as possible partners (Lydon et al., 1999). According to Margaret Clark and Edward Lemay (2010), a crucial factor in successful relationships is a sense of responsiveness — knowing that the other person understands, validates, and cares for them. This mutual and unconditional exchange of love promotes the well-being of both partners and creates a secure foundation for their growth and happiness together.

Robert Sternberg (1986) proposed that there are three components of love: intimacy, passion, and commitment. These three components form a triangle that defines multiple types of love: this is known as the **triangular theory of love**. Intimacy is the sharing of details and intimate thoughts and emotions. Passion is the physical attraction — the flame in the fire. Commitment is standing by the person — the "in sickness and health" part of the relation-

ship. Sternberg (1986) states that a healthy relationship will have all three components of love — intimacy, passion, and commitment — which is described as consummate love. However, different aspects of love might be more prevalent at different life stages. Other forms of love include liking, which is defined as having intimacy but no passion or commitment. Infatuation is the presence of passion without intimacy or commitment. Empty love is having commitment without intimacy or passion. Companionate love, which is characteristic of close friendships and family relationships, consists of intimacy and commitment but no passion. Romantic love is defined by having passion and intimacy, but no commitment. Finally, fatuous love is defined by having passion and commitment, but no intimacy, such as a long-term sexual love affair. Can you think of examples of relationships that fit these different types of love?

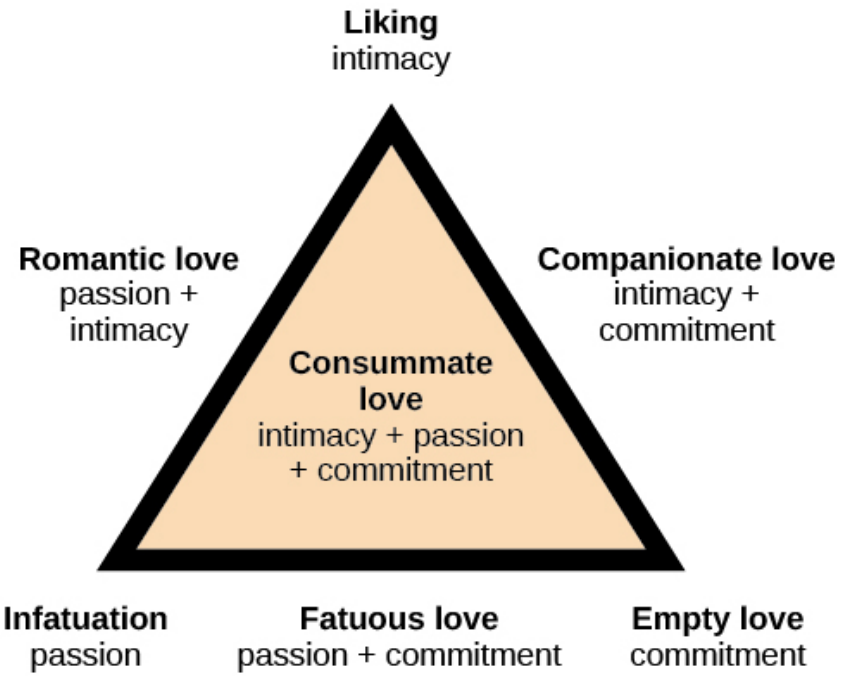

Figure SL.14. Sternberg's Triangular Theory of Love. *According to Sternberg's triangular theory of love, seven types of love can be described from combinations of three components: intimacy, passion, and commitment.* ***Alt. text:*** *Triangle diagram of Sternberg's theory of love. Center: consummate love (intimacy + passion + commitment). Peak: liking (intimacy). Left: romantic love (passion + intimacy). Right: companionate love (intimacy + commitment). Bottom left: infatuation (passion). Bottom: fatuous love (passion + commitment). Bottom right: empty love (commitment).* ***Source:*** *Figure 12.28 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence and contains modification of "The three components, labeled on the vertices of a triangle, interact with each other so as to form seven different kinds of love experiences" by "Lnesa" which is in the Public Domain.*

People are sometimes motivated to maximise the benefits and minimise the costs of relationships. According to **social exchange theory**, we act as naïve economists in keeping a tally of the ratio of costs and benefits of forming and maintaining a relationship with others (Rusbult & Van Lange, 2003). When deciding to commit to a romantic relationship, you likely weighed the benefits and costs of your choice. What are the benefits of being in a committed romantic relationship? You might have considered companionship, intimacy, and passion, along with the comfort of being with someone you know well. What are the costs of being in a committed romantic relationship? You might worry about potential boredom over time from being with only one person, and there could be expenses for shared activities like going to movies and having dinner. However, as long as the benefits of being with your romantic partner outweigh the costs, you will continue the relationship.

Helping Others

Altruism helps create harmonious relationships. **Altruism** means doing things to make someone else's life better, especially when you don't get something for yourself in return. It's like when we help a person in need on the highway, volunteer at a homeless shelter, or give to a charity. In Canada, 79% of people aged 15 and older volunteered (Statistics Canada, 2018). There are a variety of explanations for why we help. Table SL.4 summarises some of the variables that are known to increase helping.

Table SL.4. Variables known to increase helping

Variable	Effect
Mood	We help more when we are in a good mood (Guéguen & De Gail, 2003). We may also help in order to reduce our negative feelings caused by other people's sufferings (Cialdini et al.,1973).
Similarity	We help people whom we see as similar to us, e.g., those who mimic our behaviours (van Baaren et al., 2004).
Empathy	We help more when we feel empathy for the other person (Batson et al., 1983).
Responsibility	We are more likely to help when we assume a responsibility to help (Markey, 2000).
Self-esteem	We are more likely to help if we can feel good about ourselves by doing so (Snyder et al., 2004).
Reputation	We may help in order to show others that we are good people (Hardy and Van Vugt, 2006).

The tendency to help others in need is an evolutionary adaptation. Although helping others can be costly to us as individuals, helping people who are related to us can help to pass on our own genes (Madsen et al., 2007; Stewart-Williams, 2007). Eugene Burnstein and colleagues (1994) found that students indicated they would be more likely to help a person who was closely related to them (e.g., a sibling, parent, or child) than they would be to help a person who was more distantly related (e.g., a niece, nephew, uncle, or grandmother). People are more likely to donate kidneys to relatives than to strangers (Borgida et al., 1992). Even children indicate that they are more likely to help their siblings than they are to help a friend (Tisak & Tisak, 1996).

Why would we help people to whom we are not related? One explanation is based on the **reciprocity norm**. On one side, we often help people who have helped us (Whatley et al., 1999); on the flip side, we also expect that those we've helped will be there for us in the future. The reciprocity norm is found in everyday adages such as "Scratch my back, and I'll scratch yours" as well as in the Golden Rule: "Do unto others as you would have them do unto you." When we help each other, it boosts our chances of survival and reproduction. Over the course of evolution, those who help and expect help in return tend to have more opportunities to reproduce than those who don't, thus enabling this kind of altruism to continue.

We also learn to help through reinforcement and modelling. Sandi Smith and colleagues (2006) found that 73% of TV shows had some altruism and that about three altruistic behaviours were shown every hour. The prevalence of altruism was particularly high in children's shows. We are more likely to help when we receive rewards for doing so and less likely to help when helping is costly. For example, parents praise their children who share their toys with others. A potential reward is the status we gain as a result of helping. When we act altruistically, we gain a reputation as a person with high status who is able and willing to help others, and this status makes us more desirable in the eyes of others (Hardy & Van Vugt, 2006).

Helping based on the reciprocity norm and reinforcement might not seem like true altruism. We might hope that our children adopt a different social norm that feels more genuinely altruistic: the **social responsibility norm**. The social responsibility norm tells us that we should help others who need it, even without expecting anything in return. Many religions teach this norm, emphasising that as good human beings, we should lend a hand to others whenever we can.

Two social psychologists, John Darley and Bibb Latané (1968), studied the **bystander effect** — what makes people choose not to help in the presence of others. They created a model that considered how the social situation plays a crucial role in deciding whether people choose to help or not. Many studies have tested this model, and there is strong evidence supporting its validity.

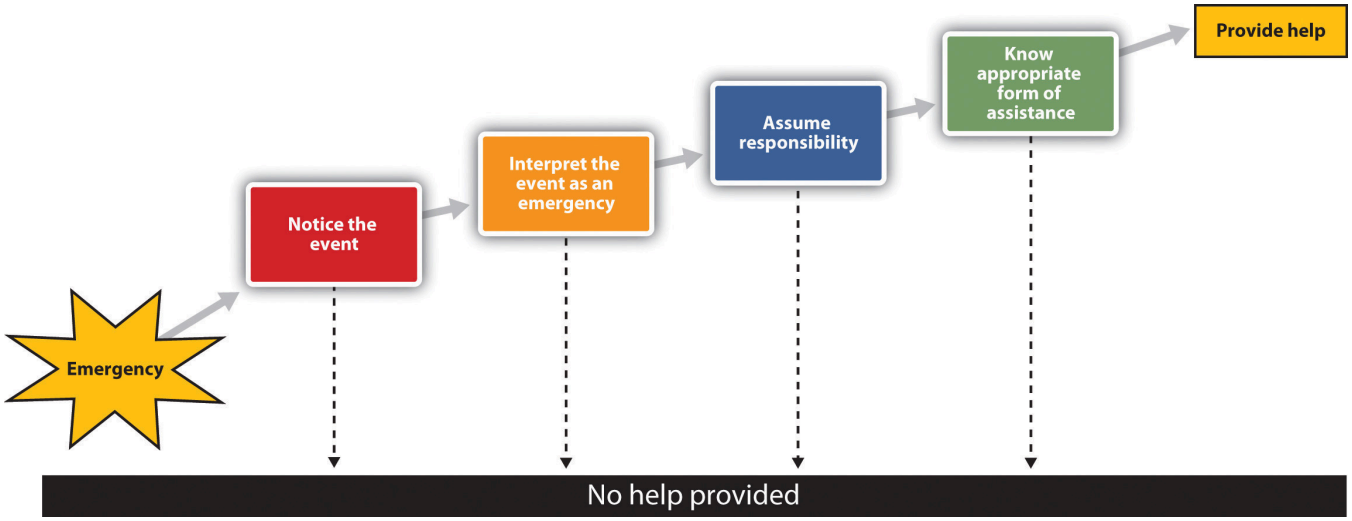

Figure SL.15. The bystander effect. *The Darley and Latané's (1968) model of the bystander effect. A variety of situational factors can influence whether or not we help.* ***Alt. text:*** *Chart shows steps from an emergency to helping: notice event, interpret as emergency, assume responsibility, know how to assist, then provide help. At each step, one may choose not to help.* ***Source:*** *Figure 7.8 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

The two prerequisites are noticing the event and interpreting it as an emergency. Latané and Darley (1968) demonstrated the important role of the social situation in noticing the event. They had some people answer questions alone, while others worked in small groups with two more people. After a few minutes, they let white smoke into the room. The researchers timed how long it took for the first person to notice the smoke and call for help.

When people were working alone, they noticed the smoke in about five seconds, and within four minutes, 75% of them took some action. In contrast, in groups, the first person took over 20 seconds on average to notice the smoke. Only 12% of the groups took actions eventually. In 3 out of the 8 groups, no one reported the smoke even after it filled the room. When we are unsure how to interpret an event, we normally look to others to help us understand them, and at the same time, they are looking to us for information. The problem is that each bystander thinks that other people aren't acting because they don't see an emergency. Believing that the others know something that they don't, each observer concludes that help is not required.

Noticing the emergency does not necessarily mean that we will come to the rescue of the person in need. We still need to decide if it is our responsibility to do something. The problem is that when we see others around, it is easy to assume that they are going to do something. **Diffusion of responsibility** occurs when we assume that others will take action, so we do not take action ourselves. People are more likely to help when they are the only ones in the situation than when there are others around (Darley & Latané, 1968). Have you ever been in an online group where you ask for help? Did you find it easier to get help when

you asked one person instead of a lot of people? Patrick Markey (2000) found that people received help more quickly, in about 37 seconds, when they asked for help by specifying a participant's name than when no name was specified, which took about 51 seconds.

The final factor is knowing how to help. For many of us, the ways to best help another person in an emergency are not that clear. We are not professionals, and we have little training in how to help in emergencies. People who have training in emergencies are more likely to help, while the rest of us might not know what to do and may just walk by. However, nowadays, many people have cell phones, and a quick call can make a big difference.

Aggression

Aggression is behaviour that is intended to harm another individual. Aggression can happen suddenly, like when a jealous person gets really angry or when sports fans cause trouble after a big game. On the other hand, it can also be more deliberate and planned, like a bully taking someone's toys, a terrorist harming civilians for attention, or a hired assassin killing for money. Not all aggression is physical. Nonphysical aggression includes things like excluding others, calling them names, spreading rumors, or cyberbullying. According to Julie Paquette and Marion Underwood (1999), both boys and girls indicated that nonphysical aggression, like name-calling, made them feel more "sad and bad" compared to physical aggression.

Aggression is often viewed as an adaptive behaviour and part of human nature. Aggression allows us to gain access to valuable resources such as food, territory, and desirable mates, or perhaps to protect ourselves from direct attack by others. If aggression helps in the survival of our genes, then the process of natural selection may well have caused humans, as it would any other animal, to be aggressive (Buss & Duntley, 2006).

One of the primary functions of the amygdala is to help us learn to associate stimuli with the rewards and the punishment that they may provide. The amygdala is particularly activated in our responses to stimuli that we see as threatening and fear-arousing. When the amygdala is stimulated, in either humans or in animals, the organism becomes more aggressive.

The prefrontal cortex serves as a control centre on aggression. When it is more highly activated, we are more able to control our aggressive impulses. Research has found that the cerebral cortex is less active in murderers and death row inmates, suggesting that violent crime may be caused in part by reduced ability to regulate aggression (Davidson et al., 2000).

Hormones are also important in regulating aggression. The male sex hormone *testosterone* is associated with increased aggression in both males and females (Dabbs et al., 1996). There is a culturally universal tendency for men to be more physically violent than

women (Archer & Coyne, 2005). These sex differences do not imply that women are never aggressive. The differences between men and women are smaller after they have been frustrated, insulted, or threatened (Bettencourt & Miller, 1996).

Consuming alcohol increases aggression. Even people who are not normally aggressive may react with aggression when they are intoxicated (Graham et al., 2006). Drinking alcohol makes it harder for people to control their anger. When people are drunk, they become more focused on themselves and less aware of the usual social rules that stop them from acting aggressively (Bushman & Cooper, 1990).

Have you ever felt angry and ended up acting aggressively? It probably happened when you were angry, in a bad mood, tired, in pain, sick, or frustrated. One important determinant of aggression is frustration. When we're frustrated, we might end up taking out our anger on others, even if they aren't the ones who caused the frustration. Frustration may arise from social rejection. Research has shown that people who are rejected by others are more likely to act aggressively when provoked (Twenge et al., 2001). Hot weather can make people more aggressive. In a study by William Griffit and Russell Veitch (1971), students filled out surveys in rooms with a regular temperature or ones hotter than 30 degrees Celsius. The students in the hotter rooms showed a lot more hostility. People tend to be more aggressive on hot days compared to cooler days, and this holds true for hot years versus cooler years (Bushman et al., 2005). In addition to high temperature, pain may also trigger aggression (Berkowitz, 1993).

If we're aware of feeling negative emotions, we might think we could release those feelings in a relatively harmless way, like punching a pillow or kicking something. This act, called **catharsis**, suggests that engaging in less harmful aggressive actions can release our aggressive tendencies, possibly reducing the likelihood of being aggressive in a more harmful way later. Many considered catharsis as a way to decrease violence. It was a significant part of Sigmund Freud's theories.

As far as social psychologists have been able to determine, however, catharsis simply does not work. Rather than decreasing aggression, engaging in aggressive behaviours increases the likelihood of later aggression. Brad Bushman and his colleagues (1999) made people in their study upset by having someone insult them. Half of the participants were allowed to engage in a cathartic behaviour: they were given boxing gloves and had a chance to hit a punching bag for two minutes. Then, all the participants played a game with the person who had insulted them earlier. In the game, they had a chance to blast the person with a painful blast of white noise. Contrary to the catharsis hypothesis, the students who had punched the punching bag set a higher noise level and delivered longer bursts of noise than the participants who did not get a chance to hit the punching bag. It seems that if we hit a punching bag, punch a pillow, or scream as loud as we can to release our frustration, the opposite may occur — rather than decreasing aggression, these behaviours in fact increase it.

Research evidence makes it very clear that, on average, people who watch violent behaviour become more aggressive. The evidence supporting this relationship comes from many studies conducted over many years using both correlational designs as well as laboratory studies in which people have been randomly assigned to view either violent or nonviolent material (Anderson et al., 2010). Viewing violent behaviour increases aggression, in part through observational learning. One example is in the studies of Albert Bandura. In his studies, children who witnessed violence were more likely to be aggressive. Continually viewing violence can also lead to desensitization to violence (Bartholow et al., 2006). When we first see violence, we are likely to be shocked, aroused, and even repulsed by it. However, over time, as we see more and more violence, we become habituated to it, such that subsequent exposures produce fewer and fewer negative emotional responses.

Chapter Resources

AMELIA LIANGZI SHI

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The reference list for this chapter has been excluded from this file to reduce page count. The full reference list can be viewed online at opentextbc.ca/psychologymtdi/chapter/social-psycology-chapter-resources/.

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I — Amelia Liangzi Shi (Chinese: 石靓子) — am a Chinese Canadian woman, and I bring a diverse range of experiences and perspectives to my role as a psychology instructor at the College of New Caledonia (CNC) on the traditional lands of the Lheidli T'enneh. I completed my Ph.D. in Cognitive Psychology at the University of Alberta, located in Treaty 6 territory, focusing my research on metamemory and autobiographical memory. I currently teach courses at CNC in introductory psychology, research methods, cognition, personality, and social psychology. Driven by a genuine desire to support and empower the students of introductory psychology, I am committed to recognising the unique needs and experiences of Indigenous students, People of Colour, individuals under the rainbow umbrella, individuals with disabilities, international students, and other marginalised voices.

CHAPTER 8. EMOTION AND MOTIVATION

Vanessa Raspa

Picture this: You've set your alarm for an early morning workout, determined to stick to your fitness goals. Yet, when the alarm buzzes, you're suddenly overwhelmed by the comfort of your bed and the reluctance to move. What drives you to either leap out of bed or hit snooze? Why do you sometimes feel energized and motivated, while at other times it feels impossible to act on your goals?

These everyday dilemmas reveal the powerful connection between emotion and motivation. Emotions color our experiences, from the joy of achieving something we care about to the frustration of falling short. They don't just happen to us, they instead serve a function, often signaling what we value and nudging us toward actions that align with our needs and desires. Motivation, on the other hand, is the engine that propels us forward, giving us the energy and persistence to pursue what matters most.

In this chapter, we'll explore the fascinating interplay between these two forces. We begin by investigating the functions of emotions, learning how emotions guide our behavior in adaptive ways. Then, we'll dive into the cultural landscape of emotions, examining how different societies shape the way emotions are expressed and experienced. The chapter will also uncover the concept of drive states that push us to satisfy our basic physiological needs. Finally, we'll turn to motives and goals, exploring how we set and pursue our aspirations, and what makes us commit to some goals but not others.

By the end of this chapter, you will see how emotions and motivation work together to influence everyday behavior. From tackling a difficult task to staying committed to a long-term goal, feelings and drive are closely linked. Understanding this connection can help explain your reactions and choices and guide you in directing your efforts toward what matters most.

Theories of Emotions

JESSICA MOTHERWELL MCFARLANE

What are the Basic and Secondary Emotions?

The most basic emotions in the scientific literature are anger, disgust, fear, happiness, sadness, and surprise. These primary emotions are thought to have evolved through natural selection because they offered survival advantages — for example, fear helps us avoid danger, disgust protects us from harmful substances, and happiness strengthens social bonds. They help us make rapid judgments about stimuli and to quickly guide appropriate behaviour (LeDoux, 2000). The basic emotions are determined in large part by one of the oldest parts of our brain, the limbic system, including the amygdala, the hypothalamus, and the thalamus. (Note: We will explore the biology of emotions in greater depth later on in this chapter.) Basic emotions are experienced and displayed in much the same way across cultures (Ekman, 1992; Elfenbein & Ambady, 2002; Fridland, Ekman, & Oster, 1987), and people, on average, are quite accurate at judging the facial expressions of people from different cultures.

Not all of our emotions come from the old parts of our brain; we also interpret our experiences to create a more complex array of emotional experiences. For instance, the amygdala may sense fear when it senses that the body is falling, but that fear may be interpreted completely differently, perhaps even as excitement, when we are falling on a roller-coaster ride than when we are falling from the sky in an airplane that has lost power. The cognitive interpretations that accompany emotions — known as **cognitive appraisal** — allow us to experience a much larger and more complex set of secondary emotions (Figure EM.3). Although they are in large part cognitive, our experiences of the secondary emotions are determined in part by arousal, as seen on the vertical axis of Figure EM.3, and in part by whether they are pleasant or unpleasant feelings — termed valence — as seen on the horizontal axis of Figure EM.3.

Disgust, the learned — and unlearned — instinct. Disgust acts as a natural defense mechanism, guiding humans away from potentially harmful substances and situations that could lead to illness. For example, the instinctive reaction to avoid eating spoiled food or to steer clear of people showing signs of sickness, like sneezing, has been essential for survival. However, this response system isn't perfect; it often errs on the side of caution, potentially leading us to feel disgust even towards harmless things. This oversensitivity means that while disgust can protect us, it also has the potential

to cause unnecessary avoidance based on the mere perception of risk rather than actual danger (Oaten et al., 2018; Sparks et al., 2018).

The study of disgust, pioneered by researchers like Paul Rozin, reveals its complex nature and societal implications. Rozin's experiments demonstrate how disgust can be triggered by simple association, regardless of any real threat of contamination. For instance, most people would refuse to eat chocolate fudge shaped like dog poop, even knowing it was delicious chocolate, illustrating Rozin's Law of Similarity: "If it looks like an X, it's an X" (Aarøe, Petersen, & Arceneaux, 2017).

Disney's Pixar Studio brilliantly plays with our sense of disgust in "Ratatouille," a movie about an unlikely talented chef, a rat named Remy, who befriends and mentors a novice human cook at a prestigious Parisian restaurant. Initially, this movie prompts us to recoil at the thought of a rat in the kitchen, "Eeew!" However, the movie then challenges us to confront our ingrained disgust towards rats. As we watch Remy cook, our initial revulsion turns into admiration for his skill and passion. The film demonstrates that our feelings of disgust can be unlearned or changed through new experiences and understanding, aligning with the notion that disgust, while a natural defense mechanism, is also deeply influenced by social and cultural factors (Bhikram, Abi-Jaoude, & Sandor, 2017).

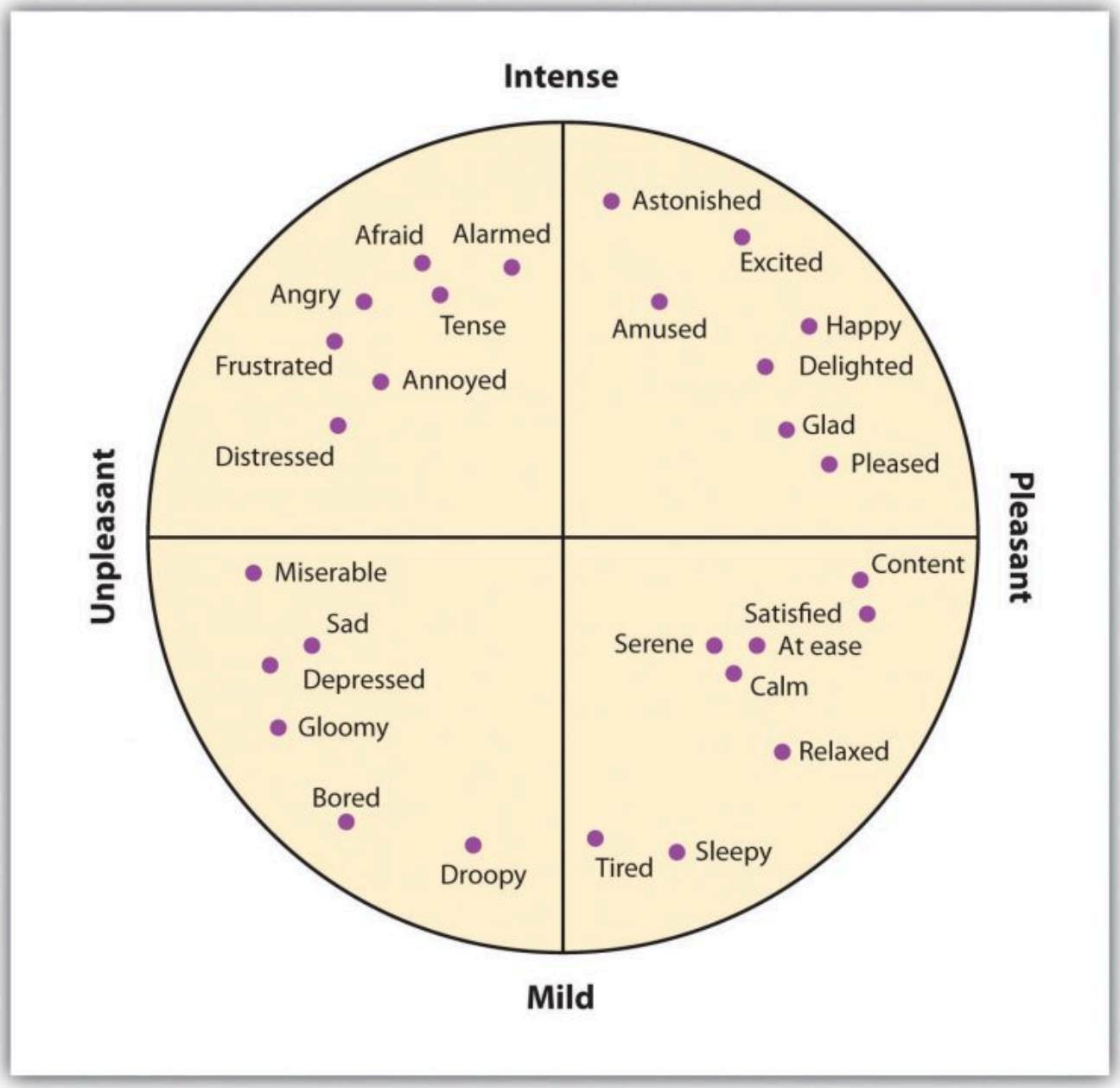

Figure EM.3. Secondary emotions. *The secondary emotions are those that have a major cognitive component. They are determined by both their level of arousal, ranging from mild to intense, and their valence, ranging from pleasant to unpleasant (Russell, 1980). [Image Description]* ***Source:*** *Figure 11.2 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Emotions play a vital role in our everyday experiences and decision-making processes. They help us react to events quickly and understand our deeper feelings about situations. For instance, when something good happens, we might feel joy and satisfaction, while negative events can bring about feelings like anger or sadness. Understanding how our brains

process these emotions can give us insight into why we react the way we do. This section explores the difference between primary and secondary emotions and how our brain's pathways contribute to these emotional experiences.

Primary emotions, such as fear, anger, happiness, and sadness, are our initial, instinctive responses to stimuli and are typically quick and automatic. These emotions are fundamental and are often shared across different cultures. Secondary emotions, on the other hand, are more complex and arise from our interpretations and evaluations of situations. They are influenced by our thoughts, experiences, and social contexts, leading to feelings like pride, guilt, jealousy, and embarrassment. Understanding the distinction between these two types of emotions can help us better manage our reactions and interactions with others.

For example, when you succeed in reaching an important goal, you might spend some time enjoying your secondary emotions, perhaps the experience of joy, satisfaction, and contentment. But when your close friend wins a prize that you thought you deserved, you might also experience a variety of secondary emotions like anger, sadness, resentment or shame. You might even think about the event for weeks or even months, experiencing these negative emotions each time you think about it (Martin & Tesser, 2006).

The difference between the primary and the secondary emotions has a parallel in the neuroanatomy of two brain pathways: a fast pathway and a slow pathway (Damasio, 2000; LeDoux, 2000; Ochsner, Bunge, Gross, & Gabrieli, 2002). The thalamus acts as the major gatekeeper in this process (Figure EM.4), meaning that it decides what sensory information gets passed on to the brain. Our response to the basic emotion of fear, for instance, is primarily determined by the fast pathway through the limbic system. When a car pulls out in front of us quickly on the highway, the thalamus activates and sends an immediate message to the amygdala. We quickly move our foot to the brake pedal.

Secondary emotions are determined more by the slow pathway through the frontal lobes in the cortex. When we are jealous of someone our partner has a crush on, or remember our win playing a video game, the process is more complex. Information moves from the thalamus to the frontal lobes for cognitive analysis and integration, and then from there to the amygdala. We experience the arousal of emotion, but it is accompanied by a more complex cognitive appraisal, producing more refined emotions and behavioural responses.

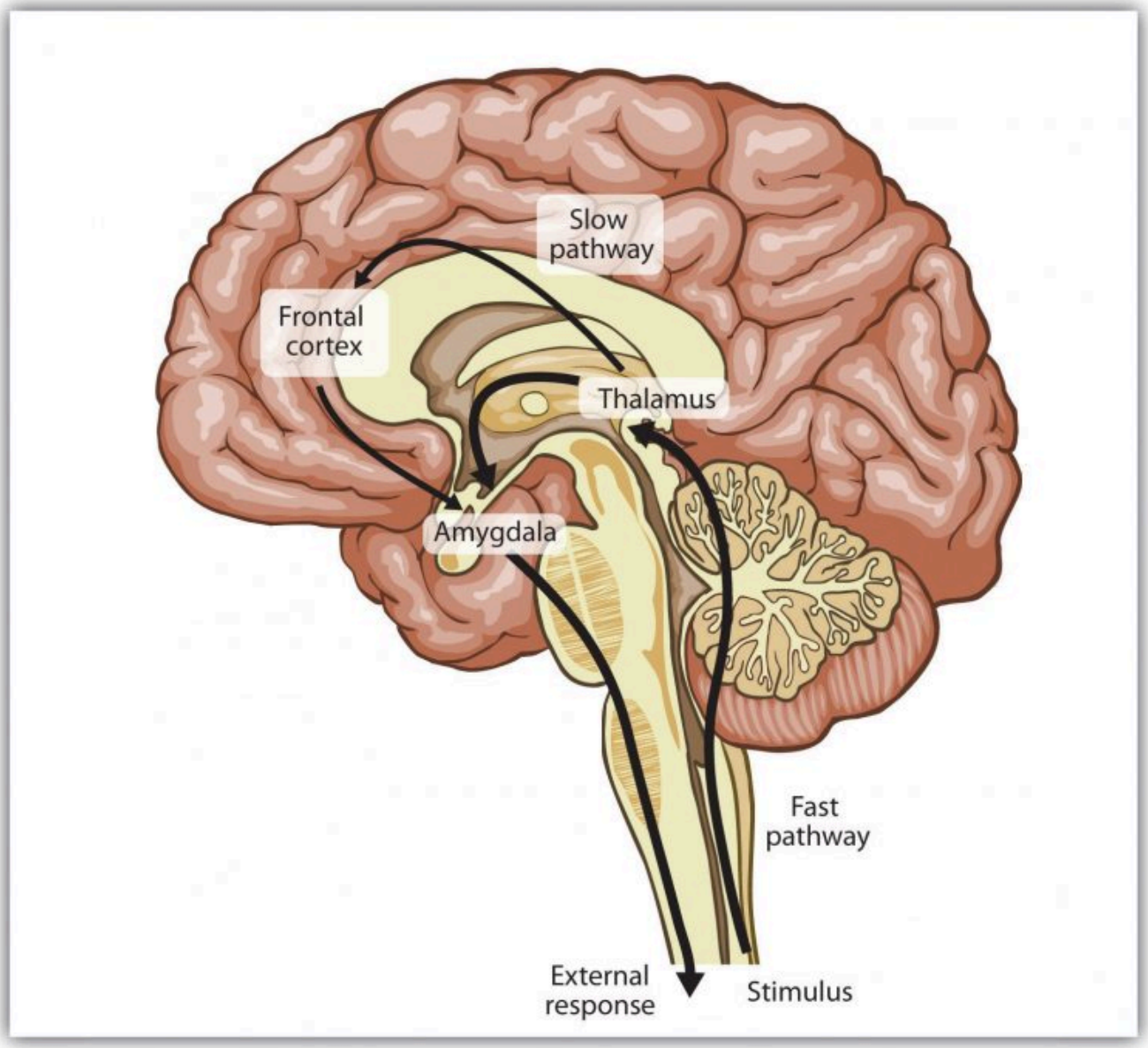

Figure EM.4. The brain's two emotional pathways. *There are two emotional pathways in the brain — one slow and the other fast — both of which are controlled by the thalamus.* ***Alt. text:*** *This diagram illustrates the slow and fast emotional pathways in the human brain.* ***Source:*** *Figure 11.3 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Both emotions and cognitions can help us make effective decisions. In some cases, we take action after rationally processing the costs and benefits of different choices, but in other cases, we rely on our emotions. Emotions become particularly important in guiding decisions when the alternatives between many complex and conflicting alternatives present us with a high degree of uncertainty and ambiguity, making a complete cognitive analysis difficult. In these cases, we often rely on our emotions to make decisions, and these decisions

may in many cases be more accurate than those produced by cognitive processing (Damasio, 1994; Dijksterhuis, Bos, Nordgren, & van Baaren, 2006; Nordgren & Dijksterhuis, 2009; Wilson & Schooler, 1991).

James-Lange Theory of Emotion

The James-Lange theory of emotion, proposed independently by psychologists William James and Carl Lange in the late 19th century, offers a surprising perspective on how we experience emotions. Instead of the common belief that we cry because we are sad, this theory suggests that we feel sad because we cry. In essence, these theorists claim that physiological reactions in our body, such as a racing heart or sweaty palms, come before and cause the emotional experiences like fear, joy, or anger. (Ratcliffe, 2005).

Recent scientific findings have supported this theory. Laird and Lacasse (2014) provided evidence suggesting that bodily feedback, combined with our perceptions of situational cues (clues from the environment or context that help us understand what's happening around us), significantly shape our emotional feelings. This aligns with the James-Lange theory's emphasis on the intertwined nature of physiological changes and emotional experiences.

However, the James-Lange theory has its critics. Hutto, Robertson, and Kirchhoff's (2018) critique proposes a more complex framework. They acknowledge the value of the James-Lange theory but suggest that emotions are not just biological but also deeply embedded in our interactions with the environment (Hutto et al., 2018). This means that what we typically think of as internal experiences, like emotions, can't be fully understood just by looking at what's happening inside our bodies; we also need to consider how we're engaged with our environment. It's like saying that to understand why you're dancing, you can't just look at the movement of your muscles; you have to hear the music and see the dance floor too.

Another example of this environmental issue is when you're feeling nervous before giving a speech. According to the James-Lange theory, you might feel nervous because your heart is racing and your palms are sweaty. But Hutto and colleagues would argue that your nervousness is also influenced by seeing the audience, the pressure of the situation, and remembering past experiences of public speaking. So, to fully understand your nervousness, you need to consider both your body's reactions and your interactions with the environment around you. We will come back to this concept that the environment may shape our emotional experience when we discuss emotional geographies later in the chapter.

Cannon-Bard Theory of Emotions

The Cannon-Bard Theory of emotion, developed by Walter Cannon and later expanded upon by Philip Bard, suggests that emotional and physiological reactions to stimuli occur simultaneously. Unlike the James-Lange theory, which suggests that physiological reactions come before emotional experiences, the Cannon-Bard theory asserts that the thalamus in the brain sends signals simultaneously to the cortex (leading to conscious emotion) and to the autonomic nervous system (leading to physiological arousal). When an individual encounters an emotion-inducing stimulus, for example, a scary barking dog, two parallel processes occur simultaneously: the emotional experience (e.g., feeling afraid) and the physiological response (e.g., increased heart rate). These processes are independent, meaning that one does not cause the other. In essence, when you see a threatening stimulus, you simultaneously feel fear at the same time as your body prepares for a fight-or-flight response. This perspective contrasts with the James-Lange theory, which suggests that physiological reactions lead to emotional experiences. Recent research, such as that by Bagur et al. (2021) has shown results consistent with the Cannon-Bard theory.

Despite having some empirical support, the Cannon-Bard theory is not without its criticisms. Critics point to the complexity and variability of emotional experiences, which the theory might not fully address. Loaiza (2020) suggests that the theory might oversimplify the nature of emotions and fail to consider cultural influences (e.g., in some cultures, the dog might be seen as a protector, reducing fear), individual differences (e.g., a person who has had negative experiences with dogs in the past might feel more intense fear), and context-specific effects (e.g., they might feel less fear if the dog is on a leash beside its owner).

Schachter-Singer Two-Factor Theory of Emotion

The Schachter-Singer two-factor theory of emotion is another variation on theories of emotions that takes into account both physiological arousal and the emotional experience. According to this theory, emotions are composed of two factors: physiological and cognitive. In other words, physiological arousal is interpreted in context to produce the emotional experience. In revisiting our example involving the barking dog, the two-factor theory maintains that the dog elicits sympathetic nervous system activation that is labeled as fear given the context, and our experience is that of fear. If you had labeled your sympathetic nervous system activation as joy, you would have experienced joy. The Schachter-Singer two-factor theory depends on labeling the physiological experience, which is a type of **cognitive appraisal**.

Magda Arnold was the first theorist to offer an exploration of the meaning of appraisal, and to present an outline of what the appraisal process might be and how it relates to emotion (Roseman & Smith, 2001). The key idea of appraisal theory is that you have thoughts (a cognitive appraisal) before you experience an emotion, and the emotion you experience depends on the thoughts you had (Frijda, 1988; Lazarus, 1991). If you think something is positive, you will have more positive emotions about it than if your appraisal was negative, and the opposite is true. Appraisal theory explains the way two people can have two completely different emotions regarding the same event. For example, suppose your psychology instructor selected you to lecture on emotion; you might see that as positive, because it represents an opportunity to be the centre of attention, and you would experience happiness. However, if you dislike speaking in public, you could have a negative appraisal and experience discomfort.

Schachter and Singer believed that physiological arousal is very similar across the different types of emotions that we experience, and therefore, the cognitive appraisal of the situation is critical to the actual emotion experienced. In fact, it might be possible to misattribute arousal to an emotional experience if the circumstances were right (Schachter & Singer, 1962). They performed a clever experiment to test their idea. Participants were randomly assigned to one of several groups. Some of the participants received injections of epinephrine that caused bodily changes that mimicked the fight-or-flight response of the sympathetic nervous system; however, only some of these participants were told to expect these reactions as side effects of the injection. The other participants that received injections of epinephrine were told either that the injection would have no side effects or that it would result in a side effect unrelated to a sympathetic response, such as itching feet or headache. After receiving these injections, participants waited in a room with someone else they thought was another subject in the research project. In reality, the other person was a confederate of the researcher. The confederate engaged in scripted displays of euphoric or angry behaviour (Schachter & Singer, 1962).

When those participants who were told that they should expect to feel symptoms of physiological arousal were asked about any emotional changes that they had experienced related to either euphoria or anger (depending on the way the confederate behaved), they reported none. However, the participants who weren't expecting physiological arousal as a function of the injection were more likely to report that they experienced euphoria or anger as a function of their assigned confederate's behaviour. While everyone who received an injection of epinephrine experienced the same physiological arousal, only those who were not expecting the arousal used context to interpret the arousal as a change in emotional state (Schachter & Singer, 1962).

Strong emotional responses are associated with strong physiological arousal, which caused some theorists to suggest that the signs of physiological arousal, including increased heart rate, respiration rate, and sweating, might be used to determine whether someone is

telling the truth or not (Klein Selle, Agari, & Ben-Shakhar, 2019; Lazarus, Speisman, & Mordkoff, 1963; Sosnowski, Nurzynska, & Połeć, 1991). The assumption is that most of us would show signs of physiological arousal if we were being dishonest with someone. A polygraph, or lie detector test, measures the physiological arousal of an individual responding to a series of questions. Someone trained in reading these tests would look for answers to questions that are associated with increased levels of arousal as potential signs that the respondent may have been dishonest on those answers. While polygraphs are still commonly used, their validity and accuracy are highly questionable because there is no evidence that lying is associated with any particular pattern of physiological arousal (Saxe & Ben-Shakhar, 1999).

Student studying hint: What is the key difference between Cannon-Bard and Schachter-Singer?
Cannon-Bard theory says that when something exciting or scary happens, two things happen at the same time: you feel the emotion (like happiness or fear) and your body reacts (like your heart beating faster). So, if you see a scary dog, you feel scared and your heart races at the same time.

Schachter-Singer theory is a bit more complex. It says that when something happens, your body reacts first (like your heart racing), but you don't feel the emotion right away. You look around and try to understand why your body is reacting that way. Once you figure it out (like realising the scary dog is why your heart is racing), that's when you feel the emotion (fear). So, it's not just the scary dog that makes you feel afraid, but also your understanding of the situation.

The Cognitive-Mediational Model

"Model" refers to the specific framework or representation of the process by which cognitive appraisal (how we mentally assess and interpret situations) mediates (influences or changes) emotional responses (our feelings and reactions).

"Theory" refers to the overarching scientific explanation that includes this model among its components. It is a broader concept that explains how and why things happen.

Therefore, Lazarus developed the "cognitive-mediational theory" (a comprehensive explanation of how emotions are processed), which includes the "Cognitive-Mediational Model" (a detailed framework showing the steps involved) as a part of its explanation on how emotions are processed.

The relationship between our experiencing of emotions and our cognitive processing of them, and the order in which these occur, remains a topic of research and debate. Lazarus (1991) developed the cognitive-mediational theory, which asserts that our emotions are determined by our appraisal of the stimulus. This appraisal mediates works in between the

stimulus and the emotional response, and it is immediate and often unconscious. In contrast to the Schachter-Singer model, the appraisal comes before a cognitive label. You will learn more about Lazarus's appraisal concept when you study stress, health, and lifestyle. However, there are other views of emotions that also emphasise the cognitive processes.

Mauss and her colleagues studied automatic emotion regulation (AER), which refers to the non-deliberate control of emotions. It is simply not reacting with your emotions, and AER can affect all aspects of emotional processes. AER can influence the things you attend to, your appraisal, your choice to engage in an emotional experience, and your behaviours after an emotion is experienced (Mauss, Bunge, & Gross, 2007; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). AER is similar to other automatic cognitive processes in which sensations activate knowledge structures that affect functioning. These knowledge structures can include concepts, schemas, or scripts.

The idea of AER is that people develop an automatic process that works like a script or schema, and the process does not require deliberate thought to regulate emotions. AER works like riding a bicycle.Once you develop the process, you just do it without thinking about it. AER can be adaptive (helpful and beneficial for dealing with situations) or maladaptive (harmful and counterproductive, making situations worse) and has important health implications (Hopp, Troy, & Mauss, 2011). Adaptive AER leads to better health outcomes than maladaptive AER, primarily due to experiencing or mitigating stressors better than people with maladaptive AERs (Hopp, Troy, & Mauss, 2011). Alternatively, maladaptive AERs may be critical for maintaining some psychological disorders (Hopp, Troy, & Mauss, 2011). Mauss and her colleagues found that strategies could reduce negative emotions, which in turn should increase psychological health (Mauss, Cook, Cheng, & Gross, 2007; Mauss, Cook, & Gross, 2007; Shallcross, Troy, Boland, & Mauss, 2010; Troy, Shallcross, & Mauss, 2013; Troy, Wilhelm, Shallcross, & Mauss, 2010). Mauss has also suggested there are problems with the way emotions are measured, but she believes most of the aspects of emotions that are typically measured are useful (Mauss, et al., 2005; Mauss & Robinson, 2009). However, another way of considering emotions challenges our entire understanding of emotions.

After about three decades of interdisciplinary research, Barrett (watch her TED talk below) argued that we do not understand emotions. She proposed that emotions were not built into your brain at birth, but rather they were constructed based on your experiences. Emotions in the constructivist theory are predictions that construct your experience of the world. In a prior chapter, you learned that concepts are categories or groupings of linguistic information, images, ideas, or memories, such as life experiences. Barrett extended that to include emotions as concepts that are predictions (Barrett, 2017). Two identical physiological states can result in different emotional states depending on your predictions. For example, your brain predicting a grumbling stomach in a bakery could lead your brain to construct hunger. However, your brain predicting a grumbling stomach while you were waiting for

medical test results could lead your brain to construct worry. Thus, you can construct two different emotions from the same physiological sensations. Rather than emotions being something over which you have no control, you can control and influence your emotions.

Student studying hint: What is the key difference between Schachter-Singer and cognitive mediational theories?

Imagine emotions like a movie that happens inside you when you experience something. Both Schachter-Singer and cognitive mediational theories are like different explanations about how this movie gets made and played inside you.

The Schachter-Singer theory, also known as the two-factor theory, says that when something happens, your body reacts first (like your heart beating faster if you're scared), and then your brain quickly looks around to figure out why your body is reacting this way. After that quick look around, your brain decides what emotion you're feeling based on what's happening outside and how your body reacted.

On the other hand, the cognitive mediational theory says your brain is the director of the movie. It says that when something happens, your brain first thinks about it, decides if it's good, bad, or not important, and then tells your body how to react. Your emotion comes from your brain's decision about the situation.

So, the big difference is about who's in charge of starting the movie of emotion inside you. Schachter-Singer theory says it's your body reacting first, then your brain making sense of it. Cognitive mediational theory says your brain is the boss, deciding first, and then telling your body how to react. In other words, the Cognitive mediational theory says that you aren't at the mercy of your emotions — your brain creates them.

Watch this video: **Tricky Topics: Theories of Emotion (4.5 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=939#oembed-1***

"Tricky Topics: Theories of Emotion" video by FirstYearPsych Dalhousie is licensed under the Standard YouTube Licence.

Raw "Gut Feeling": Emotions as Perceptual Experiences

Emotions can also be understood as "raw gut feelings." This perspective suggests that emotions can be experienced in a manner similar to how we perceive sensory stimuli, like sights or sounds. Just as we can see or hear something without necessarily understanding or naming it, we can feel emotions in a similar raw, uninterpreted manner (de Sousa, 1987; Tappolet, 2000; Tappolet, 2016; Döring, 2003; Zajonc, 1998). Recent research has echoed these theories of emotion, emphasising the integration (the process of combining or bringing together) of sensory and motor signals in emotion (Caruana Fausto, 2019). Zajonc's idea of an instantaneous and unexplainable "gut feeling" or like/dislike for someone or something (Zajonc, 1980) aligns with the understanding that emotions emerge from bodily dispositions conditioned by a specific social context (Scheer, 2012).

LeDoux also views some emotions as requiring no cognition; some emotions completely bypass contextual interpretation. His research into the neuroscience of emotion has demonstrated the amygdala's primary role in fear (Cunha, Monfils, & LeDoux, 2010; LeDoux 1996, 2002). A fear stimulus is processed by the brain through one of two paths: from the thalamus (where it is perceived) directly to the amygdala, or from the thalamus through the cortex and then to the amygdala. The first path is quick, while the second enables more processing about details of the stimulus. In the following section, we will look more closely at the neuroscience of emotional response.

Emotions Explained by Traditional Chinese Medicine

> *Authors of textbooks often privilege or give special importance to the values of Modernity, including European/Colonial theories and practices, to the exclusion of all others. This bias ignores or dismisses many valid and ancient theories of emotion — some that have existed for thousands of years — from various (often non-white) cultures.*

In this section, we will learn about a perspective not typically seen in Introduction to Psychology textbooks. We will explore emotions as explained by Traditional Chinese Medicine (TCM) — a culturally dominant (widely accepted and practiced) healthcare system for the 1.4 billion people in China (World Bank, 2024) and likely many more patients around the world. When we understand emotions through the lens of TCM, we will gain two perspec-

tives not included in the previous scientific theories discussed so far. First, we can understand how emotions may be situated in specific locations in our body and go far beyond generalised "gut feelings." Second, TCM deeply integrates the connection between emotions and Nature, specifically, the elements of fire, wood, earth, metal and water. In discussing the physical location of emotions and the broader connection to Nature and basic elements, TCM has parallels to emotional geographies discussed in the next section and holistic Indigenous theories of well-being.

Traditional Chinese Medicine is a holistic system of health care with its roots in ancient China that dates back more than 2000 years (Unschuld, 1985). In TCM, emotions are considered a fundamental aspect of health and well-being, closely interlinked with the physical state of the body. Each emotion is believed to be associated with a specific organ system, and imbalances in these emotions can lead to physical and psychological disturbances (Maciocia, 2009).

In TCM, qi — the vital life force flowing through the body — is deeply interconnected with emotions, each influencing and reflecting the state of the other. Emotions are not just mental experiences but also physiological ones that resonate with specific organ systems, potentially affecting the flow of qi. For instance, persistent stress or anger can disrupt the smooth flow of liver qi, leading to physical symptoms and further emotional imbalance. Conversely, a blockage or imbalance in qi can manifest as emotional disturbances, illustrating a bidirectional relationship. TCM practices like acupuncture (a technique of inserting thin needles into specific points on the body) and Qigong (a system of coordinated body-posture and movement, breathing, and meditation used for health, spirituality, and martial arts training) aim to harmonize qi flow (the circulation of life energy), thereby promoting both physical health and emotional balance. This intrinsic link highlights the TCM perspective that emotional well-being is a critical component of overall health, as emotions are both a reflection and determinant of the body's energetic harmony.

According to TCM, there are five primary emotions that correspond to the five elements and their associated organs:

- **Joy (Fire — Heart)**: Joy is the emotion of the heart and the fire element. The emotions of love, happiness, and joy are felt here. In moderation, joy is beneficial and can nourish the heart. However, excessive joy or excitement is believed to scatter the heart's qi (vital energy; for example, a manic episode, which is an extremely high and overly excited state that can affect a person's thoughts and behaviours), leading to restlessness and insomnia (O'Connor & Bensky, 1981). The heart directly influences mental and emotional states. Anxiety related to the heart often manifests as restlessness, palpitations, and insomnia.



Figure EM.5. Joy (Fire-Heart). *Joy is the emotion of the heart and the fire element.* ***Alt. text:*** *An illustration of a heart in front of a flame.* ***Source:*** *Joy (Fire-Heart) by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

- **Anger (Wood — Liver)**: Anger, frustration, and resentment are associated with the liver and the wood element. TCM suggests that anger can cause qi to rise, potentially leading to headaches, dizziness, and other health issues (Maciocia, 2009). The emotions of peace, kindness, and harmony are the positive aspects associated with the liver.

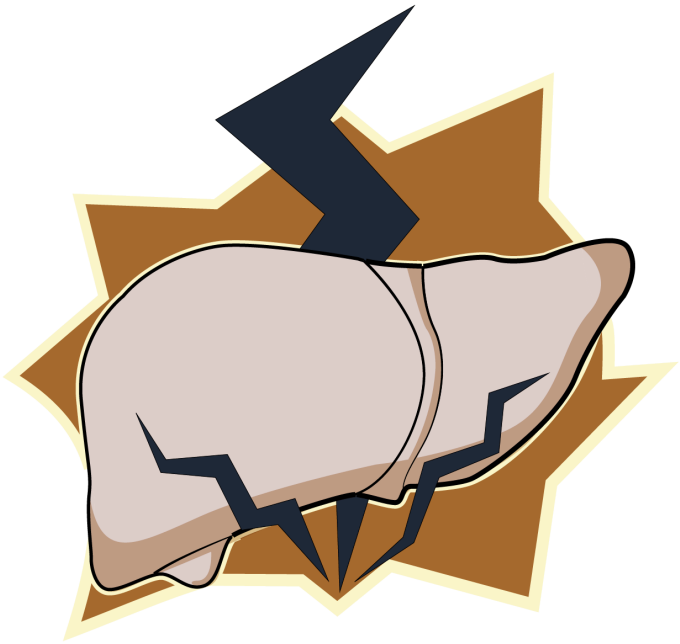

Figure EM.6. Anger (Wood-Liver). *Anger, frustration, and resentment are associated with the liver and the wood element.* ***Alt. text:*** *An illustration of a liver organ with lightning going through it on a brown background.* ***Source:*** *Anger (Wood-Liver) by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

In TCM, emotions are often viewed more broadly and can include states of being or qualities of the mind that may not strictly align with the Modern categorisation of emotions. (Maciocia, 2009).

- **Worry and Overthinking (Earth — Spleen)**: Worry and overthinking are tied to the spleen and the earth element. These emotions can lead to an imbalance in the spleen's ability to transform and transport nutrients, potentially causing digestive issues (Ni, 1995). Trust and openness are the positive aspects associated with the spleen.



Figure EM.7. Worry and Overthinking (Earth-Spleen). *Worry and overthinking are tied to the spleen and the earth element.* ***Alt. text:*** *An illustration of a spleen that is dripping in front of a grey cloud.* ***Source:*** *Worry and Overthinking (Earth-Spleen) by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

- **Sadness and Grief (Metal — Lung)**: Sadness and grief are associated with the lungs and the metal element. Excessive grief can deplete the lung's qi, affecting respiratory functions and possibly leading to fatigue and susceptibility to colds (Flaws, 2007). Courage and righteousness are the positive aspects associated with the lungs.

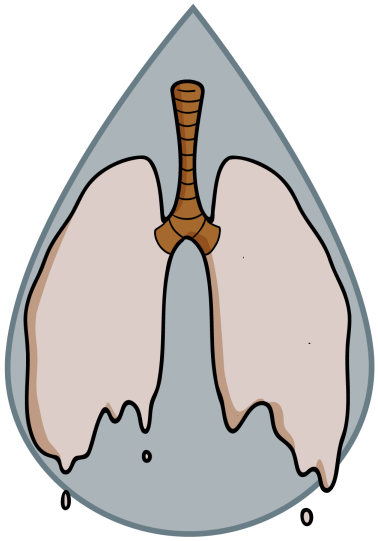

Figure EM.8. Sadness and Grief (Metal-Lung). *Sadness and grief are associated with the lungs and the metal element.* ***Alt. text:*** *An illustration of a dripping lung overtop of a grey drop of water.* ***Source:*** *Sadness and Grief (Metal-Lung) by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

- **Fear (Water — Kidney)**: Fear is linked to the kidneys and the water element. Chronic fear can weaken the kidneys, potentially leading to lower back pain, tinnitus, and in severe cases, incontinence (Ni, 1995). Wisdom and gentleness are the positive aspects associated with the kidneys.

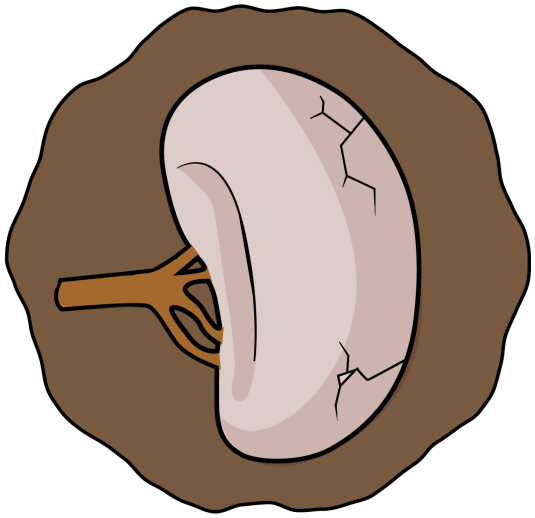

Figure EM.9. Fear (Water-Kidney). *Fear is linked to the kidneys and the water element.*
Alt. text: *An illustration of a kidney that is fracturing in front of a brown round shape.*
Source: *Fear (Water-Kidney) by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

TCM's perspective on emotions is largely theoretical and based on traditional medical practices and theory that have existed for millenia. While some modern studies have investigated the efficacy of TCM practices like acupuncture and herbal medicine, the specific theories about emotions and organ systems have not been extensively validated through scientific research as understood in academic/scientific medicine. This is partly due to the difficulty of quantifying and testing the concepts of qi and organ-emotion correspondences within a scientific framework.

Some research has explored the physiological effects of emotions and their potential impact on health, which indirectly supports certain aspects of TCM theory. For example, stress (which could be linked to TCM concepts of worry or anger) has been shown to have various detrimental effects on health, including impairing digestive and immune functions (Segerstrom & Miller, 2004).

Although TCM's understanding of the interplay between emotions, organ systems, and qi flow remains largely unvalidated by academic, scientific standards, TCM's comprehensive framework continues to inform alternative health practices and offers a complementary approach to emotional and physical health. As the dialogue between traditional and Modern medical systems evolves, TCM's insights into emotional well-being may offer valuable perspectives, encouraging a more integrated approach to health that honours the complex interconnections between mind, body, and environment.

Watch this video: **The 5 Organs and 5 Emotions: What Your Body is Saying (6.5 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=939#oembed-2***

"The 5 Organs and 5 Emotions: What Your Body is Saying" video by Dr. Alex Heyne – Acupuncture and Chinese Medicine is licensed under the Standard YouTube Licence.

Summary: Theories of Emotions

This section explores various theories of emotions, offering a comprehensive look at how emotions are conceptualised and understood within psychological science. It begins with the James-Lange Theory of Emotion, which posits that physiological reactions precede emotional experiences, suggesting that our feelings are a result of our body's responses to stimuli. The Cannon-Bard Theory challenges this by arguing that emotions and physiological responses occur simultaneously, not sequentially. The Schachter-Singer two-factor theory adds another layer, proposing that emotions arise from physiological arousal and cognitive interpretation of that arousal. The Cognitive-Mediational Model further refines this idea by emphasising the role of cognitive appraisal in the experience of emotion, suggesting that our thoughts about an event affect how we feel about it.

Additionally, the section touches on the concept of "Raw Gut Feeling," which describes emotions as perceptual experiences directly tied to our bodily sensations. Traditional Chinese Medicine (TCM) offers a unique perspective, linking emotions to the balance and health of the body's organs, as explored in the "Emotions explained by Traditional Chinese Medicine" segment. This holistic approach underscores the interconnectedness of physical health and emotional well-being, as further illustrated in the accompanying video on the 5 Organs and 5 Emotions.

What is Motivation?

JESSICA MOTHERWELL MCFARLANE

Intrinsic and Extrinsic Motivation

Why do we act the way we do? What drives our choices and behaviours? Motivation is the key to understanding these questions. It's the force that directs our behaviour towards goals, shaped by our wants and needs. Motivation isn't just about our biological needs; it also involves intrinsic and extrinsic factors. **Intrinsic motivation** comes from within us, driven by personal satisfaction and fulfillment. **Extrinsic motivation**, on the other hand, is influenced by external rewards or pressures.

Intrinsic motivation is deeply personal. For instance, if you're in college because you love learning and want to grow as a person, that's intrinsic motivation. Extrinsic motivation is more about external outcomes, like pursuing a degree for a high-paying job or to meet family expectations.

Our motivations often blend intrinsic and extrinsic elements, and this mix can shift over time. The saying, "Choose a job you love, and you'll never work a day in your life," captures this idea. However, research shows that this isn't always straightforward. When we receive extrinsic rewards, like payment, for something we love, it can start to feel more like work and less enjoyable. This phenomenon, known as the **overjustification effect**, suggests that extrinsic rewards can diminish intrinsic motivation [Deci et al., 1999].

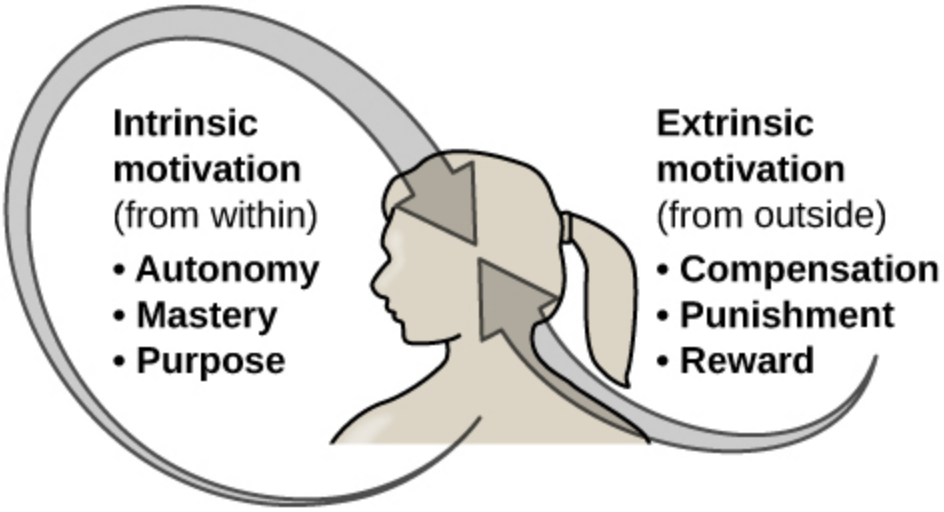

Figure MO.1. Intrinsic motivation. *Intrinsic motivation comes from within the individual, while extrinsic motivation comes from outside the individual.* ***Alt. text:*** *A person's upper body with two arrows: one pointing from the chest to the head, labelled "intrinsic motivation (from within)," highlighting autonomy, mastery, and purpose. The other arrow, starting outside and pointing to the head, represents "extrinsic motivation (from outside)", with compensation, punishment, and reward as key elements.* ***Source:*** *Figure 11.7 as found in Psychology – 1st Canadian Edition is licensed under a CC BY 4.0 Licence.*

For example, consider Lei, who loves baking (Figure MO.2). Initially, he bakes for fun, but when he starts baking professionally, his motivation changes because now he is baking for external rewards. This shift illustrates how extrinsic rewards can transform an enjoyable activity into a job, altering our intrinsic motivation.



Figure MO.2. Baking. *Research suggests that when something we love to do, like icing cakes, becomes our job, our intrinsic and extrinsic motivations to do it may change.* ***Alt. text:*** *A photograph shows several chefs preparing food together in a kitchen.* ***Source:*** *Figure 10.3 by Agustín Ruiz as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Yet, not all extrinsic rewards undermine intrinsic motivation. Verbal praise, for example, can actually enhance it [Arnold, 1976; Cameron & Pierce, 1994]. If Lei receives compliments for his baking, his passion for baking might stay strong. The impact of rewards on motivation depends on their nature and our expectations. Tangible, physical rewards like money can have a more negative effect on intrinsic motivation than intangible, non-physical rewards like praise. Also, if we expect a reward, it can reduce our intrinsic motivation. But if the reward is a surprise, our intrinsic motivation might remain unaffected [Deci et al., 1999].

In educational settings, intrinsic motivation flourishes when students feel respected and part of the classroom community. This sense of belonging can be enhanced by reducing the focus on evaluations and giving students some control over their learning. Challenging yet achievable tasks, coupled with clear reasons for engaging in them, can also boost intrinsic motivation [Niemiec & Ryan, 2009].

Why Talk About Needs in a Chapter on Motivation?

Needs are the basic things that every person must have to live a healthy and satisfying life. These include food, water, shelter, and safety. Imagine you're playing a video game, and your character needs certain items to survive and move to the next level. In real life, we also have needs that keep us alive and well.

Motivations, on the other hand, are the reasons behind why we do what we do. It's like having a personal mentor in your mind that encourages you to achieve your goals. These goals can be anything from finding safe affordable housing or making friends, to learning a new skill. Motivation is what pushes you out of bed in the morning to tackle the day ahead.

Why do we talk about needs in a chapter about motivation? Well, it's because our needs are closely linked to our motivations. Think of it this way: if you're really hungry (a need), you're motivated to find something to eat; if you feel unsafe (a need), you're motivated to find a safe place. Our needs often set the stage for our motivations. They are like the roots of a tree, while motivations are the branches that grow because of those roots.

In psychology, understanding needs is crucial because it helps us figure out what motivates people. By knowing what a person needs, we can better understand why they act in certain ways. For example, if someone is working hard in school, it might be because they have a need for achievement or they're motivated by the desire to make their family proud.

Instinct as Motivation

Motivation is a complex interaction of internal desires and external influences. Understanding this dynamic is crucial for fostering environments that support healthy, effective motivation in various contexts, from education to the workplace. Let's now survey some of the many things that can be significant motivators for us humans.

William James (1842–1910) was an important contributor to early research into motivation. James theorised that behaviour was driven by a number of instincts that aid survival (Figure EM.4). From a biological perspective, an instinct is a species-specific pattern of behaviour that is not learned. There was, however, considerable controversy among James and his contemporaries over the exact definition of instinct. James proposed several dozen special human instincts, but many of his contemporaries had their own lists that differed. A parent's protection of their baby, the urge to lick sugar, and hunting prey were among the human behaviours proposed as true instincts during James's era. This view that human behaviour is driven by instincts received a fair amount of criticism because learning — not just instinct — shapes all sorts of human behaviour.

Drive States

In addition to intrinsic and extrinsic motivation, some of our most powerful motivators arise from **drive states** — internal conditions that signal a physiological need and push us to act. Drive states differ from other affective or emotional states because they generate behaviors that provide specific benefits to the body. Hunger motivates eating to increase blood sugar, while thirst motivates drinking to maintain fluid balance. Other drive states, such as sexual arousal or drug cravings, also direct behavior toward restoring biological or psychological equilibrium.

Drive states are closely tied to the body's need to maintain homeostasis, or stable internal conditions (Billman, 2020). Just as a thermostat monitors temperature and activates heating or cooling to maintain a set point, our bodies monitor physiological systems and motivate behaviors that return them to optimal levels. Some homeostatic mechanisms, like blood circulation, operate automatically, while others involve deliberate action. Drive states use both discomfort and pleasure to guide behavior: feeling hungry or thirsty is unpleasant, motivating action, and eating or drinking produces pleasure, reinforcing behaviors that restore balance.

As drive states intensify, they also narrow attention. Hunger directs focus toward food, sexual arousal toward sexual outcomes, and drug cravings toward the substance of choice. This narrowing can reduce concern for unrelated goals, diminish long-term planning, and temporarily lower altruism (Easterbrook, 1959; Ariely & Loewenstein, 2006; Giordano et al., 2002; Righetti & Finkenauer, 2011). In extreme cases, drive states can dominate cognition and behavior, causing individuals to prioritize satisfying the drive above almost everything else.

Drive states illustrate how biological needs powerfully shape behavior. They complement intrinsic and extrinsic motivation by showing how the body signals what we must do to survive and maintain balance, while intrinsic and extrinsic motivations explain the psychological and social forces guiding our choices.

Theories of Needs and Motivations

JESSICA MOTHERWELL MCFARLANE

This section contrasts the perspectives of Blackstock's Breath of Life Theory and Maslow's Hierarchy of Needs, offering a rich exploration of human needs and motivations from distinct viewpoints. First, we introduce Cindy Blackstock and the Breath of Life Theory, rooted in the interconnectedness and communal well-being emphasised by Indigenous cultures, challenging the traditional hierarchical models of needs. Next, we revisit Maslow's well-known theory, examining its evolution and the common misinterpretations that have simplified its complexity over time. Finally, we compare these two theories side by side, highlighting their differences in focus, structure, and cultural inclusivity, and what these differences mean for understanding human motivation. This section aims to broaden our perspective on what drives us, acknowledging the diversity of human experience and the importance of cultural context in shaping our motivations.

Blackstock's Breath of Life Theory: Balance as Purpose

Cindy Blackstock, a prominent member of the Gitxsan First Nation, is a celebrated advocate for Indigenous children's rights in Canada. Her work, deeply rooted in her Indigenous heritage, has significantly guided our understanding of psychology, particularly in understanding human needs and motivations. The Breath of Life Theory both challenges and expands upon traditional European/settler psychological models like Maslow's Hierarchy of Needs.

What is the Breath of Life Theory?: The Four B's

The Breath of Life Theory calls us to shift our understanding of human needs and motivations. It emphasises a holistic view of human existence, underscoring the interconnectedness of individuals within their communities and with their ancestors. The Breath of Life Theory says that human needs are not hierarchical but are interconnected and equally important throughout life (Blackstock, 2011; 2019; 2021). This perspective aligns with many

Indigenous cultures' views, which often emphasise the importance of community, the interconnectedness of all life forms, and the continuity of knowledge and wisdom across generations.

Seeking balance as our primary motivation

Blackstock teaches us that the overall abiding purpose of our lives is to live in balance. Balance is possible with the ongoing, equitable, "deliberate and thoughtful actions made by people who position their own survival as codependent with the health of other people across generations and with the universe." Our growth as humans involves always seeking balance in all relationships, while fully realising that we are blessed, always blossoming, held in an interconnected web of belonging, and that our gift back to all is our being of service (Blackstock, 2011; 2019; 2021).

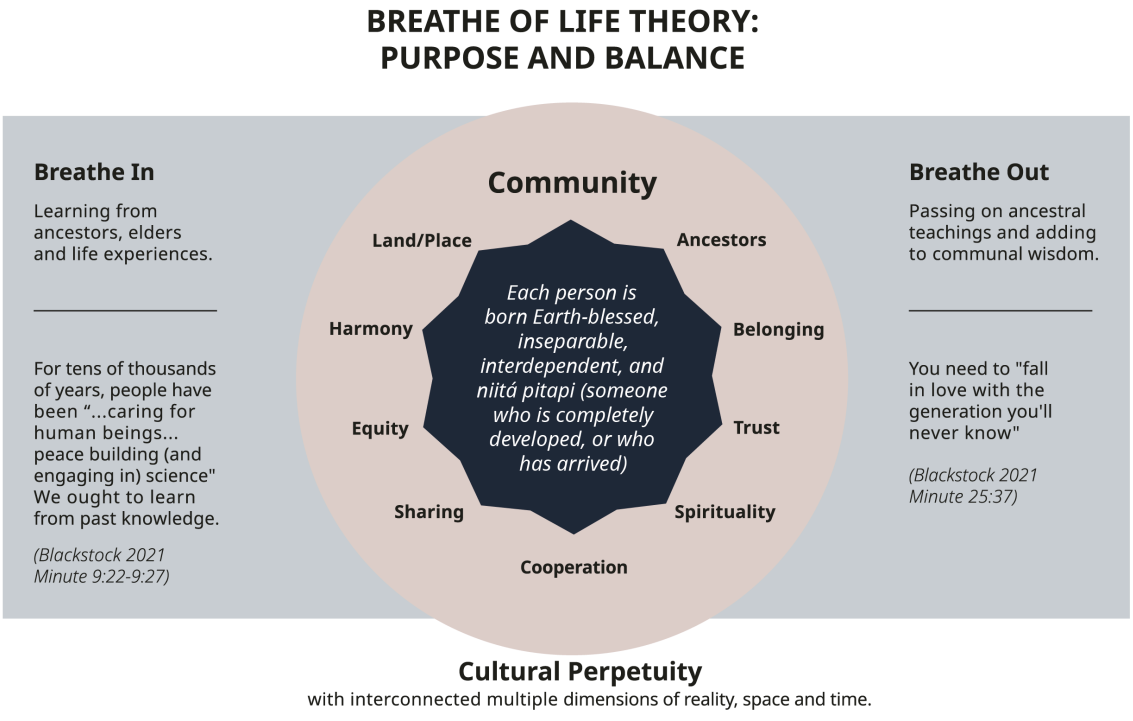

Figure MO.12. Breath of Life theory. *A visualisation of Blackstock's (2011; 2019; 2021) explanation of Blackfoot Nation's Breath of Life theory. [Image Description]* ***Source:*** *Breath of Life theory by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

Here is Blackstock's theory summarised, using words that start with "B".

The Breath of Life Theory introduces us to four kinds of human needs and motivations that interconnect to shape our lives:

1. **Blessed.** First, it emphasises that we are blessed with the Earth's abundance, highlighting our inseparable and interdependent relationship with nature.
2. **Becoming.** Second, it teaches us that we are always blossoming, born fully developed, or niita'pitapi, a term meaning "someone who is completely developed, or who has arrived" (cited in Ravilochan, 2021). In Blackfoot culture, "it's like you're credentialed at the start. You're treated with dignity for that reason, but you spend your life living up to that." (Ravilochan, 2021).
3. **Belonging.** Third, the theory underscores the importance of belonging — our connections to community, family, land, water, and all living beings — fostering trust, harmony, and cooperation.
4. **Being of Service.** Fourth, it involves seeking a fair balance in all relationships across physical, emotional, cognitive, and spiritual dimensions, and considering the past, present, and future.

Similar ideas can be seen among other Indigenous groups in North America. For example, Mi'kmaq (First Nations) peoples (Meeg-mah) are the main Indigenous Peoples of Atlantic Canada. Mi'kmaq peoples have an important concept of **Netukulimk** (Neh-doo-goo-limbk) in their culture. This concept highlights how communities are inseparable from the land and the land's resources, as they are interconnected and must support one another (Prosper, 2011). In this way, land is a community. This is expressed by the Mi'kmaq saying Msit No'kmaq (mm-sit-no-goh-mah), or "all my relations", which means that all living things and pieces of the earth are Mi'kmaq relatives (Hurley & Jackson, 2020). Another value involving cultural perpetuity comes from the Haudenosaunee (Hoe-dee-no-show-nee) peoples, also known as Iroquois or the Six Nations, which are a group of Indigenous Peoples living in the United States and Canada. The Haudenosaunee peoples have the Seven Generation Principle, which is similar to that of cultural perpetuity; this principle highlights how important it is for community members to make decisions that will result in a sustainable world for the next seven generations (Mclester, 2017).

Blackstock's theory, deeply grounded in Indigenous perspectives, underscores the interconnectedness of all life's aspects, weaving together spiritual, emotional, physical, and cognitive dimensions. She says that one of our primary motivations is meeting human needs. This is a communal endeavour, firmly anchored in ancestral wisdom and the sustainability of future generations. This holistic and communal approach sharply diverges from the model proposed by Maslow, which is next in our discussion. Maslow's model, in contrast, is characterised by a hierarchical structure that prioritises individual development and fulfilment. It

suggests a progression of needs, where higher needs emerge once lower ones are satisfied, focusing primarily on the individual rather than the collective well-being and interconnectedness emphasised by Blackstock.

Maslow's Hierarchy of Needs

In this section we will discover how a renowned psychological theory has been changed and misinterpreted over time. Imagine playing the game of "telephone," where a message gets distorted as it is whispered from person to person. This analogy aptly describes the changes and errors introduced into Abraham Maslow's Hierarchy of Needs, a theory that has been reshaped and misunderstood over time.

> "A musician must make music, an artist must paint, a poet must write, if (they) are to be ultimately happy. What a (person) can be, (they) must be. This need we may call self-actualisation. (Maslow, 1943)"

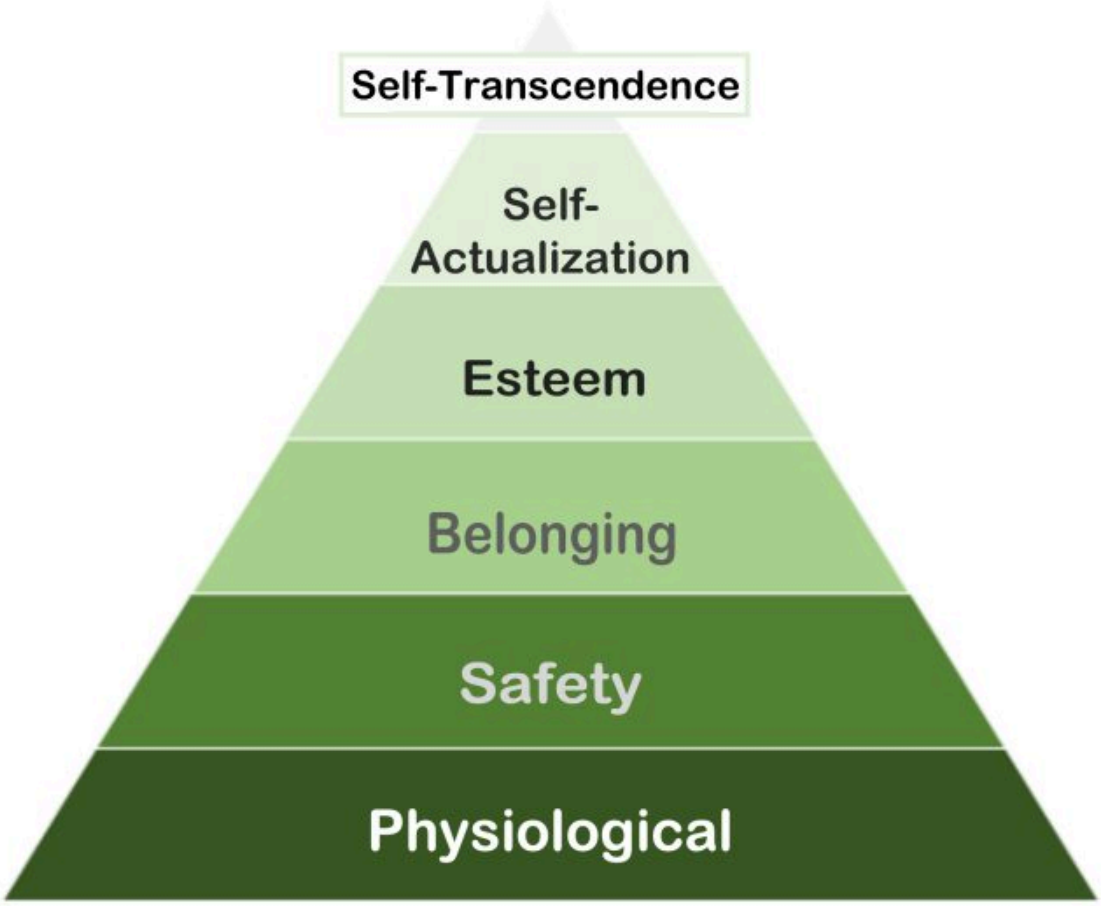

Figure MO.13. Maslow's hierarchy of needs. *Famously drawn in error as a pyramid or triangle. In some versions of Maslow's model, cognitive and aesthetic needs are also included between esteem and self-actualisation.* ***Alt. text:*** *A green triangle with six layers. From bottom to top, the layers are labeled 'physiological', 'safety', 'belonging', 'esteem', 'self-actualisation', and 'self-transcendence'.* ***Source:*** *Figure EM.8 as found in Introduction to Psychology & Neuroscience (2nd Edition) is licensed under a CC BY 4.0 Licence.*

When it was first published, Maslow's theory did not make a significant impact in the psychological community. However, it caught the attention of the business management world, where McDermid (1960) oversimplified Maslow's model for practical use in workplace training. This simplified 'pyramid' version, stripped of Maslow's complexities, became very popular in the business realm and eventually found its way back to psychology, but in a distorted, oversimplified form. For over 70 years, this misrepresentative model has been widely discussed and depicted as a pyramid, with basic needs at the base and advanced needs at the peak. This image, however, is not what Maslow intended (Maslow, 1943).

Maslow's original hierarchy, as he proposed in 1943, was more complex. He later expanded it to include **cognitive and aesthetic needs** and introduced the concept of **self-transcendence**, the motivation to pursue goals beyond oneself, such as altruism and spirituality (Koltko-Rivera, 2006).

A more accurate visualisation of Maslow's Hierarchy of Needs might be a staircase that one can ascend or descend depending on positive or negative life events. Contrary to progressing through our needs in irreversible stages, Maslow theorised that we can ascend the "stairs" of the hierarchy based on the success of personal choices, social and material privileges, personal health history, and various external pressures. When stresses are significant, we may have to move down the stairs. Conversely, when life events are favourable, we move up the stairs of the hierarchy. Our life events deeply affect if and how we self-actualise and at what pace.

Maslow's Hierarchy of Needs (with 1970 updates by Maslow)

- **Physiological Needs**: These are the basic survival needs such as food, water, and shelter. Example: grabbing a sandwich and a bottle of water to satisfy hunger and thirst.
- **Safety Needs**: This level includes the need for security and safety. Example: locking your doors at night to feel secure in your home.
- **Belongingness and Love Needs**: These needs encompass relationships, love, and affection. Example: spending time with friends or family to feel connected and loved.
- **Esteem Needs**: This level covers the need for self-esteem, respect, and recognition. Example: receiving praise at work for a job well done, which boosts your self-confidence.
- **Cognitive Needs**: This addition reflects the desire for knowledge and understanding. Example: reading a book or researching a topic online to satisfy your curiosity.
- **Aesthetic Needs**: This step includes the appreciation of beauty and form. Example: visiting an old growth forest to admire its beauty and experience a sense of awe.
- **Self-Actualisation**: This is the need to realise one's full potential and abilities. Example: pursuing a lifelong dream, like travelling the world or starting a business, to fulfil your personal goals.
- **Self-Transcendence**: This final step, added later, involves the pursuit of goals beyond the self, like altruism and spirituality. Example: volunteering at a local shelter, finding fulfilment in helping others, and contributing to a greater cause.



Figure MO.14. Abraham Maslow. *Abraham Maslow sitting next to on-reserve traditional housing (Blackfoot) in the late 1930s.* ***Alt. text:*** *Black and white photograph showing Maslow sitting cross-legged on the ground in front of traditional housing.* ***Source:*** *Glenbow Archives. Public Domain image.*

An important aspect that is often overlooked in discussions about Maslow's work is his failure to acknowledge the influence of the Blackfoot nation, who hosted him and likely contributed to his understanding of self-actualisation and community-focused values. This omission highlights a broader issue in the field of psychology, where Indigenous and non-European/Settler contributions are often underrepresented or unrecognised.

Understanding the evolution of Maslow's Hierarchy of Needs offers a valuable lesson in how theories can be changed and misinterpreted over time. It also underscores the importance of cultural context in psychological theories and the need to recognise and integrate diverse perspectives and give credit where credit is due.

If you want to read more about the process of rediscovering Blackfoot science and their influence on Maslow, read this article published by the Government of Canada's Social Sciences and Humanities Research Council: **Rediscovering Blackfoot Science: How First Nations Helped Develop a Keystone of Modern Psychology**.

Critics have pointed out that Maslow's theory, despite its revisions, is heavily influenced by European/Settler values and may not accurately reflect the needs and motivations of people from different cultural backgrounds (Bouzenita & Boulanouar, 2016; Zhang, 2017; Gambrel

& Cianci, 2003). This **ethnocentric bias,** when someone thinks their own culture or group is better or more important than others, is a significant limitation that overlooks the diverse ways in which different cultures understand and prioritise human needs.

Watch this video: **Sailing Towards Transcendence | Scott Barry Kaufman (5.5 minutes)**

> *One or more interactive elements has been excluded from this version of the text. You can view them online here:* ***https://opentextbooks.concordia.ca/psyc205/?p=979#oembed-1***

"Sailing Towards Transcendence | Scott Barry Kaufman" video by APB Speakers is licensed under the Standard YouTube Licence.

Blackstock's Compared to Maslow's Theories

The following comparison of the Breath of Life Theory with Maslow's Hierarchy of Needs (see Table MO.6) shows that they differ in several key ways:

Table MO.6. Blackstock's compared to Maslow's theory of needs and motivations

Perpective	Blackstock	Maslow
Individual versus Communal Focus	Includes communal well-being and interconnectedness of individuals within their community and with their ancestors (Blackstock, 2007).	Primarily focuses on individual development and fulfilment (Maslow, 1970).
Hierarchy versus Holism	Views needs as inherently interconnected and equally important throughout life, without a hierarchical structure (Blackstock, 2007).	Suggests a progression of needs, where higher needs emerge once lower ones are satisfied (Maslow, 1943).
Cultural Context and Inclusivity	Offers a more culturally inclusive and contextually rich perspective (Blackstock, 2007).	Primarily rooted in Western values, and may not fully encompass the cultural dimensions of motivation and needs present in Indigenous cultures (Maslow, 1970).
Concept of Self-Actualisation	Redefines self-actualisation as an inherent trait present in everyone from birth, emphasising the role of community and cultural perpetuity in personal development (Blackstock, 2007).	Self-actualisation is seen as the pinnacle of personal development, achieved after satisfying other lower-level needs (Maslow, 1970).

Our comparison of these two theories shows that Blackstock's principles prioritise interconnectedness and well-being, and take a holistic view of human needs. Maslow's principles centre on the individual, are hierarchical, and focus on becoming one's best self and giving back to younger generations.

Kaufman's Sailboat Metaphor for Maslow's Hierarchy of Needs

Scott Barry Kaufman (2021) moves away from Maslow's pyramid to introduce the sailboat metaphor as a fresh perspective on our needs. In this metaphor, life's journey is likened to sailing. The boat represents our basic needs for safety and security, while the sail, capturing the wind, symbolises our drive for personal growth, including exploration, love, and purpose. At the highest level, transcendence is envisioned as a seabird soaring above, symbolising goals beyond oneself like altruism and spirituality. This model, updated with Maslow's 1970 enhancements and McFarlane's (2024) addition of grit and resilience represented by the sailboat's mast, emphasises the dynamic nature of our needs and growth.

Unlike the static pyramid, the sailboat suggests that navigating life involves balancing foundational security with the pursuit of growth and transcendence, adapting to the challenges we encounter.

Summary: Blackstock's and Maslow's Theories of Needs and Motivations

Blackfoot's Breath of Life Theory provides a culturally rich and holistic perspective on human needs and motivations. It challenges the traditional European/Settler-biassed psychological models and encourages a more inclusive, communal, and interconnected understanding of human psychology. Maslow's theory and the Breath of Life theory differ fundamentally in their approaches to human needs and motivation. While Maslow's revised hierarchy focuses on individual development, the Breath of Life theory emphasises communal well-being and interconnectedness. Maslow suggests a progression of needs, whereas the Breath of Life theory views needs as inherently interconnected and equally important throughout life, and says that one theory is not necessarily better than the other. Both theories can teach us about our human needs and sources of motivation.

Image Descriptions

Figure MO.12. Breath of Life theory image description:

Title: Breathe of Life Theory: Purpose and Balance.

Cultural Perpetuity: With interconnected multiple dimensions of reality, space, and time.

- Community: Each person is born Earth-blessed, inseparable, interdependent, and n*iitá'pitapi* (someone who is completely developed, or who has arrived).
    - Ancestors
    - Belonging
    - Trust
    - Spirituality
    - Cooperation
    - Sharing
    - Equity
    - Harmony
    - Land/Place
- Breathe in: Learning from ancestors, elders and life experiences. Quote: For tens of thousands of years, people have been "... caring for human beings... peace building (and engaging in) science". We ought to learn from past knowledge. (Blackstock 2021, Minute 9:22-9:27).
- Breathe out: Passing on ancestral teachings and adding communal wisdom. Quote: You need to "fall in love with the generation you'll never know". (Blackstock 2021, Minute 25:37). *[Return Figure MO.12]*

Drive Reduction and Optimal Arousal

JESSICA MOTHERWELL MCFARLANE

The Drive Reduction Theory

Drive Reduction Theory, developed by Clark Hull in the 1940s, is a significant concept in understanding human motivation. It is rooted in the idea that our primary drives, such as hunger, thirst, sleep, temperature regulation, elimination, sexual satiation, breathing, and pain avoidance, are crucial in directing our behaviour (Hull, 1943). These drives are essential for maintaining homeostasis, the body's tendency to maintain a balance or optimal level within its biological systems. Think of homeostasis as your body's way of keeping everything in balance, just like how you might try to balance your study, sleep, and social life. For example, at a summer music festival, you're overwhelmed by intense thirst after hours in the sun, a clear sign that your body is out of balance. Desperately seeking hydration, you find a stand selling iced lemonade. The moment you drink it, the sweet, cold liquid quenches your thirst, instantly reducing the physiological tension and restoring your body's homeostasis, perfectly illustrating Hull's concept of balancing primary drives like thirst. This theory not only highlights the importance of physiological needs but also sets the stage for understanding more complex motivations that drive our actions, such as the pursuit of achievement, the need for belonging, and the search for emotional fulfillment. These additional drives, while not as immediately linked to physical survival, are equally vital in shaping our behaviour and guiding us toward a fulfilling and balanced life.



Figure MO.6. Primary drives. *Desperately seeking hydration, you find a stand selling iced lemonade. The moment you drink it, the sweet, cold liquid quenches your thirst, instantly reducing the physiological tension and restoring your body's homeostasis, perfectly illustrating Hull's concept of balancing primary drives like thirst.* ***Alt. text:*** *A hand holding a glass jar with a straw.* ***Source:*** *Photo by Emmanuel Ben-Paul on Unsplash.*

Here is a list of examples of some human drives:

- **Hunger:** The drive to consume food to obtain energy and nutrients. Remember how you feel when you skip breakfast and then can't concentrate in your morning class? That's this theory in action.
- **Thirst:** The drive to drink water to maintain hydration.
- **Sleep:** The drive to rest and rejuvenate the body and mind.
- **Temperature Regulation:** The drive to maintain an optimal body temperature.
- **Elimination:** The drive to excrete waste products, including urination and defecation.
- **Sexual Satiation:** The drive for engaging in sexual activity.
- **Breath:** The drive to intake oxygen and expel carbon dioxide, although this is so fundamental that it's often taken for granted.
- **Pain Avoidance:** The drive to avoid physical injury and psychological harm.

The hypothalamus plays a crucial role in homeostasis. It receives signals from various receptors throughout the body, which are complex networks of neurons sensitive to different types of internal changes. For example, osmoreceptors in the hypothalamus monitor the body's hydration level, while glucose-sensitive neurons detect blood sugar levels. Upon receiving signals from these receptors, the hypothalamus communicates with other parts of the brain and body to initiate response mechanisms. These responses can involve activating other neural pathways or signalling endocrine glands to release hormones. For instance, when blood sugar levels drop, the hypothalamus can trigger the release of hormones that signal the body to feel hungry, prompting eating behaviour to restore glucose levels.

Drive reduction theory suggests that deviations from homeostasis (when systems get unbalanced) create physiological needs, leading to psychological drive states that direct behaviour to meet these needs and restore balance. For instance, a drop in blood sugar levels induces a physiological need for food, leading to the drive state of hunger, which motivates the individual to eat. Eating then eliminates hunger, returning blood sugar levels to normal.



(a) (b)

Figure MO.7. Homeostasis. *Hunger and subsequent eating are the result of complex physiological processes that maintain homeostasis.* ***Alt. text:*** *Photograph "a" shows a child eating watermelon. Photograph "b" shows a young person eating sushi.* ***Source:*** *Photo a by Jill Wellington and Photo b by Utopix Pictures Pictures are licensed under the Pexels Licence.*

Beyond basic needs, **secondary drives** like seeking social approval, and habits formed from repeated actions like checking your phone, also influence our behaviour. Observing our daily routines, such as phone-checking, reveals how even non-survival actions are driven by underlying motivations.

While drive-reduction theory has been influential in understanding human motivation, it's important to note its limitations. It does not fully explain behaviours not directly linked to biological needs, such as curiosity-driven behaviours, and it may not account for why peo-

ple engage in activities that increase tension or arousal, like thrill-seeking. This leads us to ask more questions about human motivation and behaviour, which is what psychology is all about!

Overall, drive-reduction theory provides a foundational understanding of how physiological needs, such as hunger, thirst, and the need for sleep, create psychological drives that powerfully influence our behaviour to meet these needs. In simple terms, this theory helps us understand why we feel driven to do things like eat, drink, and sleep: our body signals a physical need, and our mind pushes us to take action to meet that need.

We will now focus on one particular motivational drive: hunger. In this next section we will look at various aspects of hunger and other motivations for eating — or intentionally not eating. We will ask why we feel hungry, how our bodies signal us to eat, and what role hunger plays in our overall health. We'll look at the science behind hunger, the debate around body weight, and the way society influences our eating habits. By focusing on hunger, we aim to understand not just the biological urge to eat but also how psychological and social factors play into our eating behaviours. Our exploration of hunger sheds light on not only this basic survival mechanism, but also the intricate web of motivations that drive our behaviours. We will discover that even our most primal needs depend on our psychological desires and our social relationships.

The Optional Arousal Model

Optimal Arousal Model builds on what we know about motivation. It says that we all have a "just right" level of alertness and energy that helps us do our best (Figure MO.10). If we're not alert enough, we get bored and look for something to wake us up. If we're too alert, or stressed, we try to find ways to relax (Berlyne, 1960). You've probably felt this during your time at school. Think about the end of the spring semester when everything seems to pile up. You might be stressed, trying to finish all your work. Then, summer comes, and you relax. But after a while, you start to feel bored. By the time Fall rolls around, maybe you are actually ready to get back to school. That's the Optimal Arousal Model in action.

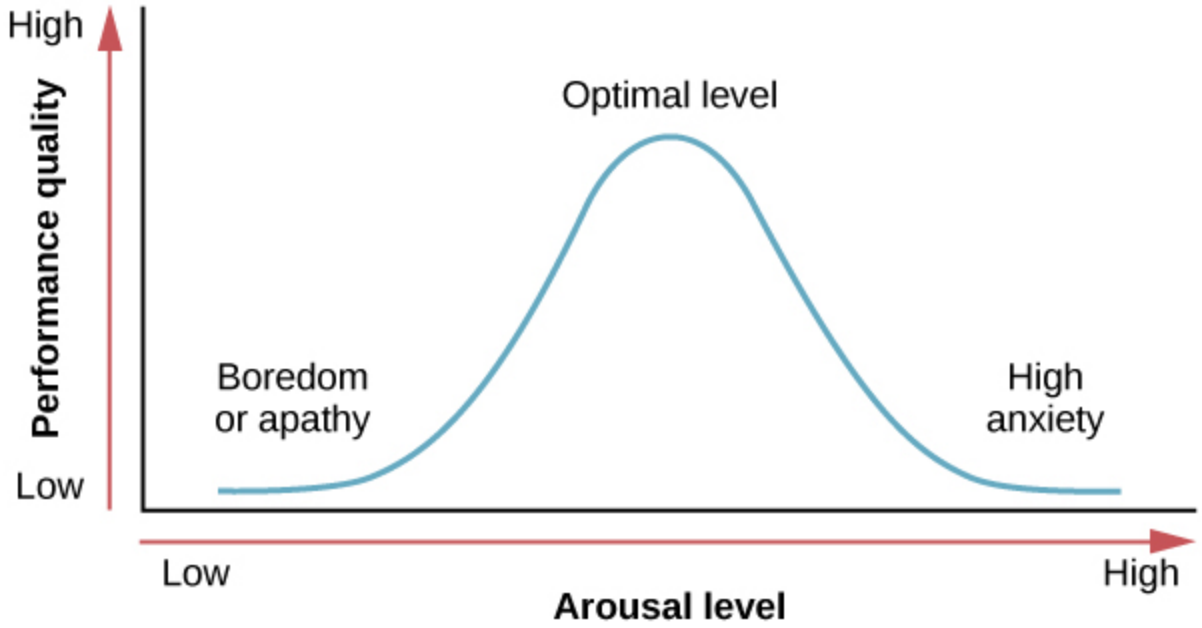

Figure MO.10. Optimal arousal. *The concept of optimal arousal in relation to performance on a task is depicted here. Performance is maximised at the optimal level of arousal, and it tapers off during under- and over-arousal. This figure shows this idea. It says that we do our best when our level of alertness is just right. If we're too relaxed or too stressed, we don't do as well.* ***Alt. text:*** *Line graph of arousal versus performance showing a curve: low arousal with low performance labeled boredom, medium arousal with peak performance labeled optimal, and high arousal with low performance labeled anxiety.* ***Source:*** *Figure 10.6 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

So, what's this perfect level of alertness? Researchers have found that it is usually somewhere in the middle between really relaxed and really stressed (Yerkes & Dodson, 1908). Think about how you feel when you're taking an exam. If you're too relaxed, you might not do well because you don't care enough. But if you're too nervous, you might freeze up and not do well either. It's like a softball team that's so sure they'll win, they don't get pumped up for the game and end up losing to a team that's not as good.

But it's not always as simple as finding a middle ground. Researchers Robert Yerkes and John Dodson found that the best level of alertness depends on how hard the task is (Figure MO.11). They say that for easy tasks, it's better to be more alert. But for hard tasks, it's better to be less alert. This relationship is known as **Yerkes-Dodson law**, which holds that a simple task is performed best when arousal levels are relatively high and complex tasks are best performed when arousal levels are lower.

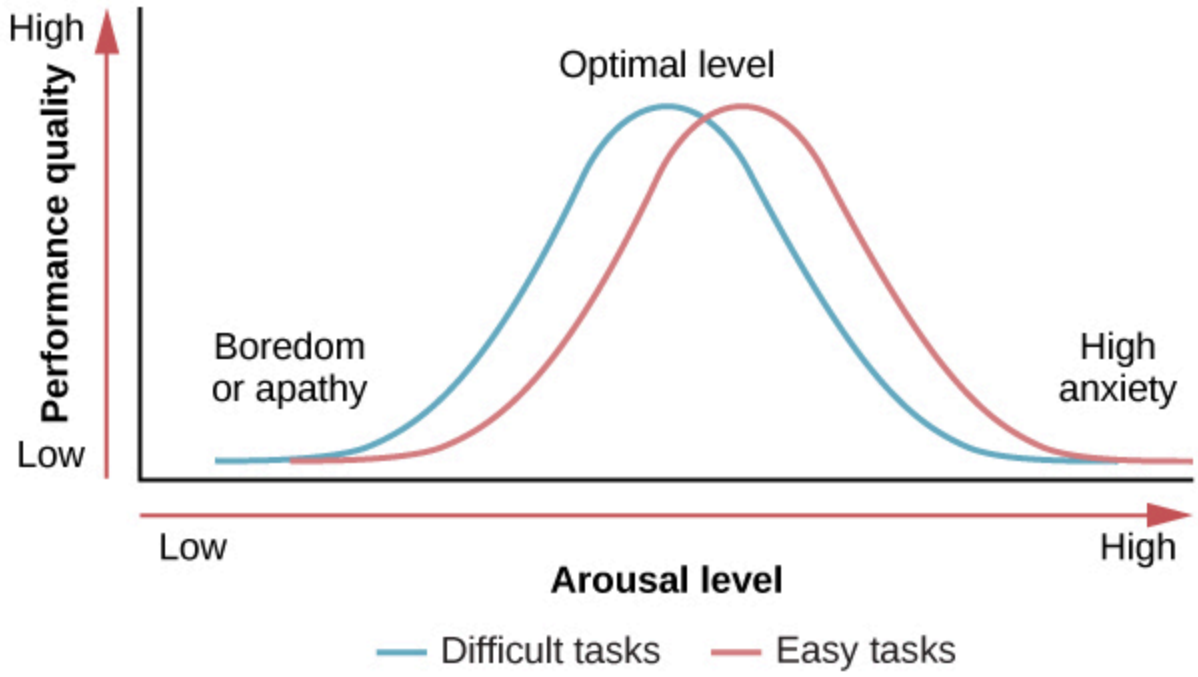

Figure MO.11. Yerkes-Dodson law. *Task performance is best when arousal levels are in a middle range, with difficult tasks best performed under lower levels of arousal and simple tasks best performed under higher levels of arousal. It says that for tough tasks, you do better when you're not too stressed. But for simple tasks, a bit more excitement can help you do better.* ***Alt. text:*** *Line graph of arousal versus performance showing optimal arousal curves: difficult tasks peak at lower arousal, easy tasks peak at higher arousal.* ***Source:*** *Figure 10.7 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Chapter Resources

JESSICA MOTHERWELL MCFARLANE

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Chapter Resources

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CHAPTER 9. PERSONALITY

Amelia Liangzi Shi

Twins Separated at Birth

Paula Bernstein and Elyse Schein were identical twins who were adopted into separate families immediately after their births in 1968. It was only at the age of 35 that the twins were reunited and discovered how similar they were to each other.

Paula Bernstein grew up in a happy home in suburban New York. She loved her adopted parents and older brother and even wrote an article titled "Why I Don't Want to Find My Birth Mother." Elyse's childhood, also a happy one, was followed by university and then film school abroad.

In 2003, 35 years after she was adopted, Elyse, acting on a whim, inquired about her biological family at the adoption agency. The response came back: "You were born on October 9, 1968, at 12:51 p.m., the younger of twin girls. You've got a twin sister named Paula, and she's looking for you."

"Oh, my God. I'm a twin! Can you believe this? Is this really happening?" Elyse cried.

Elyse dialed Paula's phone number: "It's almost like I'm hearing my own voice in a recorder back at me," she said.

"It's funny because I feel like in a way I was talking to an old, close friend I never knew I had. We had an immediate intimacy, and yet, we didn't know each other at all," Paula said.

The two women met for the first time at a café for lunch and talked until the late evening. "We had 35 years to catch up on," said Paula. "How do you start asking somebody, 'What have you been up to since we shared a womb together?' Where do you start?" With each new detail revealed, the twins learned about their remarkable similarities. They'd both gone to graduate school in film. They both loved to write, and they had both edited their high school yearbooks. They have similar taste in music.

"I think, you know, when we met it was undeniable that we were twins. Looking at this person, you are able to gaze into your own eyes and see yourself from the outside. This identical individual has the exact same DNA and is essentially your clone. We don't have to imagine," Paula said.

Now they finally feel like sisters. "But it's perhaps even closer than sisters," Elyse said, "because we're also twins."

The following YouTube video provides further details about the experiences of Paula Bernstein and Elyse Schein.

Watch this video: **Identical Twins Separated at Birth (9 minutes)**

> *One or more interactive elements has been excluded from this version of the text. You can view them online here:* ***https://opentextbooks.concordia.ca/psyc205/?p=985#oembed-1***

"Identical Twins Separated at Birth" video by Strombo is licensed under the Standard YouTube Licence.

Introduction to Personality

In this chapter, we will consider the wide variety of personality traits found in human beings. We'll consider how and when personality influences our behaviour and how well we perceive the personalities of others. We will also consider how psychologists measure personality and the extent to which personality is caused by nature versus nurture. The fundamental goal of personality psychologists is to understand what makes people different from each other by studying individual differences, but also what makes them similar, as is the case with people who share genes, such as Paula Bernstein and Elyse Schein.



Figure PE.1. What characteristics describe your personality? *Happy, sad, impatient, shy, fearful, curious, helpful. What characteristics describe your personality? Figure 11.2 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence*

Personality is defined as an individual's consistent patterns of feeling, thinking, and behaving (John et al., 2008). The word personality comes from the Latin word *persona*. In the ancient world, a persona was a mask worn by an actor. When we say that Bill is fun, that Marian is shy, or that Frank is helpful, we mean that we believe that these people have stable individual characteristics — their personalities.

Understanding personality is part of our human nature, and helps us in life. It can help us understand why people do the things they do. Knowing a person's personality may also enable us to predict how they might act in the future and in different situations.

Psychodynamic and Humanistic Views of Personality

AMELIA LIANGZI SHI

One of the most important psychological approaches to understanding personality is based on the theory of the Austrian physician and psychologist Sigmund Freud (1856–1939). His approach, known as **psychodynamics**, focuses on the role of unconscious thoughts, feelings, and memories. Freud is probably the best known of all psychologists, in part because of his impressive observation and analysis of personality. Freud built his theory of personality by studying patients, mostly women, who were experiencing a condition called hysteria. Hysteria, a historical term, was a mix of emotional and physical symptoms like chronic pain, fainting, seizures, and paralysis. Some hysterical patients, when under hypnosis, revealed they had gone through traumatic sexual experiences as children. During these sessions, patients often experienced strong emotions, known as **catharsis**, and their symptoms improved afterward. Freud believed that these issues were more related to a person's mind than their body. Like many theories, some of Freud's clever ideas have been shown to be partly wrong, but some parts of his theories still have an impact on psychology today.

In terms of free will, Freud did not believe that we were able to control our own behaviours. Rather, he believed that all behaviours are predetermined by motivations that lie outside our awareness, in the unconscious. These forces show themselves in our dreams, in neurotic symptoms such as obsessions, while we are under hypnosis, and in Freudian "slips of the tongue" in which people reveal their unconscious desires in language. Freud argued that we rarely understand why we do what we do. For Freud, the mind was like an iceberg. In this analogy, the unconscious is much larger, but also out of sight, in comparison to the conscious of which we are aware.

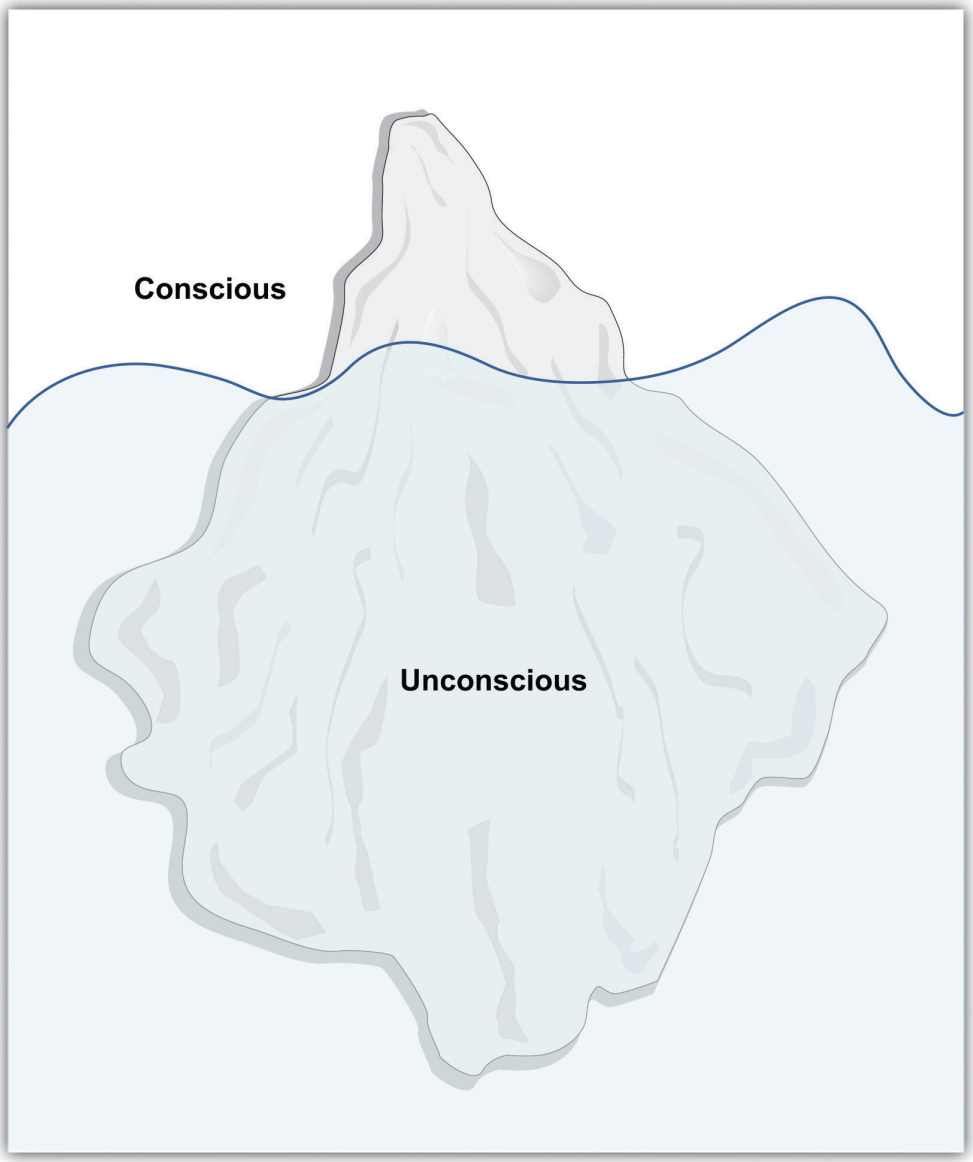

Figure PE.4. Conscious and subconscious. *In Sigmund Freud's conceptualisation of mind, the unconscious is the major part of an iceberg under water.* ***Alt. text:*** *An iceberg floating in water. A small portion of the iceberg that sticks out of the water is labeled "conscious" and the large portion under water is labeled "unconscious."* ***Source:*** *Figure 14.14 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Id, Ego, and Superego

Freud proposed that the mind is divided into three components — id, ego, and superego — and that the interactions and conflicts among the components create personality (Freud, 1923/1949). According to Freudian theory, **the id** is the component of personality that forms the basis of our most primitive impulses. The id is entirely unconscious, and it drives our most important motivations, including the sexual drive (i.e., **libido**) and the aggressive drive. According to Freud, the id is driven by **the pleasure principle**, which is the desire for immediate gratification of our sexual and aggressive urges. The id is why we smoke cigarettes, drink alcohol, view pornography, tell mean jokes about people, and engage in other fun or harmful behaviours.

In contrast to the id, the function of **the ego** is based on **the reality principle**, which is the idea that we must delay gratification of our basic motivations until the appropriate time with the appropriate outlet. The ego is the largely conscious controller. We may wish to scream, yell, or hit, and yet our ego normally tells us to wait, reflect, and choose a more appropriate response.

The superego represents our sense of right and wrong. The superego tells us all the things that we shouldn't do, based on our interpretation of the duties and obligations of society. The superego strives for perfection, and when we fail to live up to its demands, we feel guilty.

Freud believed that psychological disorders, and particularly the experience of anxiety, occur when there is conflict or imbalance among the id, ego, and superego. When the ego finds that the id is pressing too hard for immediate pleasure, it attempts to correct for this problem, often through the use of **defence mechanisms**, which are unconscious psychological strategies used to cope with anxiety and maintain a positive self-image.

Freud believed that the defence mechanisms were essential for effective coping with everyday life, but that any of them could be overused. For example, let's say Joe is a high school football player. Deep down, Joe feels sexually attracted to males. His conscious belief is that being gay is immoral and that if he were gay, his family would disown him and he would be rejected by his peers. Therefore, there is a conflict between his conscious beliefs (being gay will result in social rejection) and his unconscious urges (attraction to males). The idea that he might be gay causes Joe to have feelings of anxiety. How can he decrease his anxiety? Joe may find himself making gay jokes or picking on a school peer who is gay.

There are several different types of defence mechanisms. For instance, in repression, anxiety-causing memories from consciousness are blocked. As an analogy, let's say your car is making a strange noise, but because you do not have the money to get it fixed, you just turn up the radio so that you no longer hear the strange noise. Eventually you forget about

it. Similarly, in the human mind, if a memory is too overwhelming to deal with, it might be repressed and thus removed from conscious awareness (Freud, 1920). The table below identifies the major Freudian defence mechanisms.

Table PE.1. The major Freudian defence mechanisms

Defence Mechanism	Description	Example
Repression	Pushing anxiety-arousing thoughts into the unconscious	A person who witnesses the death of a loved one is later unable to remember anything about the event.
Displacement	Diverting threatening impulses away from the source of the anxiety and toward a more acceptable source	A student who is angry at their professor for a low grade lashes out at their roommate, who is a safer target of their anger.
Projection	Disguising threatening impulses by attributing them to others	A man with powerful unconscious sexual desires for women claims that women use him as a sex object.
Rationalisation	Justifying one's own negative behaviour in an irrational way	A drama student convinces herself that getting the part in the play wasn't that important after all.
Reaction formation	Making unacceptable motivations appear as their exact opposite	Jane is sexually attracted to Lou, but she claims in public that she intensely dislikes them.
Regression	Retreating to an earlier, more childlike, and safer stage of development	A university student who is worried about an important test begins to bite their nails.
Sublimation	Channeling unacceptable sexual or aggressive desires into acceptable activities	A person creates music or art to express sexual drives.

The most controversial part of Freudian theory is its explanations of personality development. Freud argued that personality is developed through a series of **psychosexual stages**, each focusing on pleasure from a different part of the body. The table below provides details on stages of psychosexual development. Freud believed that sexuality started when you were a baby, and how you dealt with each stage affected how your personality developed as you grew up.

Table PE.2. Freud's stages of psychosexual development

Stage	Age range	Description
Oral	Birth to 18 months	Pleasure comes from the mouth in the form of sucking, biting, and chewing
Anal	18 months to 3 years	Pleasure comes from bowel and bladder elimination, and conflict is with the co
Phallic	3 to 5 years	Pleasure comes from the genitals, and the conflict is with sexual desires for the
Latency	5 years to puberty	Sexual feelings are less important.
Genital	Puberty and older	If prior stages have been properly reached, mature sexual orientation develops.

During the oral stage (from birth to 18 months), the infant obtains sexual pleasure by sucking and drinking. If a baby doesn't get enough or gets too much oral gratification, they might get stuck or fixated in this stage. Even as adults, when they feel stressed, they might act like they did when they were babies. According to Freud, a child who was underfed or neglected will become orally dependent as an adult and be likely to manipulate others to fulfill their needs rather than becoming independent. On the other hand, the child who was overfed or overly gratified will resist growing up and try to return to the prior state of dependency by acting helpless, demanding satisfaction from others, and acting in a needy way.

During the anal stage (from about 18 months to 3 years old), children desire to experience pleasure through bowel movements, but they are also being toilet trained to delay this gratification. Freud believed that if this toilet training was either too harsh or too lenient, children would become fixated in the anal stage and become likely to regress to this stage under stress as adults. If the child received too little anal gratification (i.e., if the parents had been very harsh about toilet training), the adult personality will be ***anal retentive***, showing a tendency to be stingy and a compulsive seeking of order and tidiness. On the other hand, if the parents had been too lenient, the ***anal expulsive*** personality results, characterised by a lack of self-control and a tendency toward messiness and carelessness.

During the phallic stage (from 3 to about 5 years old), the genitals (i.e., the penis and the clitoris) become the main source of sexual pleasure. According to Freud, at this time children develop an unconscious attraction for the opposite-sex parent and a desire to replace the same-sex parent. Freud based his theory of sexual development on boys. He called this powerful desire the **Oedipus complex**, based on the Greek mythological character Oedipus, who unknowingly killed his father and married his mother before gouging his own eyes out when he learned what he had done. Freud argued that boys would normally abandon their love of the mother, eventually, and instead identify with the father, taking on the father's personality characteristics. However, boys who do not successfully resolve the Oedipus complex will experience psychological problems later in life. Freud believed that a girl would also develop a sexual desire for her father and a sense of competition with her mother for his attention. Unlike boys, girls would experience **penis envy**, or a feeling of deprivation. Freud suggested that this feeling could affect girls' thoughts and attitudes, particularly in their relationships with boys and men.

The latency stage is a period of relative calm that lasts from about 5 to 12 years old. Freud believed that sexual impulses were repressed at this time.

The genital stage begins at about 12 years of age. According to Freud, sexual impulses return at this time. If everything has been going well in a person's development until now, they should be able to start forming mature romantic relationships. However, if there were problems that weren't fixed earlier in their growing up, it might be hard for them to make close, loving connections with others.

Strengths and Limitations of Freudian Theories

Freud has probably had a greater impact on the public's understanding of personality than any other thinker, and he has also in large part defined the early field of psychology. Although Freudian psychologists no longer talk about oral, anal, or genital fixations, they do continue to believe that our childhood experiences shape our personalities and our attachments with others, and they still make use of psychodynamic concepts when they conduct psychological therapy.

Nevertheless, Freud's theories are less influential now than they have been in the past (Crews, 1998; Yeung, 2021). The problems are, first, testing Freudian theory is difficult because its predictions, especially about defense mechanisms, are often vague and unfalsifiable, and second, the aspects of the theory that can be tested often have not received much empirical support.

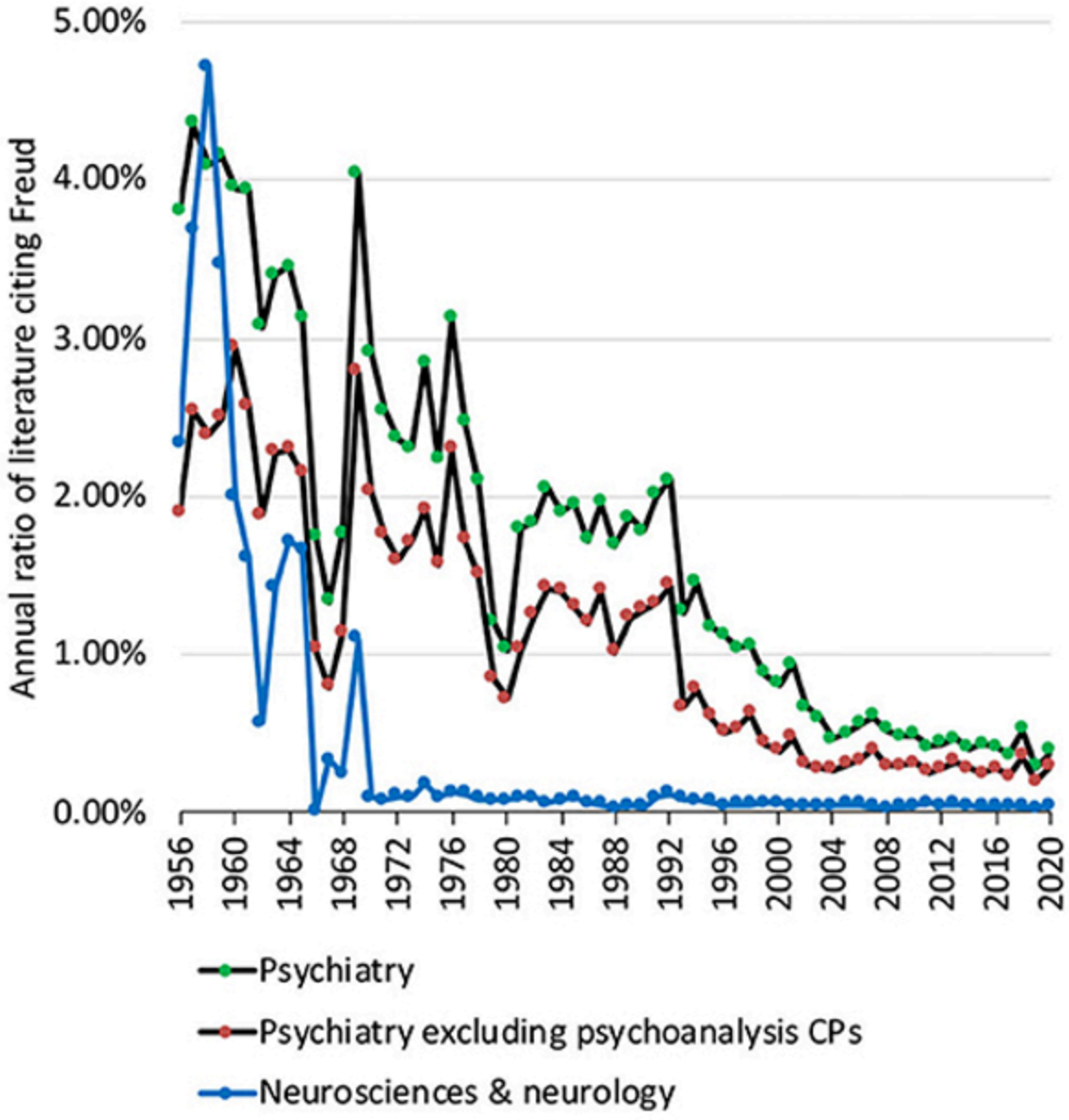

Figure PE.5. Freudian theories. *The percentage of psychiatry papers citing Freud's works has decreased over the years. CPs = citing papers. (Yeung, 2021).* ***Alt. text:*** *A line graph charting the the annual percentage of literature citing Freud from 1956 to 2020. From 1956 to 1980, Freud was generally cited in 2 to 5 percent of literature. From 1980 to 1995, Freud was generally cited in 1 to 2 percent of literature. Freud's citation rate has steadily declined from 1999 to 2020 to less than 0.5 percent of literature.* ***Source:*** *Figure 2 as found in Is the Influence of Freud Declining in Psychology and Psychiatry? A Bibliometric Analysis by Andy Wai Kan Yeung is licensed under a CC BY Licence.*

For example, although Freud claimed that children exposed to overly harsh toilet training would become fixated in the anal stage and thus be prone to excessive neatness, stinginess, and stubbornness in adulthood, research has found few reliable associations between toilet training practices and adult personality (Fisher & Greenberg, 1996).

There is also little scientific support for some of the Freudian defence mechanisms. For example, studies have failed to yield evidence for the existence of repression. People who are exposed to traumatic experiences in war have been found to remember their traumas only too well (Kihlstrom, 1997). Although we may attempt to push information that is anxiety-arousing into our unconscious, this often has the ironic effect of making us think about the information even more strongly than if we hadn't tried to repress it (Newman et al., 1997). While children remember little of their childhood experiences, this is true of both negative and positive experiences, and probably is better explained in terms of the brain's inability to form long-term memories than in terms of repression. On the other hand, Freud's important idea that expressing or talking through one's difficulties can be psychologically helpful has been supported in current research (Baddeley & Pennebaker, 2009) and has become a mainstay of psychological therapy.

A particular problem for testing Freudian theories is that almost anything that conflicts with a prediction based in Freudian theory can be explained away in terms of the use of a defence mechanism. A man who expresses a lot of anger toward his father may be seen via Freudian theory to be experiencing the Oedipus complex, which includes conflict with the father, but a man who expresses no anger at all toward the father also may be seen as experiencing the Oedipus complex by repressing the anger. Because Freud hypothesized that either was possible but did not specify when repression would or would not occur, the theory is difficult to falsify.

In terms of the important role of the unconscious, Freud seems to have been at least in part correct. Research demonstrates that a large part of everyday behaviour is driven by processes that are outside our conscious awareness (Kihlstrom, 2008). Although our unconscious motivations influence every aspect of our learning and behaviour, Freud probably overestimated the extent to which these unconscious motivations are primarily sexual and aggressive.

Taken together, it is fair to say that Freudian theory is largely unfalsifiable; the id, ego, and superego, for example, are concepts that are difficult to define, observe, and measure. Freud's ideas about the unconscious and its effects on human functioning are impossible to solidify into a set of rules for interpretation. Much of his theory has not been well supported by research; however, the fundamental ideas about personality that Freud proposed are nevertheless still major influences in popular culture, philosophy, art, film, and so on. Additionally, clinical psychologists frequently apply psychodynamic assumptions about the existence of an unconscious and the importance of early childhood in therapy. It is for these reasons that we still discuss Freudian approaches in the context of personality.

The Neo-Freudians

Freudian theory was so popular that it led to a number of followers, including many of Freud's own students, who developed, modified, and expanded his theories. Taken together, these approaches are known as neo-Freudian theories. The neo-Freudians still think that early experiences are important in shaping who we are, but they're more positive about the chances for adults to develop and change their personalities.

Alfred Adler

Alfred Adler (1870–1937) was a follower of Freud but he developed his own theory of personality. Adler proposed that the primary motivation in human personality was not sex or aggression but rather the striving for success and superiority. According to Adler, we create our unique lifestyle to achieve our life goals. For example, we may attempt to satisfy our need for success through our school or professional accomplishments. Adler believed that psychological disorders began in early childhood. He argued that children who were either overly nurtured or overly neglected by their parents were later likely to develop an **inferiority complex**, which is a psychological state in which people feel that they are not living up to expectations, leading them to have low self-esteem, with a tendency to try to overcompensate for the negative feelings. People with an inferiority complex often attempt to demonstrate their superiority to others at all costs. According to Adler, most psychological disorders result from misguided attempts to compensate for the inferiority complex in order to meet the goal of superiority. For Adler, the underlying motivation that guides successful personality is social interest. He said, "The happiness of mankind lies in working together, in living as if each individual had set himself the task of contributing to the common welfare" (Adler, 1964, p. 255).

Carl Jung

Carl Jung (1875–1961) was another student of Freud's. Jung agreed with Freud about the power of the unconscious but felt that Freud overemphasised the importance of sexuality. Jung argued that in addition to the personal unconscious, there was also a **collective unconscious**, or a collection of shared ancestral memories. Jung believed that the collective unconscious contains a variety of **archetypes**, or cross-culturally universal symbols that explain the similarities among people in their emotional reactions to many stimuli (Jung, 1928). Important archetypes include the mother, the goddess, the hero, and the mandala or

circle, which Jung believed symbolised a desire for wholeness or unity. For Jung, the underlying motivation that guides successful personality is **self-realisation**, which is learning about and developing the self to the fullest possible extent.



Figure PE.6. Mother archetype. *According, Carl Jung, the mother archetype can be found in every culture.* ***Alt. text:*** *An illustration of a pregnant mother with a fetus in uetro.* ***Source:*** *Mother archetype by Rachel Lu is is licensed under a CC BY-NC-SA Licence.*

Karen Horney

Karen Horney (1855–1952) was a German physician who applied Freudian theories to create a personality theory that she thought was more balanced between men and women. Horney believed that parts of Freudian theory (e.g., penis envy) were biased against women. Horney argued that women's sense of inferiority was not due to their lack of a penis but rather to their dependency on men, an approach that the culture made it difficult for them to break from (Horney, 1923/1967). For Horney, the underlying motivation that guides personality development is the desire for security — the ability to develop appropriate and supportive relationships with others.

Erich Fromm

Another important neo-Freudian was Erich Fromm (1900–1980). Fromm's focus was on the negative impact of technology. According to Fromm, technology brings us independence, freedom, and power, but the use of technology makes us feel increasingly isolated from others. As we desire to become closer to others, we also create the need to escape from freedom that is brought by technology.

Erik Erikson

Erik Erikson (1902–1994) agreed with Freud about the psychosexual stages, but focused on the parent-child relationship and gave more importance to the role of the ego rather than the id. As you learned when you studied lifespan development, Erikson later proposed a psychosocial theory of development, suggesting that an individual's personality develops throughout the lifespan, different from Freud's view that personality is fixed in early life. In his theory, Erikson emphasised the social relationships that are important at each stage of personality development, in contrast to Freud's emphasis on sex. Erikson identified eight stages, each of which represents a conflict or developmental task (see Table PE.3). The development of a healthy personality and a sense of competence depend on the successful completion of each task.

Table PE.3. Erikson's Psychosocial Stages of Development

Stage	Age (years)	Developmental Task	Description
1	0-1	Trust versus mistrust	Learns to trust (or mistrust) that basic needs, such as nourishment and affection, will be met
2	2-3	Autonomy versus shame/doubt	Develops a sense of independence in many tasks
3	3-5	Initiative versus guilt	Takes initiative on some activities; may develop guilt when success not met or boundaries overstepped
4	6-11	Industry versus inferiority	Develops self-confidence in abilities when competent or sense of inferiority when not
5	12-18	Identity versus confusion	Experiments with and develops identity and roles
6	19-29	Intimacy versus isolation	Establishes intimacy and relationships with others
7	30-64	Generativity versus stagnation	Contributes to society and becomes part of a family
8	65-	Integrity versus despair	Assesses and makes sense of life and meaning of contributions

Carl Rogers and the Self

Carl Rogers (1902–1987) was a humanistic psychologist. Like other humanistic psychologists, he emphasised the potential for good that exists within all people. One of Rogers's main ideas about personality regards **self-concept**, which refers to our thoughts and feelings about ourselves. How would you respond to the question, "Who am I?" Your answer can show how you see yourself. If your response is primarily positive, then you tend to feel good about who you are, and you see the world as a safe and positive place. If your response is mainly negative, then you may feel unhappy with who you are. Rogers further divided the self into two categories: the ideal self and the real self. The **ideal self** is the person that you

would like to be; the **real self** is the person you actually are. Rogers focused on the idea that we need to achieve consistency between these two selves. We experience **congruence** when our thoughts about our real self and ideal self are very similar. High congruence leads to a greater sense of self-worth and a healthy, productive life. Parents can help their children achieve this by giving them unconditional positive regard, or unconditional love. According to Rogers (1980), "As persons are accepted and prized, they tend to develop a more caring attitude towards themselves" (p. 116). Conversely, when there is a great discrepancy between our ideal and actual selves, we experience a state Rogers called **incongruence**, which can lead to maladjustment. Rogers believed that people made their free choices, and he did think personality is "determined" by biology.

It's important to note that psychodynamic and humanistic approaches share a common ground. While they prove valuable in psychotherapy, some of their ideas are hard to test and prove wrong. This lack of falsifiability can make it challenging to scientifically measure and confirm their assumptions. Now, shifting our focus to the next section, let's delve into cognitive-behaviourist theories. Unlike the previous approaches, cognitive-behaviourism stands out for its emphasis on testable ideas and measurable concepts.

Cognitive-Behaviourist Perspectives on Personality

AMELIA LIANGZI SHI

In contrast to the Freudians and neo-Freudians, who relate personality to inner and hidden processes, the learning approaches discussed in this section focus only on observable behaviour. This illustrates a significant advantage of the learning approaches over psychodynamics. Because learning approaches involve observable and measurable phenomena, they can be scientifically tested.

Behaviourists do not believe in biological determinism; they do not see personality as inborn. Instead, they view personality as significantly shaped by the reinforcements and consequences outside of the organism. In other words, people behave in a consistent manner based on prior learning. B. F. Skinner, a radical behaviourist, believed that the environment was solely responsible for all behaviour, including the enduring, consistent behaviour patterns studied by personality theorists.

As you may recall from your study on the psychology of learning, Skinner proposed that we demonstrate consistent behaviour patterns because we have developed certain response tendencies (Skinner, 1953). In other words, we learn to behave in particular ways. We increase the behaviours that lead to positive consequences, and we decrease the behaviours that lead to negative consequences. Skinner disagreed with Freud's idea that personality is fixed in childhood. According to Skinner, personality develops over our entire life, not only in the first few years. Our responses can change as we come across new situations; therefore, we can expect more variability over time in personality than Freud would anticipate. For example, consider a young woman, Greta, a risk taker. She drives fast and participates in dangerous sports such as hang gliding and kiteboarding, but after she has children, the system of reinforcements and punishments in her environment changes. Speeding and extreme sports are no longer reinforced, so she no longer engages in those behaviours. In fact, Greta now describes herself as a cautious person.

Albert Bandura and Reciprocal Determinism

Albert Bandura agreed with Skinner that personality developed through learning. He disagreed, however, with Skinner's radical behaviourist approach to personality development because he felt that how we interpret a situational event is more important than the event

itself. He presented a social-cognitive theory of personality that emphasises both learning and cognition as sources of individual differences in personality. In social-cognitive theory, the concepts of reciprocal determinism, observational learning, and self-efficacy all play a part in personality development.

In contrast to Skinner's idea that the environment alone determines behaviour, Bandura (1986) proposed the concept of **reciprocal determinism**, in which cognitive processes, behaviour, and context all interact, each factor influencing and being influenced by the others simultaneously. ***Cognitive factors*** refer to all characteristics previously learned, including beliefs, expectations, and personality characteristics. ***Behaviour*** refers to anything that we do that may be rewarded or punished. Finally, the context in which the behaviour occurs refers to the ***environment*** or ***situational factors***, which includes rewarding and punishing stimuli. Consider, for example, that you're at a festival, and one of the attractions is bungee jumping from a bridge. Do you do it? Your answer may depend on behaviour — your past and current learning experiences with bungee jumping, situation — whether there are rewards for going, such as peer approval, and cognition — your beliefs about whether you will get rewarded for going and how well you can bungee jump. According to reciprocal determinism, all of these factors are in play.

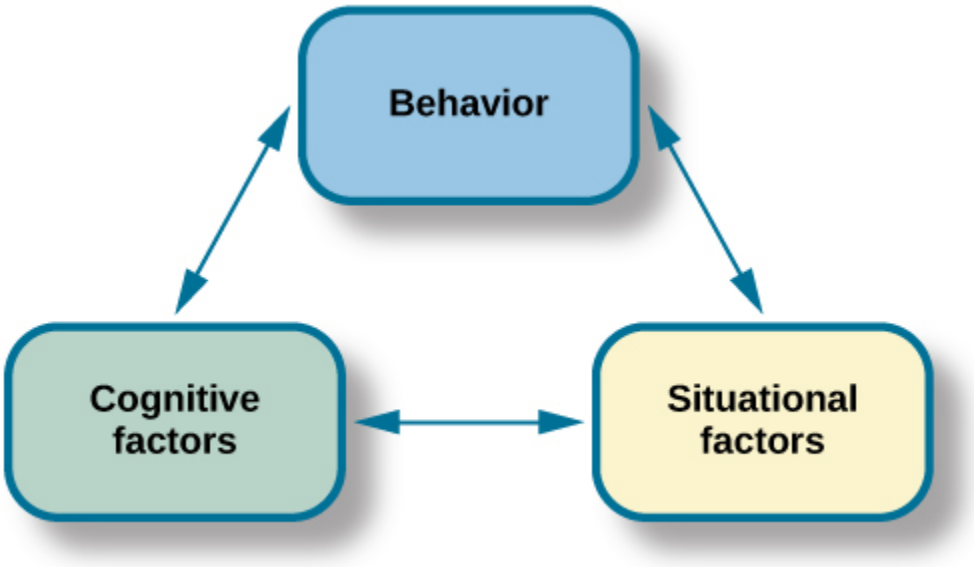

Figure PE.7. Reciprocal determinism*. Albert Bandura proposed the idea of reciprocal determinism in which our behaviour, cognitive processes, and situational context all influence each other.* ***Alt. text:*** *Three boxes are arranged in a triangle. There are lines with arrows on each end connecting the boxes. The boxes are labeled "Behaviour," "Situational factors," and "Personal factors".* ***Source:*** *Figure P.11 as found in Introduction to Psychology & Neuroscience (2nd Edition) is licensed under a CC BY 4.0 Licence.*

Bandura's key contribution was the idea that learning could be vicarious. We learn by observing someone else's behaviour and its consequences, which Bandura called **observational learning**. He felt that this type of learning also plays a part in the development of our personality. Just as we learn individual behaviours, we learn new behaviour patterns when we see them performed by other people or **models**. Drawing on the behaviourists' ideas about reinforcement, Bandura suggested that whether we choose to replicate a model's behaviour depends on whether we see the model reinforced or punished. Through observational learning, we come to learn what behaviours are rewarded in our culture, and we also learn to inhibit socially unacceptable behaviours by seeing what behaviours are punished.

Self-efficacy is a core cognitive factor that influences learning and personality development (Bandura, 1977, 1995). **Self-efficacy** refers to our level of confidence in our own ability to fulfill a task, developed through our social experiences. Self-efficacy affects how we approach challenges and reach goals. People who have high self-efficacy believe that their goals are within reach, maintain a positive view of challenges by seeing them as tasks to be mastered, develop a deep interest in and strong commitment to the activities in which they are involved, and quickly recover from setbacks. Conversely, people with low self-efficacy avoid challenging tasks because they doubt their ability to be successful, tend to focus on failure and negative outcomes, and lose confidence in their abilities if they experience setbacks. Feelings of self-efficacy are specific to certain situations. For instance, a student might feel confident in their ability in English class but much less so in math class, or vice versa.

Julian Rotter and Locus of Control

Julian Rotter (1966) proposed the concept of locus of control, another cognitive factor that affects learning and personality development. Distinct from self-efficacy, which involves our belief in our own abilities, **locus of control** refers to our beliefs about the power we have over our lives. In Rotter's view, people possess either an internal or an external locus of control. Those of us with an **internal locus of control** tend to believe that most of our outcomes are the direct result of our efforts. Those of us with an **external locus of control** tend to believe that our outcomes are outside of our control and are instead controlled by other people, luck, or chance. For example, say you didn't spend much time studying for your psychology test and went out to dinner with friends instead. When you receive your test score, you see that you earned a D. If you possess an internal locus of control, you will most likely admit that you failed because you didn't spend enough time studying and decide to study more for the next test. On the other hand, if you possess an external locus of control, you may conclude that the test was too hard and not bother studying for the next test because you figure you

will fail it anyway. Researchers have found that people with an internal locus of control perform better academically and are better able to cope with stress than people who have an external locus of control (Benassi et al., 1988; Lefcourt et al., 1981; Whyte, 1977, 1978). You may take the **locus of control test**.

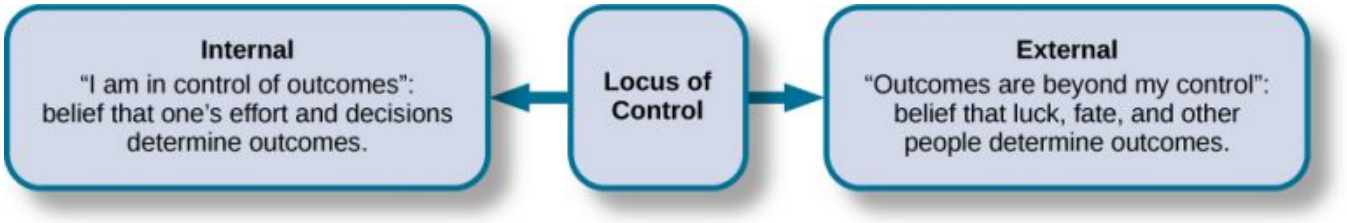

Figure PE.8. Locus of control. *Locus of control occurs on a continuum from internal to external.* ***Alt. text:*** *Chart of locus of control with a central box pointing left to "Internal" (belief outcomes depend on one's effort and decisions) and right to "External" (belief outcomes depend on luck, fate, or others).* ***Source:*** *Figure P.12 as found in Introduction to Psychology & Neuroscience (2nd Edition) is licensed under a CC BY 4.0 Licence.*

Walter Mischel and Self-Control

Walter Mischel (1930–2018) argued that understanding personality ought to be understood in the context of situations in which it is used. According to Mischel, it's not really your personality that stays the same, but rather the way you act in similar situations that tends to happen over and over again (Mischel, 1968). If we look closely at people's behaviour across many different situations, the consistency is really not that impressive. For example, children who cheat on tests at school may steadfastly follow all rules when playing games and may never tell a lie to their parents. Mischel thought that personality psychologists should focus on people's unique reactions to specific situations. For example, some kids might be more likely to cheat on a test when the chances of getting caught are low and the rewards for cheating are high. On the other hand, some kids might be drawn to the excitement of taking a risk, even if the rewards aren't that great. So, a child's actions are influenced by how they see the risks and rewards in that moment, as well as their own abilities and values. This is why the same child might act very differently in different situations. Mischel thought that specific behaviours are shaped by the interaction between the unique features of a situation, how a person perceives it, and their abilities to handle it. Mischel argued that these social-cognitive processes are what make people react consistently when the situations are similar.

Among Mischel's most notable contributions were his ideas on self-control. **Self-control** refers to the ability to control your impulses, emotions and behaviours in order to achieve long-term goals. When we talk about self-control, we tend to think of it as the ability to delay gratification. Would you be able to resist getting a small reward now in order to get a larger reward later? This is the question Mischel investigated in his marshmallow test.

In the marshmallow study, Mischel and colleagues (1972) placed a preschool child in a room with one marshmallow on the table. The child was told that they could either eat the marshmallow now or wait until the researcher returned to the room, and then they could have two marshmallows. This was repeated with hundreds of preschoolers. What the researchers found was that young children differed in their degree of self-control. Mischel and colleagues continued to follow this group of preschoolers through high school, and what do you think they discovered? The children who had more self-control in preschool — that is, the ones who waited for the bigger reward — were more successful in high school. They had higher SAT scores, had positive peer relationships, and were less likely to have substance abuse issues; as adults, they also had more stable marriages (Mischel et al., 1989, 2011).

A more recent study using a larger and more representative sample found associations between early delay of gratification (Watts et al., 2018) and measures of achievement in adolescence. However, researchers also found that the associations were not as strong as those reported during Mischel's initial experiment and were quite sensitive to situational factors such as early measures of cognitive capacity, family background, and home environment. This research suggests that consideration of situational factors is important to better understand personality.

In the years after the publication of Mischel's (1968) book, debates raged about whether personality truly exists, and if so, how it should be studied. It is certainly true, as Mischel pointed out, that a person's behaviour in one specific situation is not a good guide to how that person will behave in a very different specific situation. Someone who is talkative at a party may be quiet in class. However, this doesn't mean that personality isn't real, and it doesn't mean that people's behaviour is completely determined by situations. Personality traits can give an idea of how someone usually acts, but they might not be great at telling us exactly how a person will act in a specific moment. So, to understand traits better, we have to look at behaviours over time and in many different situations. In the next section, we'll talk about trait theories that try to explain the lasting qualities that influence how people act in lots of different situations.

Traits, Temperaments, and Heritability

AMELIA LIANGZI SHI

Trait theorists believe personality can be understood with a set of basic traits. **Personality traits** reflect people's characteristic patterns of thoughts, feelings, and behaviours. Personality traits imply consistency and stability; for example, someone who scores high on extraversion is expected to be sociable in different situations and over time. Do you tend to be sociable or shy? Passive or aggressive? Optimistic or pessimistic? Moody or even-tempered? These personality traits reflect basic dimensions on which people differ. According to trait psychologists, there are a limited number of these dimensions — dimensions like extraversion, conscientiousness, or agreeableness — and each individual falls somewhere on each dimension, meaning that they could be low, medium, or high on any specific trait.

An important feature of personality traits is that they reflect continuous distributions rather than distinct personality types. This means that when personality psychologists talk about introverts and extraverts, they are not really talking about two distinct types of people who are completely and qualitatively different from one another. Instead, they are talking about people who score relatively low or relatively high along a continuous distribution (i.e., a continuum). In fact, when personality psychologists measure traits like extraversion, they typically find that most people score somewhere in the middle, with smaller numbers showing more extreme levels. From a survey of thousands of people, the distribution of extraversion scores indicates that most people report being moderately, but not extremely, extraverted, with fewer people reporting very high or very low scores.

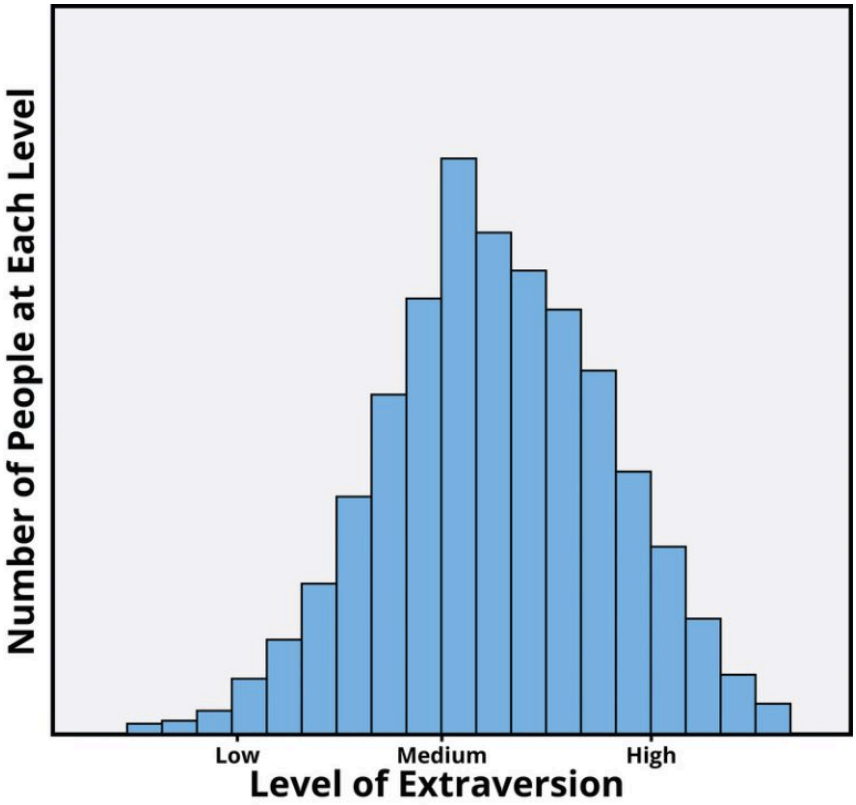

Figure PE.9. Extraversion scores. *The distribution of extraversion scores in a sample shows that most people score towards the middle of the extraversion scale, with fewer people who are highly extraverted or highly introverted.* ***Alt. text:*** *A bar graph that depicts the number of people at different levels of extraversion, ranging from low to high. The highest number of people have a middle level of extraversion.* ***Source:*** *Figure 14.8 as found in Psychology – 1st Canadian Edition is licensed under a CC BY-NC-SA Licence.*

Early trait theorists tried to describe all human personality traits. For example, one trait theorist, Gordon Allport (Allport & Odbert, 1936), found 4,500 words in the English language that could describe people. He organised these personality traits into three categories: cardinal traits, central traits, and secondary traits. A **cardinal trait** is one that dominates your entire personality, and hence your life, such as Ebenezer Scrooge's greed. Cardinal traits are not very common: few people have personalities dominated by a single trait. Instead, our personalities typically are composed of multiple central traits. **Central traits** are those that make up our personalities, such as loyal, kind, agreeable, friendly, sneaky, wild, and grouchy. Secondary traits are those that are not quite as obvious or as consistent as central traits. They are present under specific circumstances and include preferences and attitudes. For example, one person gets angry when people try to tickle them; another can only sleep on the left

side of the bed; and yet another always orders their salad dressing on the side. And you — although not normally an anxious person — feel nervous before making a speech in front of your English class.

The 16 Personality Factors

In an effort to make the list of traits more manageable, Raymond Cattell (1957) identified 16 factors or dimensions of personality:

- warmth,
- reasoning,
- emotional stability,
- dominance,
- liveliness,
- rule-consciousness,
- social boldness,
- sensitivity,
- vigilance,
- abstractedness,
- privateness,
- apprehension,
- openness to change,
- self-reliance,
- perfectionism, and
- tension.

He developed a personality assessment based on these 16 factors, called the 16PF. Instead of a trait being present or absent, each dimension is scored over a continuum, from high to low. For example, your level of warmth describes how warm, caring, and nice to others you are. If you score low on this index, you tend to be more distant and cold. A high score on this index signifies you are supportive and comforting. Take **this assessment** based on Cattell's 16PF, to see which traits may dominate your personality.

Temperament: Extroversion-Stability Model

Psychologists Hans and Sybil Eysenck focused on **temperament**, the inborn, genetically-based personality differences. The Eysencks (Eysenck & Eysenck, 1963) viewed people as having two specific personality dimensions: **extroversion/introversion** and **neuroticism/stability**. They believed personality is largely governed by biology.



Figure PE.10. Hans and Sybil Eysenck. *Hans and Sybil Eysenck believed that our personality traits are influenced by our genetic inheritance.* ***Alt. text:*** *A photograph shows Hans and Sybil Eysenck together.* ***Source:*** *Hans and Sybil Eysenck by Sirswindon is licensed under a CC BY 3.0 Licence.*

According to their theory, people high on the trait of **extroversion** are sociable and outgoing, and readily connect with others. By contrast, people high on **introversion** experienced too much sensory stimulation and arousal, which made them want to seek out quiet settings, engage in solitary behaviours, and limit their interactions with others. In the neuroticism/stability dimension, people high on **neuroticism** tend to be anxious; they tend to have an overactive sympathetic nervous system and, even with low stress, their bodies and emotional state tend to go into a flight-or-fight reaction. In contrast, people high on **stability** tend to need more stimulation to activate their flight-or-fight reaction and are considered more emotionally stable.

More recently, Jeffrey Gray suggested that these two broad traits are related to fundamental reward and avoidance systems in the brain. Extraverts might be motivated to seek reward, and thus exhibit assertive, reward-seeking behaviour, whereas people high in neu-

roticism might be motivated to avoid punishment, and thus may experience anxiety as a result of their heightened awareness of the threats in the world around them (Gray, 1981). This model has since been updated (Gray & McNaughton, 2000).

Based on these two dimensions, the Eysencks' theory divides people into four quadrants. These quadrants are sometimes compared with the four temperaments described by the Greeks: melancholic, choleric, phlegmatic, and sanguine.

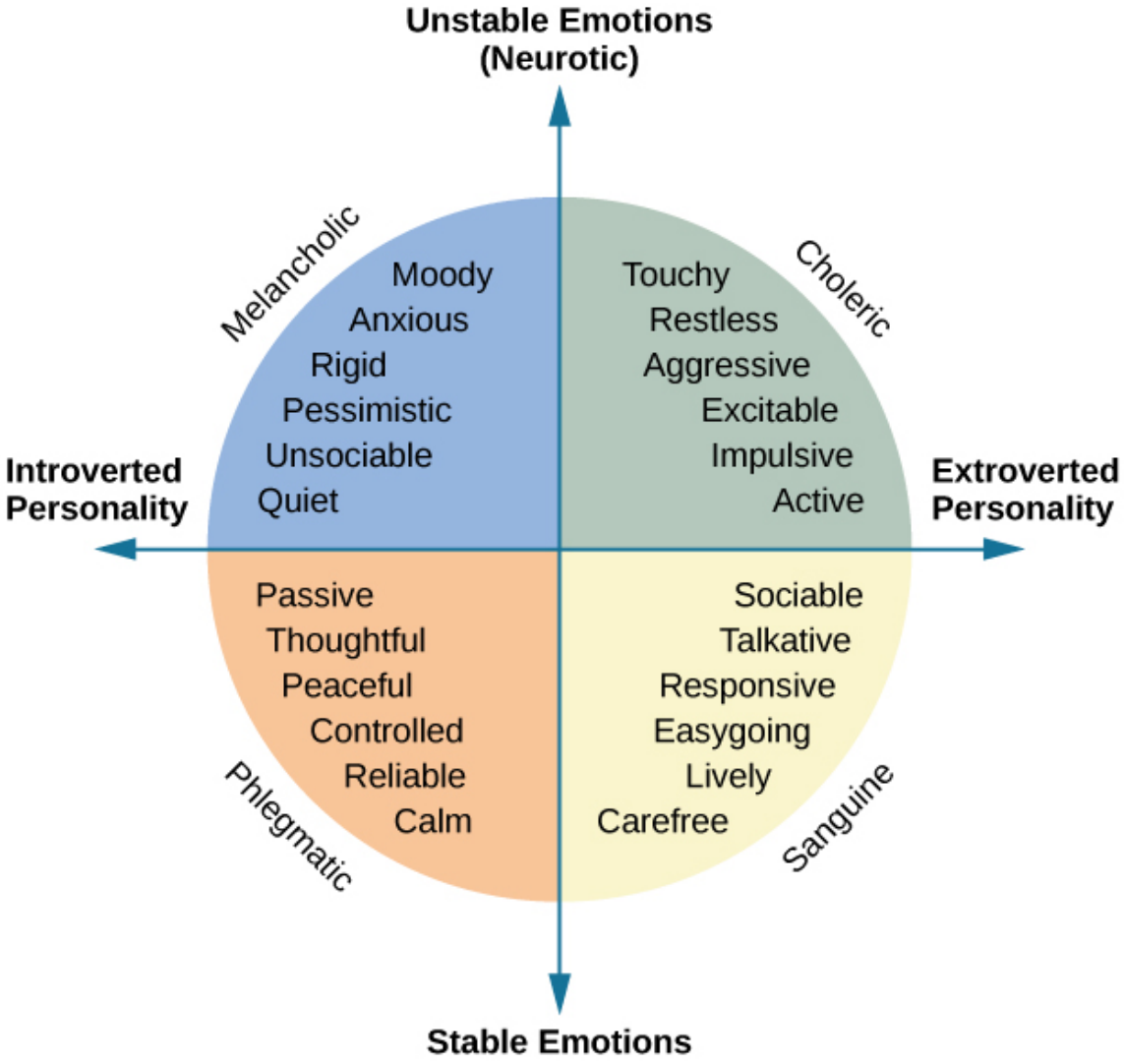

Figure PE.11. Two personality factors. *The Eysencks described two factors to account for variations in our personalities: extroversion/introversion and emotional stability/instability.* ***Alt. text:*** *Circle diagram of personality types divided into four quadrants. Axes are labeled unstable vs. stable emotions and introverted vs. extroverted. Quadrants are choleric (touchy, aggressive, excitable), sanguine (sociable, lively, carefree), phlegmatic (passive, calm, reliable), and melancholic (moody, anxious, quiet).* ***Source:*** *Figure 11.13 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Later, the Eysencks added a third dimension: psychoticism versus superego control. In this dimension, people who are high on **psychoticism** tend to be independent thinkers, cold, nonconformists, impulsive, antisocial, and hostile, whereas people who are high on **superego control** tend to have high impulse control — they are more altruistic, empathetic, cooperative, and conventional (Eysenck et al., 1985).

The Big Five

While Cattell's 16 factors may be too broad, the Eysencks' two-factor system has been criticized for being too narrow. Another personality theory, called the **Big Five**, effectively hits a middle ground, with its five factors referred to as the Big Five personality factors. It is the most popular theory in personality psychology today and the most accurate approximation of the basic personality dimensions (Funder, 2001). The five factors are: openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism. A helpful way to remember the factors is by using the mnemonic CANOE.

The following YouTube link shows Gabriela Cintron's student-made video, which cleverly describes common behavioural characteristics of the Big Five personality traits through song:

Watch this video: **5 Factors of Personality (OCEAN Song) (3 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=1005#oembed-1***

"5 Factors of Personality (OCEAN Song)" video by Vy Nguyen is licensed under the Standard YouTube Licence.

In the Big Five, each person has each factor, but they occur along a continuum.

1. **Openness to experience** is characterised by imagination, feelings, actions, and ideas. People who score high on this factor tend to be curious and have a wide range of interests.
2. **Conscientiousness** is characterised by competence, self-discipline, thoughtfulness, and achievement-striving (goal- directed behaviour). People who score high on this factor are hardworking and dependable. Numerous studies have found a positive correlation between conscientiousness and academic success (Akomolafe, 2013; Chamorro-Premuzic & Furnham, 2008; Conrad & Patry, 2012; Noftle & Robins, 2007; Wagerman & Funder, 2007).

3. **Extroversion** is characterised by sociability, assertiveness, excitement-seeking, and emotional expression. People who score high on this factor are usually described as outgoing and warm. Not surprisingly, people who score high on both extroversion and openness are more likely to participate in adventure and risky sports due to their curious and excitement-seeking nature (Tok, 2011).
4. **Agreeableness** refers to the tendency to be pleasant, cooperative, trustworthy, and good-natured. People who score low on agreeableness tend to be described as rude and uncooperative, yet one recent study reported that men who scored low on this factor actually earned more money than men who were considered more agreeable. This negative correlation between agreeableness and income was not supported in women (Judge et al., 2012).
5. **Neuroticism** refers to the tendency to experience negative emotions. People high on neuroticism tend to experience emotional instability and are characterised as angry, impulsive, and hostile. People reporting high levels of neuroticism often report feeling anxious and unhappy (Watson & Clark,1984). In contrast, people who score low in neuroticism tend to be calm and even-tempered.

The Big Five personality factors each represent a range between two extremes. In reality, most of us tend to lie somewhere midway along the continuum of each factor, rather than at polar ends. It's important to note that the Big Five factors are relatively stable over our lifespan, with some tendency for the factors to increase or decrease slightly. Researchers have found that conscientiousness increases through young adulthood into middle age, as we become better able to manage our personal relationships and careers (Donnellan & Lucas, 2008). Agreeableness also increases with age, peaking between 50 to 70 years (Terracciano et al., 2005). Neuroticism and extroversion tend to decline slightly with age (Donnellan & Lucas, 2008; Terracciano et al., 2005). Additionally, the Big Five factors have been shown to exist across ethnicities, cultures, and ages, and may have substantial biological and genetic components (Jang et al., 1996, 2006; McCrae & Costa, 1997; Schmitt et al., 2007).

Check out the link so you can take the fave factors test to see where you stand in terms of your Big Five scores. **Big 5 personality test**

Trait theorists agree that personality traits are important in understanding behaviour, but there are still debates on the exact number and composition of the traits that are most important. For example, Michael Ashton and Kibeom Lee (2005) argued that one important class of individual differences was omitted from the Big Five model. Their HEXACO model adds honesty-humility as a sixth dimension of personality. People high in **honesty-humility** are sincere, fair, and modest, whereas those low in this trait are manipulative, narcissistic, and self-centred. You may go to the **HEXACO website** to learn more about the HEXACO model and **download** the scales in different languages.

Adaptive Traits

Like trait theorists, evolutionary psychologists look at personality traits that are universal. In this view, adaptive differences have evolved and then provide a survival and reproductive advantage. David Buss (1991) has identified five adaptive traits:

1. **Surgency** indicates a person's preference in a hierarchy. A surgent person tends to dominate and lead others.
2. **Agreeableness** marks a person's willingness to cooperate; however, it is not always maladaptive to be selfish and hostile toward others.
3. **Conscientiousness** signals to others whom we can trust and whom we can depend on; however, being less conscientious and dependent on others is not maladaptive.
4. **Emotional stability** indicates one's ability to handle stress. Although hypersensitivity to stress may disrupt everyday functioning and thus is less favoured, vigilance and anxiety may be adaptive and necessary to avoid harm and threat.
5. In ancestral times, **openness** (or intellect) might be expressed in one's willingness to explore new territories for food and shelter and one's creativity in solving problems.



Figure PE.12. Algerian desert petroglyph. *We inherited some personality traits from our ancestors because those traits were useful for them to solve survival and reproductive problems.* ***Alt. text:*** *Rock art depicting people hunting.* ***Source:*** *Algerian Desert by Gruban is licensed under a CC BY-SA 2.0 Generic licence.*

Heritability of Traits and Temperament

Most contemporary psychologists believe temperament has a biological basis due to its appearance very early in our lives (Rothbart, 2011). Thomas and Chess (1977) found that babies could be categorised into one of three temperaments: easy, difficult, or slow to warm up. Mary Rothbart and colleagues proposed two temperaments in adulthood — reactivity and self-regulation (Rothbart et al., 2000). **Reactivity** refers to how we respond to new or challenging environmental stimuli; **self-regulation** refers to our ability to control that response (Rothbart et al., 2011). For example, one person may immediately respond to new stimuli with a high level of anxiety, while another barely notices it.

In the field of behavioural genetics, the Minnesota Study of Twins Reared Apart — a well-known study of the genetic basis for personality — conducted research with twins from 1979 to 1999. In studying 350 pairs of twins, including pairs of identical and fraternal twins reared together and apart, researchers found that identical twins, whether raised together or apart, have very similar personalities (Bouchard, 1994; Bouchard et al.,1990; Segal, 2012). These findings suggest the heritability of some personality traits. **Heritability** refers to the proportion of difference among people that is attributable to genetics. Some of the traits that the study reported as having more than a 0.50 heritability ratio include leadership, obedience to authority, a sense of well-being, alienation, resistance to stress, and fearfulness. The implication is that some aspects of our personalities are largely controlled by genetics; however, it's important to point out that traits are not determined by a single gene, but by the complex relationship among the various genes, as well as a variety of random factors. Genetic factors work with environmental factors to create personality. Having a given pattern of genes does not necessarily mean that a particular trait will develop because some traits might occur only in some environments. For example, a person may have a genetic variant that is known to increase their risk for developing emphysema from smoking, but if that person never smokes, then emphysema most likely will not develop.

One question that is exceedingly important for the study of personality concerns the extent to which it is the result of nature or nurture. If nature is more important, then our personalities will form early in our lives and may be difficult to change later. If nurture is more important, then our experiences are likely to be particularly important, and our personalities may change in response to experiences over time. While identical twins Paula Bernstein and Elyse Schein turned out to be very similar even though they had been raised separately, those traits that they share are likely to be the result of genes, but environments, particularly those that are unique to individuals, are important in shaping personality as well. In the next section, we will see how personality can be influenced by environments.

Personality and Culture

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As you have learned in this chapter, personality is shaped by both genetic and environmental factors. The culture in which you live is one of the most important environmental factors that shapes your personality (Triandis & Suh, 2002). The term **culture** refers to all of the beliefs, customs, art, and traditions of a particular society. Culture is transmitted to people through language as well as through the modelling of culturally acceptable and unacceptable behaviours that are either rewarded or punished (Triandis & Suh, 2002).

Why might it be important to consider cultural influences on personality? Western ideas about personality may not be applicable to other cultures (Benet-Martínez & Oishi, 2008). On the other hand, evolutionary psychologists argue that the five factors in the Big Five reflect universal responses to environmental challenges that existed throughout humans' ancestral environment and over millennia. According to this view, all humans should share some universal personality traits.

Two approaches that can be used to study personality in a cultural context are the cultural-comparative approach and the Indigenous approach. Because ideas about personality have a Western basis, the **cultural-comparative approach** seeks to test Western ideas about personality in other cultures to determine whether they can be generalised and if they have cultural validity (Cheung et al., 2011). For example, recall from the trait perspective discussed earlier in this chapter that researchers used the cultural-comparative approach to test the universality of McCrae and Costa's five-factor model.

Asian cultures are more collectivist, and people in these cultures tend to be less extroverted. In contrast, people in Central and South American cultures tend to score higher on openness to experience, whereas Europeans score higher on neuroticism (Benet-Martínez & Karakitapoğlu-Aygün, 2003). Individualist cultures and collectivist cultures place emphasis on different basic values. People who live in individualist cultures tend to believe that independence, competition, and personal achievement are important. Individuals in Western nations such as the United States, England, and Australia score high on individualism (Oyserman et al., 2002). People who live in collectivist cultures value social harmony, respectfulness, and group needs over individual needs. These values influence personality. For example, Kuo-Shu Yang (2006) found that people in individualist cultures displayed more personally oriented personality traits, whereas people in collectivist cultures displayed more socially oriented personality traits.

The **Indigenous approach** came about in reaction to the dominance of Western approaches to the study of personality in non-Western settings (Cheung et al., 2011). Personality traits may be understood differently or have unique expressions in Indigenous cultures,

possibly influenced by language and cultural contexts (Heine & Buchtel, 2009). The Indigenous model emphasises developing assessment instruments based on constructs relevant to the specific culture being studied. This approach involves translating personality assessment instruments into other languages, considering cultural perspectives, and incorporating Indigenous views on personality traits and development.

Jacob Burack, Erin Gurr, Emily Stubbert, and Vanessa Weva (2019) argue that Indigenous identity in Canada is poorly understood because there is enormous variety in the culture, language, and traditions of Indigenous communities in Canada. The history before, during, and after the colonization by Europeans differs between Indigenous communities, as do social and economic conditions, resources, and geography. Indigenous Peoples in Canada share a history of colonization, oppression, displacement from traditional territories, forced cultural assimilation, and genocide. The Canadian government and its representatives subjected Indigenous communities to forced relocation, family separation, and residential schools which were frequent sources of psychological, sexual, physical, and emotional abuse. Thus, the collective history, trauma, and resilience of Indigenous Peoples in Canada provides multiple sources of influence on personality development that may have intergenerational effects.

As well as the influence of collective historical effects, personality is also shaped within one's own Indigenous community and its understanding of personality development, which may include concepts unfamiliar to people outside of that culture. Instead of thinking that Indigenous experience is all the same, to understand personality development, we need to know about the particular culture and its shared history (Burack et al., 2019). Furthermore, in the development of personality, Indigenous youth must navigate a relationship with mainstream Canadian society and its environmental influences. Taken together, understanding personality in a culture different to one's own requires a careful and systematic study of all of the historical, shared, and individual environmental influences that shape personality. With respect to Canadian Indigenous communities, this requires a willingness to seek to understand the consequences of a long history of colonization, oppression, and resilience that followed an even longer history of self-sufficiency, sovereignty, and cultural and linguistic traditions.

Keeping in mind the limitations of personality assessment tools rooted in Western theories, let's explore some of these widely used assessments in the following section.

Personality Assessment

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Personality testing is often used to screen applicants for employment and job training. Personality tests are also used in criminal cases, custody battles, and assessments of psychological disorders. This section explores the best known among the many different types of personality tests and discusses the strengths and criticisms of each type. Tests are often categorized into two groups – objective tests and projective tests.

Objective tests represent the most familiar and widely used approach to assessing personality. Objective tests involve administering a standard set of items, each of which is answered using a limited set of response options (e.g., true or false; strongly disagree, slightly disagree, slightly agree, strongly agree). Responses to these items then are scored in a standardized, predetermined way. For example, self-ratings on items assessing talkativeness, assertiveness, sociability, adventurousness, and energy can be summed up to create an overall score on the personality trait of extraversion.

It must be emphasized that the term "objective" refers to the method that is used to *score* a person's responses, rather than to the responses themselves.

Self-Report Inventories

Personality inventories are objective, standardized, and norm-based tests used to assess personality. They typically use multiple-choice items or numbered scales, which represent a range from 1, signalling strong disagreement, to 5, identifying strong agreement. They often are called **Likert scales** after their developer, Rensis Likert (1932).

	Strongly Disagree	Somewhat Disagree	No Opinion	Somewhat Agree	Strongly Agree
I am easygoing.	O	O	O	O	O
I have high standards.	O	O	O	O	O
I enjoy time alone.	O	O	O	O	O
I work well with others.	O	O	O	O	O
I dislike confrontation.	O	O	O	O	O
I prefer crowds over intimacy.	O	O	O	O	O

Figure PE.13. Likert-type scale. *If you've ever taken a survey, you are probably familiar with Likert-type scale questions. Most personality inventories employ these types of response scales.* ***Alt. text:*** *Example Likert scale survey with statements like "I am easygoing" and five response options from strongly disagree to strongly agree.* ***Source:*** *Figure 11.16 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Minnesota Multiphasic Personality Inventory (MMPI)

One of the most widely used personality inventories is the **Minnesota Multiphasic Personality Inventory (MMPI)**, first published in 1943, with 504 true-false questions, and updated to the MMPI-2 in 1989, with 567 questions. In 2020, the test was again revised to the MMPI-3, with only 335 questions. Responses are scored to produce a clinical profile composed of 52 scales. The original MMPI was developed using an **empirical** or **criterion keying approach**, with clinical scales derived by selecting items that were endorsed by patients known to have been diagnosed with certain pathologies. The original MMPI was based on a small, limited sample, composed mostly of Minnesota farmers and psychiatric patients; the revised inventories were based on a more representative, national sample to allow for better standardization.

Watch this video: **Advantages of the MMPI-3 (1.5 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=1014#oembed-1***

"Advantages of the MMPI-3" video by Pearson Assessments US is licensed under the Standard YouTube Licence.

	True	False
1. I like gardening magazines.	O	O
2. I am unhappy with my sex life.	O	O
3. I feel like no one understands me.	O	O
4. I think I would enjoy the work of a teacher.	O	O
5. I am not easily awakened by noise.	O	O

Figure PE.14. True-false questions. *These true-false questions resemble the kinds of questions you would find on the MMPI. Although the MMPI was originally developed to assist in the clinical diagnosis of psychological disorders, it is now also used for occupational screening, such as in law enforcement, and in college, career, and marital counselling (Ben-Porath & Tellegen, 2008).* ***Alt. text****: Sample True/False questionnaire with items such as liking gardening magazines, dissatisfaction with sex life, feeling misunderstood, interest in teaching, and ease of waking from noise.* ***Source:*** *Figure 11.17 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

In addition to clinical scales, the tests also have validity and reliability scales. Recall the concepts of reliability and validity from the research method chapters. One of the validity scales, the Lie Scale, or "L" Scale, consists of 15 items and is used to decide whether the respondent is "faking good" (i.e., presenting themselves in a favourable light). For example, if someone responds "yes" to a number of unrealistically positive items such as "I have never told a lie," they may be trying to "fake good" or appear better than they actually are.

Reliability tests an instrument's consistency over time, assuring that if you take the MMPI-3 today and then again five years later, your two scores will be similar. Beutler and colleagues (1988) gave the MMPI to newly recruited police officers and then to the same police

officers two years later. After two years on the job, police officers' responses indicated an increased vulnerability to alcoholism, somatic symptoms (i.e., vague, unexplained physical complaints), and anxiety. When the test was given an additional two years later — four years after starting on the job — the results suggested high risk for alcohol-related difficulties.

NEO Personality Inventory

Unlike MMPI, which was developed with an empirical approach, Paul Costa and Robert McCrae created NEO-PI questions based on the Big Five model. The NEO inventory originally covered only three traits: Neuroticism, Extraversion, and Openness. Later on, they added two more: Agreeableness and Conscientiousness (Costa & McCrae, 1985). Each trait or "domain" contains six "facets". The inventory has been updated over time. In 2005, McCrae and colleagues made NEO-PI-3, which is better for adolescents and adults with lower reading levels. The NEO-PI-3 has 240 personality questions and some validity questions. Instead of presenting true or false items like in MMPI, NEO-PI uses a 5-point Likert scale (from strongly disagree to strongly agree). NEO-PIs are highly reliable and valid. They have been used in different places for counseling, hiring, and education (McCrae et al., 2005).

Domains and facets measured by the NEO-PI-3:

- **Extraversion (E) facets**
  - E1: Warmth
  - E2: Gregariousness
  - E3: Assertiveness
  - E4: Activity
  - E5: Excitement-Seeking
  - E6: Positive Emotions
- **Agreeableness (A) facets**
  - A1: Trust
  - A2: Straightforwardness
  - A3: Altruism
  - A4: Compliance
  - A5: Modesty
  - A6: Tender-Mindedness
- **Neuroticism (N) facets**
  - N1: Anxiety
  - N2: Angry Hostility
  - N3: Depression
  - N4: Self-Conciousness
  - N5: Impulsiveness
  - N6: Vulnerability
- **Openness (O) facets**
  - O1: Fantasy
  - O2: Aesthetics
  - O3: Feelings
  - O4: Actions
  - O5: Ideas
  - O6: Values
- **Conscientiousness (C) facets**
  - C1: Competence
  - C2: Order
  - C3: Dutifulness
  - C4: Achievement Striving

- C5: Self-Discipline
- C6: Deliberation

Informant ratings

Another approach is to ask someone who knows a person well to describe his or her personality characteristics. In the case of children or adolescents, the informant is most likely to be a parent or teacher. In studies of older participants, informants may be friends, roommates, dating partners, spouses, children, or bosses. Generally speaking, informant ratings are similar in format to self-ratings. As was the case with self-report, items may consist of single words, short phrases, or complete sentences. Indeed, many popular instruments include parallel self- and informant-rating versions, and it often is relatively easy to convert a self-report measure so that it can be used to obtain informant ratings.

Projective Tests

Another method for the assessment of personality is projective testing. Projective tests rely on one of Freud's defence mechanisms — projection — as a way to assess unconscious processes. In **projective tests**, a series of ambiguous cards is shown to the person being tested, who then is encouraged to project their feelings, impulses, and desires onto the cards, by telling a story, interpreting an image, or completing a sentence. The results are then interpreted by the test administrator. Many projective tests have undergone standardization procedures (e.g., Exner, 2002) and can be used to assess whether someone has unusual thoughts, a high level of anxiety, or is likely to become vulnerable to certain disorders.

Rorschach Inkblot Test

The **Rorschach Inkblot Test** was developed in 1921 by a Swiss psychologist named Hermann Rorschach. It is a series of symmetrical inkblot cards that are presented to a client by a psychologist. Upon presentation of each card, the psychologist asks the client, "What might this be?" What the test-taker sees reveals unconscious feelings and struggles (Piotrowski, 1987; Weiner, 2003). The Rorschach has been standardized and is effective in measuring depression, psychosis, and anxiety.

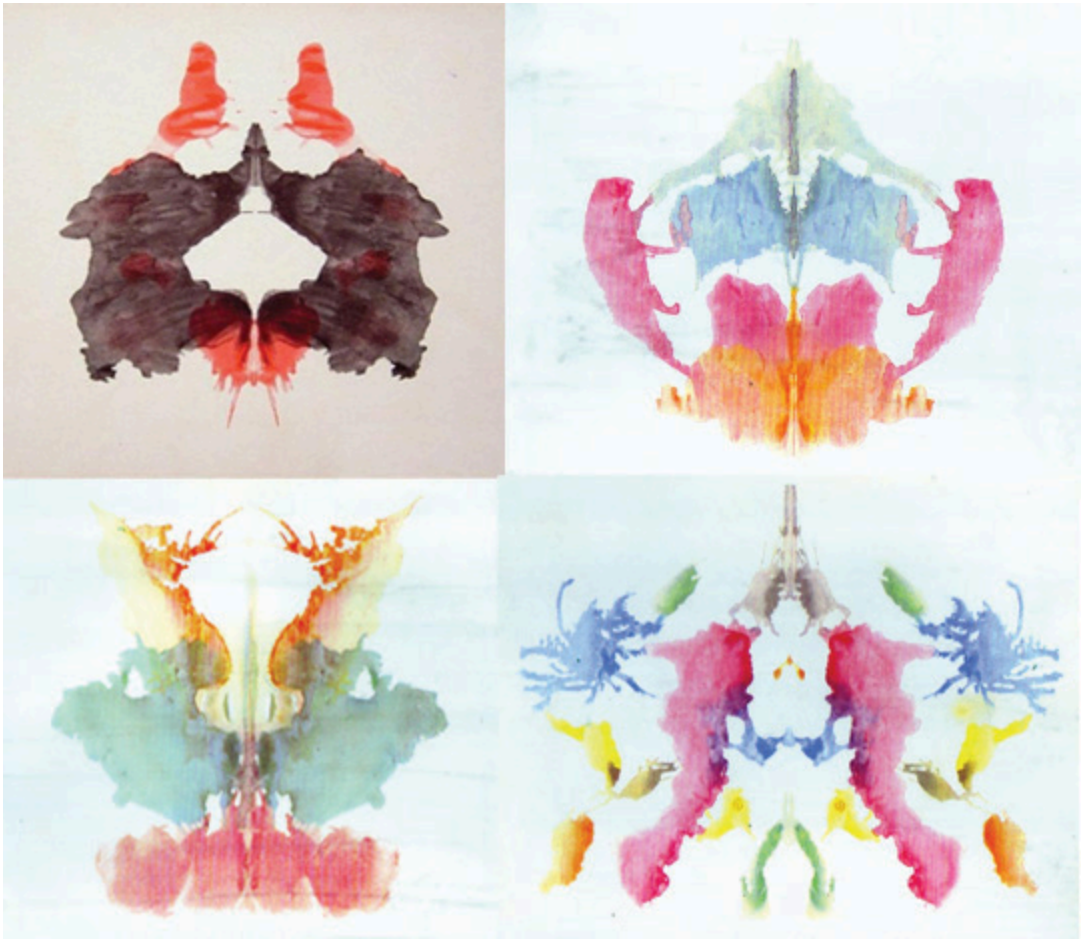

Figure PE.15. Rorschach Inkblot Test. *The Rorschach Inkblot Test is a projective test designed to assess psychological disorders.* ***Alt. text:*** *Four examples of Rorschach inkblot tests.* ***Source:*** *Rorschach Blot 02 by Hermann Rorschach is in the Public Domain; Rorschach Blot 08 by Hermann Rorschach is in the Public Domain; Rorschach Blot 09 by Hermann Rorschach is in the Public Domain; Rorschach Blot 10 by Hermann Rorschach is in the Public Domain.*

Thematic Apperception Test (TAT)

A second projective test is the **Thematic Apperception Test (TAT)**, created in the 1930s by Henry Murray and Christiana Morgan. A person taking the TAT is shown eight to twelve ambiguous pictures and is asked to tell a story about each picture. The stories give insight into their social world, revealing hopes, fears, interests, and goals. The storytelling format helps to lower a person's resistance to reveal unconscious personal details (Cramer, 2004). The TAT has been used in clinical settings to evaluate psychological disorders; more recently, it has been used in counselling settings to help clients gain a better understanding of themselves and achieve personal growth. Standardization of test administration is virtually nonex-

istent among clinicians, and the test tends to be modest to low on validity and reliability (Aronow et al., 2001; Lilienfeld et al., 2000). Despite these shortcomings, the TAT has been one of the most widely used projective tests.

Rotter Incomplete Sentences Blank (RISB)

A third projective test is the **Rotter Incomplete Sentences Blank (RISB)** developed by Julian Rotter in 1950. There are three forms of this test for use with different age groups: the school form, the college form, and the adult form. The tests include 40 incomplete sentences that people are asked to complete with one to two words in length. This test is similar to a word association test, and like other types of projective tests, it is presumed that responses will reveal desires, fears, and struggles. The RISB has been used in screening college students for adjustment problems and in career counselling (Holaday et al., 2010; Rotter & Rafferty 1950).

1. I feel...	
2. I regret...	
3. At home...	
4. My mother...	
5. My greatest worry...	

Figure PE.16. Rotter Incomplete Sentences Blank (RISB). *These incomplete sentences resemble the types of questions on the RISB. How would you complete these sentences?* ***Alt. text****: This chart provides examples of question prompts that include five incomplete sentences stacked vertically with empty space to the right of each sentence. The sentence starters include "I feel...," "I regret...," "At home...," "My mother...," and "My greatest worry..."* ***Source:*** *Figure 11.19 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Projective Tests and Cultural Diversity

For many decades, these traditional projective tests have been used in cross-cultural personality assessments. Michelle Hoy-Watkins and Valata Jenkins-Monroe (2008) pointed out that the test bias restricted how well we can measure the behaviours and lifestyles of people

from different cultural backgrounds. This happens when the questions in the test are based on information from just one culture or race, making it hard to accurately understand and assess individuals from diverse ethnocultural groups. For example, when the TAT was used with African American test-takers, the result was often shorter story length and low levels of cultural identification (Duzant, 2005). So, it was important to create different personality tests that looked into things like race, language, and how well someone has adapted to a new culture.

Contemporized-Themes Concerning Blacks Test (C-TCB)

To address this need, Robert Williams developed the first culturally specific projective test designed to reflect the everyday life experiences of African Americans. The updated version of the instrument is the **Contemporized-Themes Concerning Blacks Test (C-TCB)**, which contains 20 colour images that show scenes of African American lifestyles (Williams, 1972). When the C-TCB was compared with the TAT for African Americans, it was found that use of the C-TCB led to increased story length, higher degrees of positive feelings, and stronger identification with the C-TCB (Hoy, 1997; Hoy-Watkins & Jenkins-Moore, 2008).



Figure PE.17. Thematic Apperception Tests (TAT). *This image from the Thematic Apperception Tests (TAT) can be used in counselling settings.* ***Alt. text:*** *Illustration of two people sitting on a bench. One winds thread around her hands; the other holds the loose end and the ball of thread.* ***Source:*** *'girls with yarn drawing' by Rick&Brenda Beerhorst is published under a CC BY 2.0 Deed Attribution 2.0 Generic Licence.*

TEMAS Multicultural Thematic Apperception Test

The **TEMAS Multicultural Thematic Apperception Test** is another tool designed to be culturally relevant to minority groups, especially Hispanic youths. TEMAS stands for "Tell Me a Story," but it's also a play on the Spanish word *temas* (themes). TEMAS tries to make pictures and prompts that connect with both minority and nonminority children. It aims to show scenes that are familiar to everyone from everyday life in cities (Costantino & Malgady, 1999).

Evidence on Projective Tests

Despite their widespread use, the empirical evidence supporting the use of projective tests is mixed (Karon, 2000; Wood et al., 2003). The reliability of the measures is low because people often produce very different responses on different occasions. The validity of the measures is also questionable. There are very few consistent associations between Rorschach scores or TAT scores and most personality traits. The projective tests often fail to distinguish between people with psychological disorders and those without, and they often fail to correlate with other measures of personality or with behaviour. As such, projective tests are more useful as icebreakers to get to know a person better, to make the person feel comfortable, and to get some ideas about topics that may be of importance to that person rather than for accurately diagnosing personality.

Chapter Resources

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CHAPTER 10. PSYCHOLOGICAL DISORDERS

Elisa Niunin

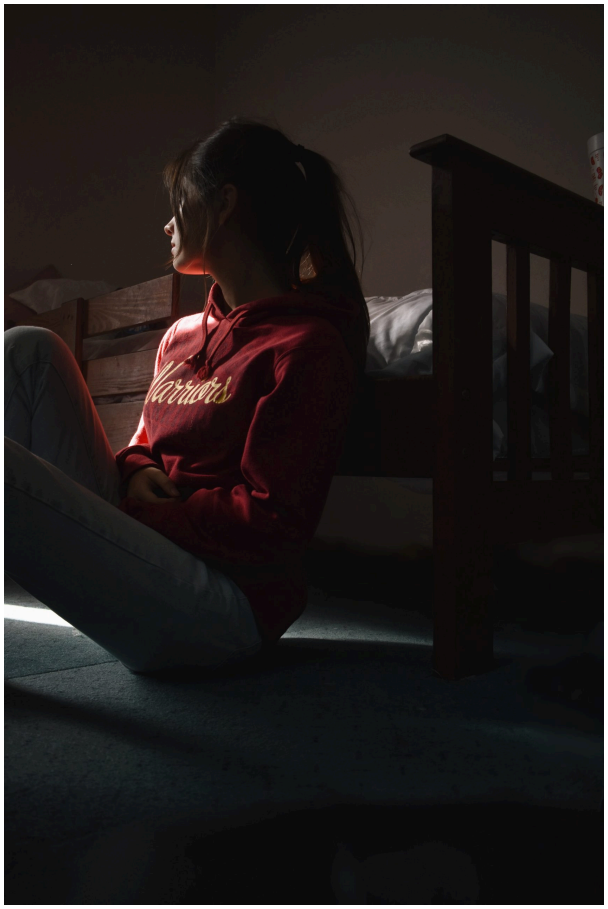

Figure PD.1. University student. *Photo by Sofia Alehandra on Pexels.*

Nearly everyone has felt sad, anxious, or happy at some point in their life. The spectrum of human emotion is far and wide, and every individual experiences the world in a different way. When those experiences lead to significant distress and impairment, they can be considered to be parts of different psychological disorders, such as schizophrenia, mood disorders, anxiety disorders, and personality disorders. While each of these groups of disorders bring together similar characteristics and put a label on them, the presentation of a disorder can differ from one person to another. In addition, these disorders and how we view them may change drastically over time. Many disorders have had changes to their descrip-

tions and classifications from the DSM-IV to the DSM-V. That is not to say that what we know about psychological disorders is unfounded. In fact, our knowledge is growing day by day, and that knowledge allows us to refine how we see and treat these disorders. It is important to be equally critical and compassionate when learning about psychological disorders. What we knew then is different from what we know now, and what we know now will most likely be different from what we will know in the future. Regardless, it is critical to remember that each person with a psychological disorder is human and should be treated as such. After all, we are more similar than we are different.

Optional pre-reading for this chapter

What are Psychological Disorders?

LEANNE STEVENS; JENNIFER STAMP; KEVIN LEBLANC (EDITORS - ORIGINAL CHAPTER); AND JESSICA MOTHERWELL MCFARLANE (EDITOR - ADAPTED CHAPTER)

Content disclosure: *Fear of spiders will be discussed in one of the examples below.*

A psychological disorder is a condition characterised by abnormal thoughts, feelings, and behaviours. **Psychopathology** is the study of psychological disorders, including their symptoms, etiology (the cause or reasons behind something), and treatment. The term psychopathology can also refer to the display or showing of something, like symptoms of a disease or a psychological disorder. Although consensus (agreement among a group of people) can be difficult, it is extremely important for mental health professionals to agree on what kinds of thoughts, feelings, and behaviours are truly abnormal in the sense that they genuinely indicate the presence of psychopathology.

Certain patterns of behaviour and inner experience can easily be labeled as abnormal and clearly signify some kind of psychological disturbance. The person who washes their hands 40 times per day and the person who claims to hear the voices of demons exhibit behaviours and inner experiences that most would regard as abnormal — beliefs and behaviours that suggest the existence of a psychological disorder. But consider the nervousness a young person feels when talking to an attractive person or the loneliness and longing for home a first-year student experiences during their first semester of college; these feelings may not be regularly present, but they fall in the range of normal.

So, what kinds of thoughts, feelings, and behaviours represent a true psychological disorder? Psychologists try to tell the difference between mental health problems and feelings or actions that are just based on a situation, unique to a person, or not usual. They want to make sure that when they say someone has a mental health issue, it's not just because of something that happened once or because someone acts in a way that's a bit different from most people.

Definition of a Psychological Disorder

Perhaps the simplest approach to conceptualising psychological disorders is to label behaviours, thoughts, and inner experiences that are atypical (unusual or not what's normally expected), distressful, dysfunctional (not working properly or normally), and sometimes even dangerous, as signs of a disorder. For example, if you ask a classmate for a date and you are rejected, you probably would feel a little dejected. Such feelings would be *normal*. If you felt extremely depressed — so much so that you lost interest in activities, had difficulty eating or sleeping, felt utterly worthless, and contemplated suicide — your feelings would be *atypical*, would deviate from the norm, and could signify the presence of a psychological disorder. Just because something is atypical, however, does not necessarily mean it is disordered. More criteria are required for a psychological disorder.

For example, only about 2-6% of people in Canada have red hair, so red hair is considered an atypical characteristic, but it is not considered disordered; it's just unusual. And it is less unusual in Scotland, where approximately 13% of the population has red hair ("DNA Project Aims," 2012). As you will learn, some disorders, although not exactly typical, are far from atypical, and the rates in which they appear in the population are surprisingly high.

If we can agree that merely being atypical is an insufficient criterion for a having a psychological disorder, is it reasonable to consider behaviour or inner experiences that differ widely from expected cultural values or expectations disordered? Using this criterion, a person who walks around a subway platform wearing a heavy winter coat in July while screaming obscenities at strangers may be considered to exhibit symptoms of a psychological disorder. Their actions and clothes violate socially accepted rules governing appropriate dress and behaviour; these characteristics are atypical.

Cultural Expectations

Violating cultural expectations is not, in and of itself, a satisfactory means of identifying the presence of a psychological disorder. Since behaviour varies from one culture to another, what may be expected and considered appropriate in one culture may not be viewed as such in other cultures. For example, returning a stranger's smile is expected in the United States because a pervasive social norm dictates that we reciprocate friendly gestures. This pressure to smile is even greater for female-presenting people. A person who refuses to acknowledge such gestures might be considered disrespectful, socially awkward — perhaps even disordered — for violating this expectation. However, such expectations are not universally shared.

Cultural expectations in Japan involve showing reserve, restraint, and a concern for maintaining privacy around strangers. Japanese people are generally unresponsive to smiles from strangers (Patterson et al., 2007). Eye contact is another example. In the United States and Europe, eye contact with others typically signifies honesty and attention. However, most Latin-American, Asian, and African cultures interpret direct eye contact as rude, confrontational, and aggressive (Pazain, 2010). Thus, someone who makes eye contact with you could be considered appropriate and respectful or brazen and offensive, depending on your culture (Figure PD.1).



Figure PD.1. Eye contact. *Eye contact is one of many social gestures that vary from culture to culture.* ***Alt. text:*** *A photograph of two people making eye contact during a conversation.* ***Source:*** *"Cory Ondrejka and Donatella Della Ratta" by Joi Ito is licensed under a CC BY 2.0 Generic Licence.*

In some cultures and societies, hallucinations (seeing, hearing or feeling things that aren't really there) are a violation of cultural expectations; a person who reports such inner experiences is readily labeled as psychologically disordered. In other cultures and societies, visions that, for example, pertain to future events may be regarded as normal experiences that are positively valued (Bourguignon, 1970).

Finally, it is important to recognise that cultural norms change over time. What might be considered typical in a society at one time may no longer be viewed this way later, e.g., fashion trends from one era may elicit quizzical looks decades later; imagine how the lace collars, broad-brimmed hats, and slashed sleeves — high-fashion in the 1600s (Figure PD.2) would go over on your campus today.



Figure PD.2. Frans Hals. *Frans Hals "The Laughing Cavalier". **Alt. text:** Painting by Frans Hals titled The Laughing Cavalier. **Source:** Public Domain Image.*

The Myth of Mental Illness

In the 1950s and 1960s, some people started to question the idea of mental illness. They thought that calling something a "mental illness" was just a way to disagree with behaviours that society didn't like (Wakefield, 1992). Thomas Szasz, a well-known psychiatrist, strongly believed in this idea. He said that society and doctors made up the idea of mental illness to control or criticise people who acted differently from what was normally accepted. Szasz wrote that what we often call symptoms of mental illness are actually just challenges people face in life (Szasz, 1960).

In his book from 1961, The Myth of Mental Illness: Foundations of a Theory of Personal Conduct, Szasz shared his negative views on mental illness and psychiatry (Oliver, 2006). He believed that real sickness could only be something discoverable through medical tests, like infections or organ problems. Since mental illness can't always be seen this way, he argued that psychological disorders aren't real illnesses (Szasz, 1961/2010).Despite Szasz's controversial opinions, it's hard to ignore the real struggles that people with mental health issues face, including their painful thoughts, feelings, and the difficult behaviours they might exhibit.

Even though Szasz's ideas were debated, they did change how people think about mental health. Now, many refer to mental health issues as "problems" instead of illnesses, which reflects Szasz's way of thinking (Buchanan-Barker & Barker, 2009). Szasz was also one of the first psychiatrists to say that being gay shouldn't be considered a mental illness. This helped to improve the rights and acceptance of gay and lesbian people (Barker, 2010). His ideas also led to changes in laws that give people in psychiatric care more control over their lives (Buchanan-Barker & Barker, 2009).

Harmful Dysfunction

If none of the criteria discussed so far is adequate by itself to define the presence of a psychological disorder, how can a disorder be conceptualised? Many efforts have been made to identify the specific dimensions of psychological disorders, yet none is entirely satisfactory. No universal definition of psychological disorder exists that can apply to all situations in which a disorder is thought to be present (Zachar & Kendler, 2007). However, one of the more influential conceptualisations was proposed by Wakefield (1992), who defined psychological disorder as a harmful dysfunction. Wakefield argued that natural internal mechanisms — that is, psychological processes honed by evolution, such as cognition, perception, and learning — have important functions, such as enabling us to experience the world the way others do and to engage in rational thought, problem solving, and communication. For example, learning allows us to associate a fear with a potential danger in such a way that the intensity of fear is roughly equal to the degree of actual danger. **Dysfunction** occurs when an internal mechanism breaks down and can no longer perform its normal function. But the presence

of a dysfunction by itself does not determine a disorder. The dysfunction must be harmful in that it leads to negative consequences for the individual or for others, as judged by the standards of the individual's culture. The harm may include significant internal anguish (e.g., high levels of anxiety or depression) or problems in day-to-day living (e.g., in one's social or work life).

Case study – Danon's Fear of Spiders

Let's talk about Danon, who is very scared of spiders. This fear is so big that it's causing problems. It's like Danon's brain isn't learning correctly that spiders aren't as scary as they feel. Because of this fear, Danon avoids places where they think spiders might be, like basements or friends' houses. Danon even left their job because they saw a spider at work and couldn't handle it. This situation shows what experts call a disorder for two reasons: (1) something inside Danon isn't working right; and (2) this issue is making life hard for them.

Just as we can have physical sickness because something in our body isn't working right, people can have mental health issues when their mind isn't working as it should causing distorted perceptions and thinking. The idea that these problems come from something going wrong inside the body is interesting because it fits with what scientists know about how our brain and body control our thoughts and feelings (Fabrega, 2007).

The American Psychiatric Association (APA) Definition

Many of the features of the harmful dysfunction model are incorporated in a formal definition of psychological disorder developed by the American Psychiatric Association (APA). According to the APA (2013), a psychological disorder is a condition that is said to consist of the following:

1. **There are significant disturbances in thoughts, feelings, and behaviours**. A person must experience inner states (e.g., thoughts and/or feelings) and exhibit behaviours that are clearly disturbed, that is, unusual, but in a negative, self-defeating way. Often, such disturbances are troubling to those around the individual who experiences them. For example, an individual who is uncontrollably preoccupied by thoughts of germs spends hours each day bathing and has inner experiences and displays behaviours that most would consider atypical and negative (disturbed) and that would likely be troubling to family members.

2. **The disturbances reflect some kind of biological, psychological, or developmental dysfunction**. Disturbed patterns of inner experiences and behaviours should reflect some flaw (dysfunction) in the internal biological, psychological and developmental mechanisms that lead to normal, healthy psychological functioning. For example, the hallucinations observed in schizophrenia could be a sign of brain abnormalities.
3. **The disturbances lead to significant distress or disability in one's life**. A person's inner experiences and behaviours are considered to reflect a psychological disorder if they cause the person considerable distress, or greatly impair their ability to function as a normal individual (often referred to as functional impairment, or occupational and social impairment). As an illustration, a person's fear of social situations might be so distressing that it causes the person to avoid all social situations (e.g., preventing that person from being able to attend class or apply for a job).
4. **The disturbances do not reflect expected or culturally approved responses to certain events**. Disturbances in thoughts, feelings, and behaviours must be socially unacceptable responses to certain events that often happen in life. For example, it is perfectly natural (and expected) that a person would experience great sadness and might wish to be left alone following the death of a close family member. Because such reactions are in some ways culturally expected, they would not be assumed to signify a mental disorder in this individual.

Some believe that there is no essential criterion or set of criteria that can definitively distinguish all cases of disorder from non-disorder (Lilienfeld & Marino, 1999). In truth, no single approach to defining a psychological disorder is adequate by itself, nor is there universal agreement on where the boundary is between disordered and not disordered. From time to time we all experience anxiety, unwanted thoughts, and moments of sadness; our behaviour at other times may not make much sense to ourselves or to others. These inner experiences and behaviours can vary in their intensity, but are only considered disordered when they are highly disturbing to us and/or others, suggest a dysfunction in normal mental functioning, and are associated with significant distress or disability in social or occupational activities.

Mood Disorders

LEANNE STEVENS; JENNIFER STAMP; KEVIN LEBLANC (EDITORS - ORIGINAL CHAPTER); AND JESSICA MOTHERWELL MCFARLANE (EDITOR - ADAPTED CHAPTER)

Blake cries all day, feels worthless and believes that life is hopeless; he cannot get out of bed. Keisha stays up all night and talks very rapidly; she went on a shopping spree in which she spent $3,000 on furniture, although she cannot afford it. Skylar recently had a baby; they feel overwhelmed, teary, anxious, and panicked practically every day since the baby was born. Skylar also believes they are a terrible parent. All these individuals demonstrate symptoms of a potential mood disorder.

Mood disorders (Figure PD.14) are characterised by severe disturbances in mood and emotions — most often depression, but also mania and elation (Rothschild, 1999). All of us experience fluctuations in our moods and emotional states, and often these fluctuations are caused by events in our lives. We become elated if our favourite team wins the World Series and dejected if a romantic relationship ends or if we lose our job. At times, we feel fantastic or miserable for no clear reason. People with mood disorders also experience mood fluctuations, but their fluctuations are extreme, distort their outlook on life, and impair their ability to function.



Figure PD.3 Mood disorders. *Mood disorders are characterised by massive disruptions in mood. Symptoms can range from the extreme sadness and hopelessness of depression to the extreme elation and irritability of mania.* ***Alt. text:*** *A photograph shows a person sitting in a fetal position.* ***Source:*** *Figure 15.15 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

The DSM-5 lists two general categories of mood disorders. Bipolar and related disorders are a group of disorders in which mania is the defining feature. **Mania** is a state of extreme elation, agitation, heightened energy, reduced need for sleep, grandiosity, impulsive behaviour, and rapid speech. When people experience mania, they may become extremely talkative, behave recklessly, or attempt to take on many tasks simultaneously. The most recognised of these disorders is bipolar disorder.

Depressive disorders are a group of disorders in which depression is the main feature. Depression is a vague term that, in everyday language, refers to an intense and persistent sadness and feelings of disconnection. Depression is a diverse and varied mood state — it consists of a broad spectrum of symptoms that range in severity. Depressed people feel sad, discouraged and hopeless. These individuals lose interest in activities once enjoyed, often experience a decrease in drives such as hunger and sex, and frequently doubt personal worth.

Depressive disorders vary by degree, but this chapter highlights the most well-known: major depressive disorder (sometimes called unipolar depression).

Major Depressive Disorder

According to the DSM-5, the defining symptoms of **major depressive disorder** include "depressed mood most of the day, nearly every day" (feeling sad, empty, hopeless, or appearing tearful to others), and loss of interest and pleasure in usual activities (APA, 2013). In addition to feeling overwhelmingly sad most of each day, people with depression will no longer show interest or enjoyment in activities that previously were gratifying, such as hobbies, sports, sex, social events, time spent with family, and so on. Friends and family members may notice that the person has completely abandoned previously enjoyed hobbies; for example, an avid tennis player who develops major depressive disorder no longer plays tennis (Rothschild, 1999).

To receive a diagnosis of major depressive disorder, one must experience a total of five symptoms for at least a two-week period; these symptoms must cause significant distress or impair normal functioning, and they must not be caused by substances or a medical condition. At least one of the two symptoms mentioned above must be present, plus any combination of the following symptoms (APA, 2013):

- significant weight loss (when not dieting) or weight gain and/or significant decrease or increase in appetite;
- difficulty falling asleep or sleeping too much;
- psychomotor agitation (the person is noticeably fidgety and jittery, demonstrated by behaviours like the inability to sit, pacing, handwringing, and pulling or rubbing of the skin, clothing, or other objects) or psychomotor retardation (the person talks and moves slowly, for example, talking softly, very little, or in a monotone);
- fatigue or loss of energy;
- feelings of worthlessness or guilt;
- difficulty concentrating and indecisiveness; and
- suicidal ideation: thoughts of death (not just fear of dying), thinking about or planning suicide, or making an actual suicide attempt.

Major depressive disorder is considered **episodic**; its symptoms are typically present at their full magnitude for a certain period of time and then gradually abate. Approximately 50%–60% of people who experience an episode of major depressive disorder will have a second episode at some point in the future; those who have had two episodes have a 70% chance of having a third episode, and those who have had three episodes have a 90%

chance of having a fourth episode (Rothschild, 1999). Although the episodes can last for months, a majority of people diagnosed with this condition (around 70%) recover within a year. However, a substantial number do not recover; around 12% show serious signs of impairment associated with major depressive disorder after 5 years (Boland & Keller, 2009). In the long-term, many who do recover will still show minor symptoms that fluctuate in their severity (Judd, 2012).

Risk Factors for Major Depressive Disorder

Major depressive disorder is a common psychiatric disorder. Around 6.6% of the US population experiences major depressive disorder each year; 16.9% will experience the disorder during their lifetime (Kessler & Wang, 2009). It is more common among women than among men, affecting approximately 20% of women and 13% of men at some point in their life (National Comorbidity Survey, 2007). The greater risk among women is not accounted for by a tendency to report symptoms or to seek help more readily, suggesting that gender differences in the rates of major depressive disorder may reflect biological and gender-related environmental experiences (Kessler, 2003).

Lifetime rates of major depressive disorder tend to be highest in North and South America, Europe, and Australia; they are considerably lower in Asian countries (Hasin, Fenton, & Weissman, 2011). The rates of major depressive disorder are higher among younger age cohorts than among older cohorts, perhaps because people in younger age cohorts are more willing to admit depression (Kessler & Wang, 2009).

A number of risk factors are associated with major depressive disorder: unemployment (including home and family caretakers); earning less than $20,000 per year; living in urban areas; or being separated, divorced, or widowed (Hasin et al., 2011). Comorbid disorders (i.e., other diseases that happen at the same time) include anxiety disorders and substance abuse disorders (Kessler & Wang, 2009).

Bipolar Disorder

A person with **bipolar disorder** (commonly known as manic depression) often experiences mood states that vacillate between depression and mania; that is, the person's mood is said to alternate from one emotional extreme to the other (in contrast to unipolar, which indicates a persistently sad mood).

To be diagnosed with bipolar disorder, a person must have experienced a manic episode at least once in their life; although major depressive episodes are common in bipolar disorder, they are not required for a diagnosis (APA, 2013). According to the DSM-5, a manic episode is characterised as a "distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased activity or energy lasting at least one week," that lasts most of the time each day (APA, 2013, p. 124). During a manic episode, some experience a mood that is almost euphoric and become excessively talkative, sometimes spontaneously starting conversations with strangers; others become excessively irritable and complain or make hostile comments. The person may talk loudly and rapidly, exhibiting flights of ideas, abruptly switching from one topic to another. These individuals are easily distracted, which can make a conversation very difficult. They may exhibit grandiosity, in which they experience inflated but unjustified self-esteem and self-confidence.

For example, they might quit a job in order to "strike it rich" in the stock market, despite lacking the knowledge, experience, and capital for such an endeavour. They may take on several tasks at the same time (e.g., several time-consuming projects at work) and show little, if any, need for sleep — some may go for days without sleep. Patients may also recklessly engage in pleasurable activities that could have harmful consequences, including spending sprees, reckless driving, foolish investments, excessive gambling, or sexual encounters with strangers (APA, 2013).

During a manic episode, individuals usually feel as though they are not ill and do not need treatment. However, the reckless behaviours that often accompany these episodes — which can be antisocial, illegal, or physically threatening to others — may require involuntary hospitalization (APA, 2013). Some patients with bipolar disorder will experience a rapid-cycling subtype, which is characterised by at least four manic episodes (or some combination of at least four manic and major depressive episodes) within one year.

More About Bipolar Disorder

Watch '**The Other Side of Me**', in which Julie Kraft describes her lived experience with bipolar disorder. Watch this video: **The Other Side of Me – inside my bipolar mind (15 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=1166#oembed-1***

"The Other Side of Me – inside my bipolar mind" video by Julie Kraft is licensed under the Standard YouTube Licence.

Risk Factors for Bipolar Disorder

Bipolar disorder affects people considerably less frequently than major depressive disorder. In the United States, 1 out of every 167 people meets the criteria for bipolar disorder each year, and 1 out of 100 meet the criteria within their lifetime (Merikangas et al., 2011). The rates are higher in men than in women, and about half of those with this disorder report onset before the age of 25 (Merikangas et al., 2011). Around 90% of those with bipolar disorder have a comorbid (additional) disorder, most often an anxiety disorder or a substance abuse problem. Unfortunately, close to half of the people suffering from bipolar disorder do not receive treatment (Merikangas & Tohen, 2011). Suicide rates are extremely high among those with bipolar disorder; around 36% of individuals with this disorder attempt suicide at least once in their lifetime (Novick, Swartz, & Frank, 2010), and between 15%–19% complete suicide (Newman, 2004).

The Biological Basis of Mood Disorders

Mood disorders have been shown to have a strong genetic and biological basis. Relatives of those with major depressive disorder have double the risk of developing major depressive disorder; relatives of patients with bipolar disorder have over nine times the risk (Merikangas

et al., 2011). The rate of concordance (both people having the same diagnosis) for major depressive disorder is higher among identical twins (50%) than fraternal twins (38%). The pattern is similar for bipolar disorder: identical twins (67%) versus fraternal twins (16%). This suggests that genetic factors play a stronger role in bipolar disorder than in major depressive disorder (Merikangas et al. 2011).

People with mood disorders often have imbalances in certain neurotransmitters, particularly norepinephrine and serotonin (Thase, 2009). These neurotransmitters are important regulators of the bodily functions that are disrupted in mood disorders, including appetite, sex drive, sleep, arousal, and mood. Medications that are used to treat major depressive disorder typically boost serotonin and norepinephrine activity, whereas lithium, which is used in the treatment of bipolar disorder, blocks norepinephrine activity at the synapses (Figure PD.13).

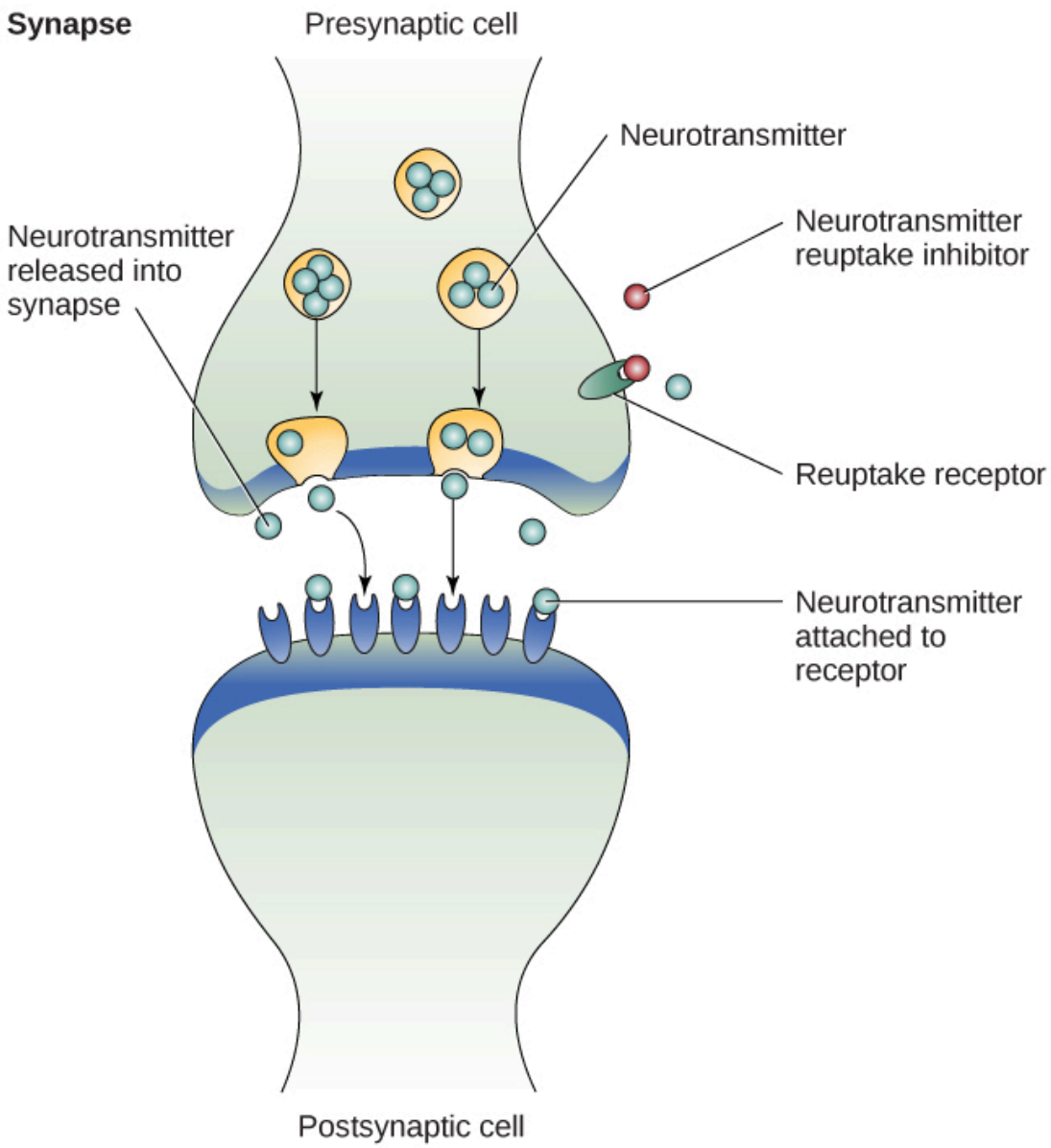

Figure PD.4. Medications for mood disorders. *Many medications designed to treat mood disorders work by altering neurotransmitter activity in the neural synapse.*
Alt. text: *An illustration shows the synaptic space between two neurons with neurotransmitters being released into the synapse and attaching to receptors.*
Source: *Figure 15.16 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Cognitive Theories of Depression

Cognitive theories of depression take the view that depression is triggered by negative thoughts, interpretations, self-evaluations, and expectations (Joormann, 2009). Perhaps the most well-known cognitive theory of depression was developed in the 1960s by psychiatrist

Aaron Beck, based on clinical observations and supported by research (Beck, 2008). Beck theorised that depression-prone people possess **depressive schemas**, or mental predispositions to think about most things in a negative way (Beck, 1976). Depressive schemas contain themes of loss, failure, rejection, worthlessness and inadequacy, and may develop early in childhood in response to adverse experiences, then remain dormant until they are activated by stressful or negative life events.

Depressive schemas prompt dysfunctional and pessimistic thoughts about the self, the world, and the future. Beck believed that this dysfunctional style of thinking is maintained by cognitive biases, or errors in how we process information about ourselves, which lead us to focus on negative aspects of experiences, interpret things negatively, and block positive memories (Beck, 2008). A person whose depressive schema consists of a theme of rejection might be overly attentive to social cues of rejection (more likely to notice another's frown), and they might interpret this cue as a sign of rejection and automatically remember past incidents of rejection. Longitudinal studies have supported Beck's theory in showing that a preexisting tendency to engage in this negative, self-defeating style of thinking, when combined with life stress, over time predicts the onset of depression (Dozois & Beck, 2008). Cognitive therapies for depression, aimed at changing a depressed person's negative thinking, were developed as an expansion of this theory (Beck, 1976).

Anxiety Disorders

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Everybody experiences anxiety from time to time. Although anxiety is closely related to fear, the two states possess important differences. Fear involves an instantaneous reaction to an imminent threat, whereas anxiety involves apprehension, avoidance, and cautiousness regarding a potential threat, danger, or other negative event (Craske, 1999). While anxiety is unpleasant to most people, it is important to our health, safety, and well-being.

Anxiety motivates us to take actions — such as preparing for exams, checking that we have turned off the stove, showing up to work on time — that enable us to avert potential future problems. Anxiety also motivates us to avoid certain things — such as running up debts and engaging in illegal activities — that could lead to future trouble. Most individuals' level and duration of anxiety approximates the magnitude of the potential threat they face. Some people experience anxiety that is excessive, persistent, and greatly out of proportion to the actual threat; if one's anxiety has a disruptive influence on one's life, this is a strong indicator that the individual is experiencing an anxiety disorder.

Anxiety disorders are characterised by excessive and persistent fear and anxiety, and by related disturbances in behaviour (APA, 2013). Although anxiety is universally experienced, anxiety disorders cause considerable distress. As a group, anxiety disorders are common: approximately 25%–30% of the US population meets the criteria for at least one anxiety disorder during their lifetime (Kessler et al., 2005). Also, these disorders appear to be much more common in women than they are in men; within a 12-month period, around 23% of women and 14% of men will experience at least one anxiety disorder (National Comorbidity Survey, 2007). Anxiety disorders are the most frequently occurring class of mental disorders and are often comorbid with each other (happen at the same time) and with other mental disorders (Kessler, Ruscio, Shear, & Wittchen, 2009).

Specific Phobia

Phobia is a Greek word that means fear. A person diagnosed with a specific phobia (formerly known as simple phobia) experiences excessive, distressing, and persistent fear or anxiety about a specific object or situation (such as animals, enclosed spaces, elevators, or flying) (APA, 2013). Even though people realise that their level of fear and anxiety in relation to the phobic stimulus is irrational, some people with a specific phobia may go to great

lengths to avoid the phobic stimulus (the object or situation that triggers the fear and anxiety). Typically, the fear and anxiety a phobic stimulus elicits is disruptive to the person's life. For example, a man with a phobia of flying might refuse to accept a job that requires frequent air travel, thus negatively affecting his career. Clinicians who have worked with people who have specific phobias have encountered many kinds of phobias, some of which are shown in Table PD.1.

Table PD.1 Specific Phobias

Phobia	Feared Object or Situation
Acrophobia	heights
Aerophobia	flying
Arachnophobia	spiders
Claustrophobia	enclosed spaces
Cynophobia	dogs
Glossophobia	public speaking
Hematophobia	blood
Ophidiophobia	snakes
Taphophobia	being buried alive
Trypanophobia	injections

Specific phobias are common; in the United States, around 12.5% of the population will meet the criteria for a specific phobia at some point in their lifetime (Kessler et al., 2005). One type of phobia, agoraphobia, is listed in the DSM-5 as a separate anxiety disorder. Agoraphobia, which literally means "fear of the marketplace", is characterised by intense fear, anxiety, and avoidance of situations in which it might be difficult to escape or receive help if one experiences symptoms of a panic attack (a state of extreme anxiety that we will discuss shortly). These situations include public transportation, open spaces (parking lots), enclosed spaces (stores), crowds, or being outside the home alone (APA, 2013). About 1.4% of Americans experience agoraphobia during their lifetime (Kessler et al., 2005).

Social Anxiety Disorder

Social anxiety disorder (formerly called social phobia) is characterised by extreme and persistent fear or anxiety and avoidance of social situations in which the person could potentially be evaluated negatively by others (APA, 2013). As with specific phobias, social anxiety disorder is common in the United States; a little over 12% of all Americans experience social anxiety disorder during their lifetime (Kessler et al., 2005).

The heart of the fear and anxiety in social anxiety disorder is the person's concern that they may act in a humiliating or embarrassing way, such as appearing foolish, showing symptoms of anxiety (blushing), or doing or saying something that might lead to rejection (such as offending others). The kinds of social situations in which individuals with social anxiety disorder usually have problems include public speaking, having a conversation, meeting strangers, eating in restaurants, and, in some cases, using public restrooms.

Although many people become anxious in social situations like public speaking, the fear, anxiety, and avoidance experienced in social anxiety disorder are highly distressing and lead to serious impairments in life. Adults with this disorder are more likely to experience lower educational attainment and lower earnings (Katzelnick et al., 2001), perform more poorly at work and are more likely to be unemployed (Moitra, Beard, Weisberg, & Keller, 2011), and report greater dissatisfaction with their family lives, friends, leisure activities, and income (Stein & Kean, 2000).

When people with social anxiety disorder are unable to avoid situations that provoke anxiety, they typically perform safety behaviours: mental or behavioural acts that reduce anxiety in social situations by reducing the chance of negative social outcomes. Safety behaviours include avoiding eye contact, rehearsing sentences before speaking, talking only briefly, and not talking about oneself (Alden & Bieling, 1998). Other examples of safety behaviours include the following (Marker, 2013):

- assuming roles in social situations that minimise interaction with others (e.g., taking pictures, setting up equipment, or helping prepare food);
- asking people many questions to keep the focus off oneself;
- selecting a position to avoid scrutiny or contact with others (sitting in the back of the room);
- wearing bland, neutral clothes to avoid drawing attention to oneself; and
- avoiding substances or activities that might cause anxiety symptoms (such as caffeine, warm clothing, and physical exercise).

Although these behaviours are intended to prevent the person with social anxiety disorder from doing something awkward that might draw criticism, these actions usually exacerbate the problem because they do not allow the individual to disconfirm his negative beliefs, often eliciting rejection and other negative reactions from others (Alden & Bieling, 1998).

People with social anxiety disorder may resort to self-medication, such as drinking alcohol, as a means to avert the anxiety symptoms they experience in social situations (Battista & Kocovski, 2010). The use of alcohol when faced with such situations may become negatively reinforcing, encouraging individuals with social anxiety disorder to turn to the substance whenever they experience anxiety symptoms. The tendency to use alcohol as a coping mechanism for social anxiety can come with a hefty price tag; a number of large-scale studies have reported a high rate of comorbidity between social anxiety disorder and alcohol use disorder (Morris, Stewart, & Ham, 2005).

As with specific phobias, it is highly probable that the fears inherent to social anxiety disorder can develop through conditioning experiences. For example, a child who is subjected to early unpleasant social experiences (e.g., bullying at school) may develop negative social images of herself that become activated later in anxiety-provoking situations (Hackmann, Clark, & McManus, 2000). Indeed, one study reported that 92% of a sample of adults with social anxiety disorder reported a history of severe teasing in childhood, compared to only 35% of a sample of adults with panic disorder (McCabe, Antony, Summerfeldt, Liss, & Swinson, 2003).

One of the most well-established risk factors for developing social anxiety disorder is behavioural inhibition (Clauss & Blackford, 2012). **Behavioural inhibition** is thought to be an inherited trait, characterised by a consistent tendency to show fear and restraint when presented with unfamiliar people or situations (Kagan, Reznick, & Snidman, 1988). Behavioural inhibition is displayed very early in life; behaviourally inhibited toddlers and children respond with great caution and restraint in unfamiliar situations, and are often timid, fearful and shy around unfamiliar people (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). A recent statistical review of studies demonstrated that behavioural inhibition was associated with more than a sevenfold increase in the risk of developing social anxiety disorder, demonstrating that behavioural inhibition is a major risk factor for the disorder (Clauss & Blackford, 2012).

Panic Disorder

Imagine that you are at the mall one day with your friends and — suddenly and inexplicably — you begin sweating and trembling, your heart starts pounding, you have trouble breathing, and you start to feel dizzy and nauseous. This episode lasts for 10 minutes and is terrifying because you start to think that you are going to die. When you visit your doctor the

following morning and describe what happened, the doctor tells you that you have experienced a panic attack (Figure PD.18). If you experience another one of these episodes two weeks later and worry for a month or more that similar episodes will occur in the future, it is likely that you have developed panic disorder.

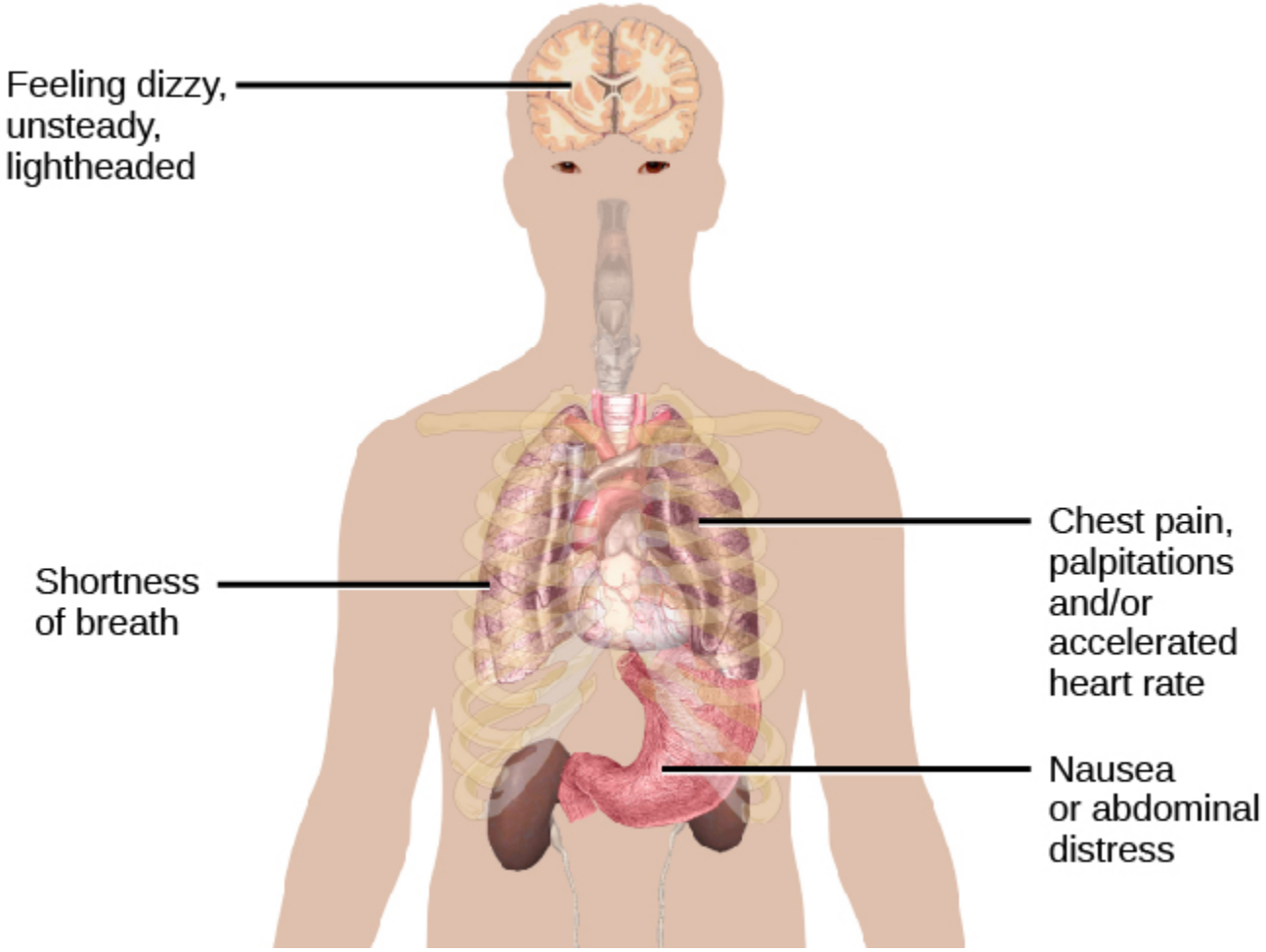

Figure PD.5. Panic attacks. *Some of the physical manifestations of a panic attack are shown. People may also experience sweating, trembling, feelings of faintness, or a fear of losing control, among other symptoms. Figure 15.9 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

People with **panic disorder** experience recurrent (more than one) and unexpected panic attacks, along with at least one month of persistent concern about additional panic attacks, worry over the consequences of the attacks, or self-defeating changes in behaviour related to the attacks (e.g., avoidance of exercise or unfamiliar situations) (APA, 2013). As is the case with other anxiety disorders, the panic attacks cannot result from the physiological effects of drugs and other substances, a medical condition, or another mental disorder.

A **panic attack** is defined as a period of extreme fear or discomfort that develops abruptly and reaches a peak within 10 minutes. Its symptoms include accelerated heart rate, sweating, trembling, choking sensations, hot flashes or chills, dizziness or lightheadedness, fears of losing control or going crazy, and fears of dying (APA, 2013). Sometimes panic attacks are expected, occurring in response to specific environmental triggers (such as being in a tunnel); other times, these episodes are unexpected and emerge randomly (such as when relaxing). According to the DSM-5, the person must experience unexpected panic attacks to qualify for a diagnosis of panic disorder.

Experiencing a panic attack is often terrifying. Rather than recognising the symptoms of a panic attack merely as signs of intense anxiety, individuals with panic disorder often misinterpret them as a sign that something is intensely wrong internally (thinking, for example, that the pounding heart represents an impending heart attack). Panic attacks can occasionally precipitate trips to the emergency room because several symptoms of panic attacks are, in fact, similar to those associated with heart problems (e.g., palpitations, racing pulse, and a pounding sensation in the chest) (Root, 2000). Unsurprisingly, those with panic disorder fear future attacks and may become preoccupied with modifying their behaviour in an effort to avoid future panic attacks. For this reason, panic disorder is often characterised as fear of fear (Goldstein & Chambless, 1978).

Panic attacks themselves are not mental disorders. Indeed, around 23% of Americans experience isolated panic attacks in their lives without meeting the criteria for panic disorder (Kessler et al., 2006), indicating that panic attacks are fairly common. Panic disorder is, of course, much less common, afflicting 4.7% of Americans during their lifetime (Kessler et al., 2005). Many people with panic disorder develop agoraphobia, which is marked by fear and avoidance of situations in which escape might be difficult or help might not be available if one were to develop symptoms of a panic attack. People with panic disorder often experience a comorbid disorder, such as other anxiety disorders or major depressive disorder (APA, 2013).

Researchers are not entirely sure what causes panic disorder. Children are at a higher risk of developing panic disorder if their parents have the disorder (Biederman et al., 2001), and family and twins studies indicate that the heritability of panic disorder is around 43% (Hettema, Neale, & Kendler, 2001). The exact genes and gene functions involved in this disorder, however, are not well-understood (APA, 2013). Cognitive factors may play an integral part in panic disorder. Generally, cognitive theories (Clark, 1996) argue that those with panic disorder are prone to interpret ordinary bodily sensations catastrophically, and these fearful interpretations set the stage for panic attacks. For example, a person might detect bodily changes that are routinely triggered by innocuous events such getting up from a seated position (dizziness), exercising (increased heart rate, shortness of breath), or drinking a large cup of coffee (increased heart rate, trembling). The individual interprets these subtle bodily changes catastrophically ("Maybe I'm having a heart attack!"). Such interpretations cre-

ate fear and anxiety, which trigger additional physical symptoms; subsequently, the person experiences a panic attack. Support of this contention rests with findings that people with more severe catastrophic thoughts about sensations have more frequent and severe panic attacks, and among those with panic disorder, reducing catastrophic cognitions about their sensations is as effective as medication in reducing panic attacks (Good & Hinton, 2009).

Generalised Anxiety Disorder

Alex has always worried about many things. He worries that his children would drown when they played at the beach. Each time Alex leaves the house, he worries that an electrical short circuit would start a fire in their home. He worried that his life-partner Reese would lose their job at the prestigious law firm. He worried that their child's minor staph infection could turn into a massive life-threatening condition. These and other worries constantly weighed heavily on Alex's mind, so much so that they made it difficult for Alex to make decisions and often left him feeling tense, irritable and worn out. One night, Reese was scheduled to drive their child home from a soccer game. However, Reese stayed after the game and talked with some of the other parents, resulting in Reese arriving home 45 minutes late. Alex had tried to call Reese's cell phone three or four times, but they could not get through because the soccer field did not have a signal. Extremely worried, Alex eventually called the police, convinced that Reese and their child had not arrived home because they had been in a terrible car accident.

Alex suffers from **generalised anxiety disorder**, a relatively continuous state of excessive, uncontrollable, and pointless worry and apprehension. People with generalised anxiety disorder often worry about routine, everyday things, even though their concerns are unjustified (Figure PD.17). For example, an individual may worry about their health and finances, the health of family members, the safety of their children, or minor matters (e.g., being late for an appointment) without having any legitimate reason for doing so (APA, 2013). A diagnosis of generalised anxiety disorder requires that the diffuse worrying and apprehension characteristic of this disorder — what Sigmund Freud referred to as free-floating anxiety — is not part of another disorder, occurs more days than not for at least six months, and is accompanied by any three of the following symptoms: restlessness, difficulty concentrating, being easily fatigued, muscle tension, irritability, and sleep difficulties.



Figure PD.6. Worry. *Worry is a defining feature of generalised anxiety disorder. Figure 15.10 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

About 5.7% of the US population will develop symptoms of generalised anxiety disorder during their lifetime (Kessler et al., 2005); females are twice as likely as males to experience the disorder (APA, 2013). Generalised anxiety disorder is highly comorbid with mood disorders and other anxiety disorders (Noyes, 2001), and tends to be chronic. Also, generalised anxiety disorder appears to increase the risk for heart attacks and strokes, especially in people with preexisting heart conditions (Martens et al., 2010).

Although there have been few investigations aimed at determining the heritability of generalised anxiety disorder, a summary of available family and twin studies suggests that genetic factors play a modest role in the disorder (Hettema et al., 2001). Cognitive theories of generalised anxiety disorder suggest that worry represents a mental strategy to avoid more powerful negative emotions (Aikins & Craske, 2001), perhaps stemming from earlier unpleasant or traumatic experiences. Indeed, one longitudinal study found that childhood maltreatment was strongly related to the development of this disorder during adulthood (Moffitt et al., 2007); worrying might distract people from remembering painful childhood experiences.

Personality Disorders

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The term *personality* refers loosely to one's stable, consistent, and distinctive way of thinking about, feeling, acting, and relating to the world. People with **personality disorders** exhibit a personality style that differs markedly from the expectations of their culture, is pervasive and inflexible, begins in adolescence or early adulthood, and causes distress or impairment (APA, 2013). Generally, individuals with these disorders exhibit enduring personality styles that are extremely troubling and often create problems for them and those with whom they come into contact. Their maladaptive personality styles frequently bring them into conflict with others, disrupt their ability to develop and maintain social relationships, and prevent them from accomplishing realistic life goals.

The DSM-5 recognises 10 personality disorders, organised into 3 different clusters.

Cluster A disorders include people who display a personality style that is odd or eccentric:

- paranoid personality disorder
- schizoid personality disorder
- schizotypal personality disorder

Cluster B disorders include people who are impulsive, overly dramatic, highly emotional, and erratic:

- antisocial personality disorder
- histrionic personality disorder
- narcissistic personality disorder
- borderline personality disorder

Cluster C disorders include people who often appear to be nervous and fearful:

- avoidant personality disorder
- dependent personality disorder
- obsessive-compulsive personality disorder (which is not the same thing as obsessive-compulsive disorder).

Table PD.2 provides a description of each of the DSM-5 personality disorders:

Table PD.2 DSM-5 Personality Disorders

DSM-5 Personality Disorder	Description
Paranoid	harbours a pervasive and unjustifiable suspiciousness and mistrust of others; reluctant to confide i close to others; reads hidden demeaning or threatening meaning into benign remarks or events; t easily and bears grudges; not due to schizophrenia or other psychotic disorders
Schizoid	lacks interest and desire to form relationships with others; aloof and shows emotional coldness and indifferent to approval or criticism of others; lacks close friends or confidants; not due to schizophr psychotic disorders, not an autism spectrum disorder
Schizotypal	exhibits eccentricities in thought, perception, emotion, speech, and behaviour; shows suspiciousne paranoia; has unusual perceptual experiences; speech is often idiosyncratic; displays inappropriate lacks friends or confidants; not due to schizophrenia or other psychotic disorder, or to autism spec
Antisocial	continuously violates the rights of others; history of antisocial tendencies prior to age 15; often lies, has problems with the law; impulsive and fails to think ahead; can be deceitful and manipulative in profit or pleasure; irresponsible and often fails to hold down a job or pay financial debts; lacks feelin and remorse over misdeeds
Histrionic	excessively overdramatic, emotional, and theatrical; feels uncomfortable when not the centre of ot attention; behaviour is often inappropriately seductive or provocative; speech is highly emotional b vague and diffuse; emotions are shallow and often shift rapidly; may alienate friends with demand attention
Narcissistic	overinflated and unjustified sense of self-importance and preoccupied with fantasies of success; be are entitled to special treatment from others; shows arrogant attitudes and behaviours; takes adva others; lacks empathy
Borderline	unstable in self-image, mood, and behaviour; cannot tolerate being alone and experiences chronic emptiness; unstable and intense relationships with others; behaviour is impulsive, unpredictable, a sometimes self-damaging; shows inappropriate and intense anger; makes suicidal gestures
Avoidant	socially inhibited and oversensitive to negative evaluation; avoids occupations that involve interper because of fears of criticism or rejection; avoids relationships with others unless guaranteed to be a unconditionally; feels inadequate and views self as socially inept and unappealing; unwilling to tak engage in new activities if they may prove embarrassing
Dependent	allows others to take over and run their life; is submissive, clingy, and fears separation; cannot mak without advice and reassurance from others; lacks self-confidence; cannot do things on their own; uncomfortable or helpless when alone
Obsessive-Compulsive	pervasive need for perfectionism that interferes with the ability to complete tasks; preoccupied wit rules, order, and schedules; excessively devoted to work at the expense of leisure and friendships; r and stubborn; insists things be done his way; miserly with money

Slightly over 9% of the US population suffers from a personality disorder, with avoidant and schizoid personality disorders the most frequent (Lezenweger, Lane, Loranger, & Kessler, 2007). Two of these personality disorders, borderline personality disorder and antisocial personality disorder, are regarded by many as especially problematic.

Borderline Personality Disorder

The “borderline” in borderline personality disorder was originally coined in the late 1930s in an effort to describe patients who appeared anxious but were prone to brief psychotic experiences; that is, patients who were thought to be literally on the borderline between anxiety and psychosis (Freeman, Stone, Martin, & Reinecke, 2005). Today, borderline personality disorder has a completely different meaning.

The term “borderline” in Borderline Personality Disorder (BPD) has historical roots and reflects the initial conceptualization of the disorder. When the term was first introduced, it described a condition thought to lie on the “borderline” between neurosis and psychosis. Today, BPD is better understood and is no longer viewed in this way, but the term has persisted.

Borderline personality disorder is characterised chiefly by instability in interpersonal relationships, self-image, and mood, as well as marked impulsivity (APA, 2013). As for boundaries, individuals with BPD often struggle with identity and interpersonal boundaries. They may have difficulty distinguishing their own needs and emotions from those of others. This can manifest in several ways:

1. **Identity Disturbance**: Individuals with BPD may have an unstable sense of self, making it hard for them to establish clear personal boundaries.
2. **Interpersonal Relationships**: They often experience intense and unstable relationships. Their sense of self can be heavily influenced by their interactions with others, leading to difficulties in maintaining consistent boundaries.
3. **Emotional Dysregulation**: People with BPD may have intense and rapidly changing emotions, which can blur the lines between their own emotional states and those of others.
4. **Fear of Abandonment**: This fear can lead to frantic efforts to avoid real or imagined abandonment, further complicating their ability to maintain healthy boundaries.

People with borderline personality disorder cannot tolerate the thought of being alone and will make frantic efforts (including making suicidal gestures and engaging in self-mutilation) to avoid abandonment or separation (whether real or imagined). Their relationships are intense and unstable; for example, a lover may be idealised early in a relationship, but then later vilified at the slightest sign they appear to no longer show interest.

These individuals have an unstable view of self and, thus, might suddenly display a shift in personal attitudes, interests, career plans, and choice of friends. For example, a law school student may, despite having invested tens of thousands of dollars toward earning a law degree and having performed well in the program, consider dropping out and pursuing a career in another field. People with borderline personality disorder may be highly impulsive

and may engage in reckless and self-destructive behaviours such as excessive gambling, spending money irresponsibly, substance abuse, engaging in unsafe sex, and reckless driving. They sometimes show intense and inappropriate anger that they have difficulty controlling, and they can be moody, sarcastic, bitter, and verbally abusive.

The prevalence of borderline personality disorder in the US population is estimated to be around 1.4% (Lezenweger et al., 2007), but the rates are higher among those who use mental health services; approximately 10% of mental health outpatients and 20% of psychiatric inpatients meet the criteria for diagnosis (APA, 2013). Additionally, borderline personality disorder is comorbid with anxiety, mood, and substance use disorders (Lezenweger et al., 2007).

Biological Basis for Borderline Personality Disorder

Genetic factors appear to be important in the development of borderline personality disorder. For example, core personality traits that characterise this disorder, such as impulsivity and emotional instability, show a high degree of heritability (Livesley, 2008). Also, the rates of borderline personality disorder among relatives of people with this disorder have been found to be as high as 24.9% (White, Gunderson, Zanarani, & Hudson, 2003).

Individuals with borderline personality disorder report experiencing childhood physical, sexual, and/or emotional abuse at rates far greater than those observed in the general population (Afifi et al., 2010), indicating that environmental factors are also crucial. These findings would suggest that borderline personality disorder may be determined by an interaction between genetic factors and adverse environmental experiences. Consistent with this hypothesis, one study found that the highest rates of borderline personality disorder were among individuals with a borderline temperament (characterised by high novelty-seeking and high harm-avoidance) and those who experienced childhood abuse and/or neglect (Joyce et al., 2003).

Antisocial Personality Disorder

Most human beings live in accordance with a moral compass, a sense of right and wrong. Most individuals learn at a very young age that there are certain things that should not be done. We learn that we should not lie or cheat. We are taught that it is wrong to take things that do not belong to us, and that it is wrong to exploit others for personal gain. We also learn the importance of living up to our responsibilities, of doing what we say we will do. People

with antisocial personality disorder, however, do not seem to have a moral compass. These individuals act as though they neither have a sense of nor care about right or wrong. Not surprisingly, these people represent a serious problem for others and for society in general.

According to the DSM-5, the individual with **antisocial personality disorder** shows no regard at all for other people's rights or feelings. This lack of regard is exhibited a number of ways and can include repeatedly performing illegal acts, lying to or conning others, impulsivity and recklessness, irritability and aggressiveness toward others, and failure to act in a responsible way (e.g., leaving debts unpaid) (APA, 2013). The worst part about antisocial personality disorder, however, is that people with this disorder have no remorse over their misdeeds; these people will hurt, manipulate, exploit, and abuse others and not feel any guilt. Signs of this disorder can emerge early in life; however, a person must be at least 18 years old to be diagnosed with antisocial personality disorder.

People with antisocial personality disorder seem to view the world as self-serving and unkind. They seem to think that they should use whatever means necessary to get by in life. They tend to view others not as living, thinking, feeling beings, but rather as pawns to be used or abused for a specific purpose. They often have an over-inflated sense of themselves and can appear extremely arrogant. They frequently display superficial charm; for example, without really meaning it they might say exactly what they think another person wants to hear. They lack empathy — they are incapable of understanding the emotional point-of-view of others. People with this disorder may become involved in illegal enterprises, show cruelty toward others, leave their jobs with no plans to obtain another job, have multiple sexual partners, repeatedly get into fights with others, and show reckless disregard for themselves and others (e.g., repeated arrests for driving while intoxicated) (APA, 2013).

The DSM-5 has included an alternative model for conceptualising personality disorders based on the traits identified in the Five Factor Model of personality. This model addresses the level of personality functioning such as impairments in self (identity or self-direction) and interpersonal (empathy or intimacy) functioning. In the case of antisocial personality disorder, the DSM-5 identifies the predominant traits of antagonism (such as disregard for others' needs, manipulative or deceitful behaviour) and disinhibition (characterised by impulsivity, irresponsibility, and risk-taking) (Hopwood, Schade, Krueger, Wright, & Markon, 2012). A psychopathology specifier is also included that emphasises traits such as attention-seeking and low anxiousness (lack of concern about negative consequences for risky or harmful behaviour) (Crego & Widiger, 2014).

Risk Factors for Antisocial Personality Disorder

Antisocial personality disorder is observed in about 3.6% of the population. The disorder is much more common among males, with a 3 to 1 ratio of men to women; it is more likely to occur in men who are younger, widowed, separated, divorced, of lower socioeconomic status, who live in urban areas, and who live in the western United States (Compton, Conway, Stinson, Colliver, & Grant, 2005). Compared to men with antisocial personality disorder, women with the disorder are more likely to have experienced emotional neglect and sexual abuse during childhood, and they are more likely to have had parents who abused substances and who engaged in antisocial behaviours themselves (Alegria et al., 2013).

Table PD.3 shows some of the differences in the specific types of antisocial behaviours that men and women with antisocial personality disorder exhibit (Alegria et al., 2013).

Table PD.3. Gender differences in Antisocial Personality Disorder

Men with antisocial personality disorder are more likely than women with antisocial personality disorder to:	Women with antisocial personality disorder are more likely than men with antisocial personality to:
• do things that could easily hurt themselves or others • receive three or more traffic tickets for reckless driving • have their driver's licence suspended • destroy others' property • start a fire on purpose • make money illegally • do anything that could lead to arrest • hit someone hard enough to injure them • hurt an animal on purpose	• run away from home overnight • frequently miss school or work • lie frequently • forge someone's signature • get into a fight that comes to blows with an intimate partner • live with others besides the family for at least one month • harass, threaten, or blackmail someone

Family, twin, and adoption studies suggest that both genetic and environmental factors influence the development of antisocial personality disorder, as well as general antisocial behaviour (criminality, violence, aggressiveness) (Baker, Bezdjian, & Raine, 2006). Personality and temperament dimensions that are related to this disorder, including fearlessness, impulsive antisociality, and callousness, have a substantial genetic influence (Livesley & Jang, 2008).

Adoption studies clearly demonstrate that the development of antisocial behaviour is determined by the interaction of genetic factors and adverse environmental circumstances (Rhee & Waldman, 2002). For example, one investigation found that adoptees of biological parents with antisocial personality disorder were more likely to exhibit adolescent and adult antisocial behaviours if they were raised in adverse adoptive family environments (e.g., adop-

tive parents had marital problems, were divorced, used drugs, and had legal problems) than if they were raised in a more normal adoptive environment (Cadoret, Yates, Ed, Woodworth, & Stewart, 1995).

Researchers who are interested in the importance of environment in the development of antisocial personality disorder have directed their attention to such factors as the community, the structure and functioning of the family, and peer groups. Each of these factors influences the likelihood of antisocial behaviour. One longitudinal investigation of more than 800 Seattle-area youth measured risk factors for violence at 10, 14, 16, and 18 years of age (Herrenkohl et al., 2000). The risk factors examined included those involving the family, peers, and community. A portion of the findings from this study are provided in Figure PD.23.

Risk Factors During Adolescence That Predict Later Violence			
Risk factor	**Age 10 predictor (elementary school)**	**Age 14 predictor (middle school)**	**Age 16 predictor (high school)**
Family			
Parental violence		✕	
Parental criminality		✕	✕
Poor family management		✕	✕
Family conflict		✕	✕
Parental attitudes favorable to violence	✕		
Frequent moves			✕
Peer			
Peer delinquency	✕	✕	✕
Gang membership		✕	✕
Community			
Economic deprivation	✕		✕
Community disorganization		✕	✕
Availability of drugs	✕	✕	✕
Neighborhood adults involved in crime		✕	✕

Figure PD.7. Risk factors for predicting violent behavior. *Longitudinal studies have helped to identify risk factors for predicting violent behaviour. Figure 15.20 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

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Here is the **Tricky Topics: Neuronal Structure transcript**.

Schizophrenia

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Schizophrenia is a devastating psychological disorder that is characterised by major disturbances in thought, perception, emotion and behaviour. About 1% of Canadians aged 10 and older are diagnosed with schizophrenia (Government of Canada, 2019). The disorder is commonly first diagnosed in young adulthood, with a significant number of new cases identified between the ages of 20 and 34, highlighting the critical period of early adulthood for the onset of this mental illness (Public Health Agency of Canada, 2019).

Most people with schizophrenia experience significant difficulties in many day-to-day activities, such as holding a job, paying bills, caring for oneself (grooming and hygiene), and maintaining relationships with others. Frequent hospitalisations are more often the rule rather than the exception with schizophrenia. Even when they receive the best treatments available, many with schizophrenia will continue to experience serious social and occupational impairment throughout their lives.

What is schizophrenia? First, schizophrenia is *not* a condition involving a split personality; that is, schizophrenia is not the same thing as dissociative identity disorder (better known as multiple personality disorder). These disorders are sometimes confused because the word *schizophrenia,* first coined by the Swiss psychiatrist Eugen Bleuler in 1911, derives from Greek words that refer to a "splitting" (schizo) of psychic functions (phrene) (Green, 2001).

Schizophrenia is considered a psychotic disorder, or one in which the person's thoughts, perceptions and behaviours are impaired to the point where they are not able to function normally in life. In informal terms, one who suffers from a psychotic disorder (that is, has a psychosis) is disconnected from the world in which most of us live.

Symptoms of Schizophrenia

The main symptoms of schizophrenia include hallucinations, delusions, disorganised thinking, disorganised or abnormal motor behaviour, and negative symptoms (APA, 2013). A **hallucination** is a perceptual experience that occurs in the absence of external stimulation. Auditory hallucinations (hearing voices) occur in roughly two-thirds of patients with schizophrenia and are by far the most common form of hallucination (Andreasen, 1987). The voices may be familiar or unfamiliar, they may have a conversation or argue, or the voices may provide a running commentary on the person's behaviour (Tsuang, Farone, & Green, 1999).

Less common are visual hallucinations (seeing things that are not there) and olfactory hallucinations (smelling odours that are not actually present).

Delusions are beliefs that are contrary to reality and are firmly held even in the face of contradictory evidence. Many of us hold beliefs that some would consider odd, but a delusion is easily identified because it is clearly absurd. A person with schizophrenia may believe that their mother is plotting with the FBI to poison their coffee, or that their neighbour is an enemy spy who wants to kill them. These kinds of delusions are known as **paranoid delusions**, which involve the (false) belief that other people or agencies are plotting to harm the person. People with schizophrenia also may hold **grandiose delusions**, beliefs that one holds special power, has unique knowledge, or is extremely important.

For example, the person who claims to be Cleopatra, or who claims to be a traveler, or claims to have a superpower, is experiencing grandiose delusions. Other delusions include the belief that one's thoughts are being removed (thought withdrawal) or thoughts have been placed inside one's head (thought insertion). Another type of delusion is somatic delusion, which is the belief that something highly abnormal is happening to one's body (e.g., that one's kidneys are being eaten by cockroaches).

Disorganised thinking refers to disjointed and incoherent thought processes, which are usually detected by what a person says. The person might ramble, exhibit loose associations (jump from topic to topic), or talk in a way that is so disorganised and incomprehensible that it seems as though the person is randomly combining words. Disorganised thinking is also exhibited by blatantly illogical remarks (e.g., "The CN Tower is in Toronto. I live in Toronto. Therefore, I live at the CN Tower.") and by tangentiality — responding to others' statements or questions with remarks that are either barely related or unrelated to what was said or asked. For example, if a person diagnosed with schizophrenia is asked if they are interested in receiving special job training, they might state that they once rode on a train somewhere. To a person with schizophrenia, the tangential (slightly related) connection between job *training* and riding a *train* are sufficient enough to cause such a response.

Disorganised or abnormal motor behaviour refers to unusual behaviours and movements: becoming unusually active, exhibiting silly child-like behaviours (giggling and self-absorbed smiling), engaging in repeated and purposeless movements, or displaying odd facial expressions and gestures. In some cases, the person will exhibit catatonic behaviours that show decreased reactivity to the environment, such as posturing, in which the person maintains a rigid and bizarre posture for long periods of time, or catatonic stupor, a complete lack of movement and verbal behaviour.

Negative symptoms are those that reflect noticeable decreases and absences of certain behaviours, emotions, or drives (Green, 2001). A person who exhibits diminished emotional expression shows no emotion in his facial expressions, speech or movements, even when such expressions are normal or expected. **Avolition** is characterised by a lack of motivation to engage in self-initiated and meaningful activity, including the most basic of tasks, such

as bathing and grooming. **Alogia** refers to reduced speech output; in simple terms, patients do not say much. Another negative symptom is **asociality**, or social withdrawal and lack of interest in engaging in social interactions with others. A final negative symptom, **anhedonia**, refers to an inability to experience pleasure. One who exhibits anhedonia expresses little interest in what most people consider to be pleasurable activities, such as hobbies, recreation, or sexual activity.

Causes of Schizophrenia

There is considerable evidence suggesting that schizophrenia has a genetic basis. The risk of developing schizophrenia is nearly 6 times greater if one has a parent with schizophrenia than if one does not (Goldstein, Buka, Seidman, & Tsuang, 2010). Additionally, one's risk of developing schizophrenia increases as genetic relatedness to family members diagnosed with schizophrenia increases (Gottesman, 2001).

Neurotransmitters

If we accept that schizophrenia is at least partly genetic in origin, as it seems to be, it makes sense that the next step should be to identify biological abnormalities commonly found in people with the disorder. The dopamine hypothesis of schizophrenia proposes that an overabundance of dopamine or too many dopamine receptors are responsible for the onset and maintenance of schizophrenia (Snyder, 1976). More recent work in this area suggests that abnormalities in dopamine vary by brain region and thus contribute to symptoms in unique ways. In general, this research has suggested that an overabundance of dopamine in the limbic system may be responsible for some symptoms, such as hallucinations and delusions, whereas low levels of dopamine in the prefrontal cortex might be responsible primarily for the negative symptoms (avolition, alogia, asociality and anhedonia) (Davis, Kahn, Ko, & Davidson, 1991).

Brain Anatomy

Brain imaging studies reveal that people with schizophrenia have enlarged ventricles, the cavities within the brain that contain cerebral spinal fluid (Green, 2001). In addition, many people with schizophrenia display a reduction in grey matter (cell bodies of neurons) in the frontal lobes (Lawrie & Abukmeil, 1998), and many show less frontal lobe activity when per-

forming cognitive tasks (Buchsbaum et al., 1990). The frontal lobes are important in a variety of complex cognitive functions, such as planning and executing behaviour, attention, speech, movement, and problem solving. Hence, abnormalities in this region offer legitimate reasons why people with schizophrenia experience deficits in these areas.

Events During Pregnancy

Why do people with schizophrenia have these brain abnormalities? A number of environmental factors that could impact normal brain development might be at fault. High rates of obstetric complications in the births of children who later developed schizophrenia have been reported (Cannon, Jones, & Murray, 2002). In addition, people are at an increased risk for developing schizophrenia if the pregnant parent was exposed to influenza or experienced nutritional deficiencies or maternal stress during the first trimester of pregnancy (Brown et al., 2004; Brown, 2011; Fineberg et al., 2016; Pugliese et al., 2019).

Cannabis

Another variable that is linked to schizophrenia is cannabis (marijuana) use. A review of 35 longitudinal studies found a substantially increased risk of schizophrenia and other psychotic disorders in people who had used cannabis, with the greatest risk in the most frequent users (Moore et al., 2007). The National Institute on Drug Abuse (NIDA) highlights that considerable evidence, though not universally consistent, has linked cannabis use to an earlier onset of psychosis in individuals with genetic risk factors for psychotic disorders, including schizophrenia. Various factors, such as the amount of drug consumed, the frequency of use, the potency of the cannabis product, and the age at first use, play significant roles in influencing this relationship (National Institute on Drug Abuse, 2023). One plausible interpretation of the data is that early cannabis use may disrupt normal brain development during important early maturation periods in adolescence (Trezza, Cuomo, & Vanderschuren, 2008). Thus, early cannabis use may set the stage for the development of schizophrenia and other psychotic disorders, especially among individuals with an established vulnerability (Casadio et al., 2011).

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Chapter Resources

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Chapter Attribution

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CHAPTER 11. TREATMENT OF PSYCHOLOGICAL DISORDERS

Elisa Niunin

The majority of this textbook exposed you to the many intricacies of our brain and behavior, but little time has been spent detailing what comes next. What do you do when you've spent most of your life conditioning yourself to associate an event or object with a negative emotion? Or when, as you grow into adolescence, you notice your feelings start to change and you feel as if nobody understands you anymore? Or, maybe, when your relationship with a loved one starts to bend under the tension? Our knee-jerk reaction would be to recommend treatment, but what is treatment? Which treatment? Treat what, exactly? And how? There are just as many combinations of treatments as there are mental illnesses. It is never as simple as 1 + 1 = 2 to treat an individual. A problem has to be pin-pointed and an adequate solution has to be determined. Sometimes, that problem will be influenced by many different aspects, which is why treatments and therapies are often combined to cover the most ground. This chapter will explore psychological, biological, and alternative approaches to therapy.

Mental Health Treatment: Past and Present

LEANNE STEVENS; JENNIFER STAMP; KEVIN LEBLANC (EDITORS - ORIGINAL CHAPTER); AND JESSICA MOTHERWELL MCFARLANE (EDITOR - ADAPTED CHAPTER)

Treatment in the Past

For much of history, the mentally ill have been treated very poorly. It was believed that mental illness was caused by demonic possession, witchcraft, or an angry god (Szasz, 1960). For example, in medieval times, abnormal behaviours were viewed as a sign that a person was possessed by demons. If someone was considered to be possessed, there were several forms of treatment to release spirits from the individual. The most common treatment was exorcism, often conducted by priests or other religious figures: Incantations and prayers were said over the person's body, and they may have been given some medicinal drinks. Another form of treatment for extreme cases of mental illness was trephining: A small hole was made in the afflicted individual's skull to release spirits from the body. Most people treated in this manner died. In addition to exorcism and trephining, other practices involved execution or imprisonment of people with psychological disorders. Still others were left to be homeless beggars. Generally speaking, most people who exhibited strange behaviours were greatly misunderstood and treated cruelly. The prevailing theory of psychopathology in earlier history was the idea that mental illness was the result of demonic possession by either an evil spirit or an evil god because early beliefs incorrectly attributed all unexplainable phenomena to deities deemed either good or evil.

From the late 1400s to the late 1600s, a common belief perpetuated by some religious organisations was that some people made pacts with the devil and committed horrible acts, such as eating babies (Blumberg, 2007). These people were considered to be witches and were tried and condemned by courts — they were often burned at the stake. Worldwide, it is estimated that tens of thousands of mentally ill people were killed after being accused of being witches or under the influence of witchcraft (Hemphill, 1966).

By the 18th century, people who were considered odd and unusual were placed in asylums (Figure PY.1). Asylums were the first institutions created for the specific purpose of housing people with psychological disorders, but the focus was on ostracising them from society rather than treating their disorders. Often these people were kept in windowless dungeons, beaten, and chained to their beds, with little to no contact with caregivers.



Figure PY.1. The Madhouse. *This painting by Francisco Goya, called The Madhouse, depicts a mental asylum and its inhabitants in the early 1800s. It portrays those with psychological disorders as victims.* ***Alt. text:*** *A painting depicts the inside of a mental asylum in the early 1800s.* ***Source:*** *Figure 16.4 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

In the late 1700s, a French physician, Philippe Pinel, argued for more humane treatment of the mentally ill. He suggested that they be unchained and talked to, and that's just what he did for patients at La Salpêtrière in Paris in 1795 (Figure PY.2). Patients benefited from this more humane treatment, and many were able to leave the hospital.



Figure PY.2. Philippe Pinel. *This painting by Tony Robert-Fleury depicts Dr. Philippe Pinel ordering the removal of chains from patients at the Salpêtrière asylum in Paris.* ***Alt. text:*** *A painting, set inside an asylum, depicts a person removing the chains from a patient.* ***Source:*** *Figure 16.5 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

In the 19th century, Dorothea Dix led reform efforts for mental health care in the United States (Figure PY.3). She investigated how those who are mentally ill and poor were cared for, and she discovered an underfunded and unregulated system that perpetuated abuse of this population (Tiffany, 1891). Horrified by her findings, Dix began lobbying various state legislatures and the US Congress for change (Tiffany, 1891). Her efforts led to the creation of the first mental asylums in the United States.



Figure PY.3 Dorothea Dix. *Dorothea Dix was a social reformer who became an advocate for the indigent insane and was instrumental in creating the first American mental asylum. She did this by relentlessly lobbying state legislatures and Congress to set up and fund such institutions.* ***Alt. text:*** *A portrait of Dorothea Dix is shown.* ***Source:*** *Figure 16.6 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Despite reformers' efforts, however, a typical asylum was filthy, offered very little treatment, and often kept people for decades. At Willard Psychiatric Center in upstate New York, for example, one treatment was to submerge patients in cold baths for long periods of time. Electroshock treatment was also used, and the way the treatment was administered often broke patients' backs; in 1943, doctors at Willard administered 1,443 shock treatments (Willard Psychiatric Center, 2009). (Electroshock is now called electroconvulsive treatment, and the therapy is still used, but with safeguards and under anaesthesia. A brief application of electric stimulus is used to produce a generalised seizure. Controversy continues over its effectiveness versus the side effects.) Many of the wards and rooms were so cold that a glass of water would be frozen by morning (Willard Psychiatric Center, 2009). Willard's doors were not closed until 1995. Conditions like these remained commonplace until well into the 20th century.

Starting in 1954 and gaining popularity in the 1960s, antipsychotic medications were introduced. These proved a tremendous help in controlling the symptoms of certain psychological disorders, such as psychosis. Psychosis was a common diagnosis of individuals in mental hospitals, and it was often evidenced by symptoms like hallucinations and delusions, indicating a loss of contact with reality. Then in 1963, Congress passed and John F. Kennedy signed the Mental Retardation Facilities and Community Mental Health Centers Construction Act, which provided federal support and funding for community mental health centres (National Institutes of Health, 2013). This legislation changed how mental health services were delivered in the United States. It started the process of deinstitutionalisation — the closing of large asylums — by providing for people to stay in their communities and be treated locally. In 1955, there were 558,239 severely mentally ill patients institutionalised at public hospitals (Torrey, 1997). By 1994 (by percentage of the population) there were 92% fewer hospitalised individuals (Torrey, 1997).

Mental Health Treatment Today

Today, there are community mental health centres across the nation. They are located in neighbourhoods near the homes of clients, and they provide large numbers of people with mental health services of various kinds and for many kinds of problems. Unfortunately, part of what occurred with deinstitutionalisation was that those released from institutions were supposed to go to newly created centres, but the system was not set up effectively. Centres were underfunded; staff was not trained to handle severe illnesses such as schizophrenia; there was high staff burnout; and no provision was made for the other services people needed, such as housing, food, and job training. Without these supports, those people released under deinstitutionalisation often ended up homeless. Even today, a large portion of the homeless population is considered to be mentally ill (Figure PY.4). Statistics show that 26% of homeless adults living in shelters experience mental illness (U.S. Department of Housing and Urban Development [HUD], 2011).



(a) (b)

Figure PY.4. Mental health treatment today. *(a) Of the homeless individuals in US shelters, about one-quarter have a severe mental illness (HUD, 2011). (b) Correctional institutions also report a high number of individuals living with mental illness. Alt. text: Photograph A shows a homeless man sitting outside with his possessions. Photograph B shows a prison yard from afar.* ***Source:*** *a modification of "Homeless" by Carl Campbell, which is licensed under a CC BY 2.0 Licence. credit b: modification of "Inmates" by Bart Everson is licensed under a CC BY 2.0 Licence.)*

Mental Health and the Corrections System: Indigenous people over-represented

Another group of the mentally ill population is managed by the corrections system. In Canadian prisons, the prevalence of mental health disorders is notably higher than in the general population, affecting a significant portion of the incarcerated individuals. Studies indicate that about 25% of men and up to 50% of women in federal custody are identified with serious mental illnesses, such as depression and anxiety disorders (Sapers, 2016). The rate is particularly high among women, who are also more likely to be diagnosed with borderline personality disorder compared to their male counterparts (Beaudette & Stewart, 2016). Additionally, mental health disorders such as schizophrenia, major depressive disorder, and bipolar disorder are common among inmates; a notable presence of co-occurring substance abuse disorders complicates treatment and rehabilitation (Stewart & Wilton, 2017).

In the Canadian correctional system, Indigenous people are significantly over-represented. While Indigenous men and women represent a small fraction of the general population, they face incarceration rates much higher than their non-Indigenous counterparts. Indigenous men are incarcerated at a rate 10 times greater than that for non-Indigenous men. The rate for Indigenous women is 19 times greater than that for non-Indigenous women. These disparities are in part a result of the complex interaction of the egregious harm done by separating children from their families, the socioeconomic disadvantages due to the theft of land and resources by colonial agencies, and the cultural genocidal legacies of colonisation (Statistics Canada, 2021).

Despite the pressing need, there is a significant gap in providing adequate mental health services to Indigenous inmates. Systemic barriers and a lack of culturally appropriate interventions mean that many do not receive the care they need. Recognising these issues, various levels of government have initiated reforms aimed at acknowledging the unique circumstances of Indigenous offenders and improving mental health care within correctional facilities (Correctional Service Canada, 2019; Office of the Correctional Investigator, 2020).

Today, instead of asylums, there are psychiatric hospitals run by state governments and local community hospitals, focused on short-term care. In all types of hospitals, the emphasis is on short-term stays, with the average length of stay being less than two weeks and often only several days. This is partly due to the very high cost of psychiatric hospitalisation, which can be about $800 to $1000 per night (Stensland, Watson, & Grazier, 2012). Therefore, insurance coverage often limits the length of time a person can be hospitalised for treatment. Usually, individuals are hospitalised only if they are an imminent threat to themselves or others.

Most people suffering from mental illnesses are not hospitalised. If someone is feeling very depressed, complains of hearing voices, or feels anxious all the time, they might seek psychological treatment. A friend, spouse, or parent might refer someone for treatment. The individual might go see their primary care physician first and then be referred to a mental health practitioner.

Some people seek treatment because they are involved with the state's child protective services — that is, their children have been removed from their care due to abuse or neglect. The parents might be referred to psychiatric or substance abuse facilities and the children would likely receive treatment for trauma. If the parents are interested in and capable of becoming better parents, the goal of treatment might be family reunification. For other children whose parents are unable to change — for example, the parent or parents who are heavily addicted to drugs and refuse to enter treatment — the goal of therapy might be to help the children adjust to foster care and/or adoption (Figure PY.5).



Figure PY.5. Treatment for children. *Therapy with children may involve play.* ***Alt. text:*** *An adult and a child sit and talk at a child's table.* ***Source:*** *Figure 16.8 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Some people seek therapy because the criminal justice system referred them or required them to go. For some individuals, for example, attending weekly counseling sessions might be a condition of parole. If an individual is mandated to attend therapy, they are seeking services involuntarily. Involuntary treatment refers to therapy that is not the individual's choice. Other individuals might voluntarily seek treatment. Voluntary treatment means the person chooses to attend therapy to obtain relief from symptoms.

Psychological treatment can occur in a variety of places. An individual might participate in traditional healing methods (e.g., sweat lodge ceremonies, herbal medicines, smudging, and talking circles) facilitated by and under the guidance of Elders or traditional healers. An individual might go to a community mental health centre or a practitioner in private or community practice. A child might see a school counselor, school psychologist, or school social worker. An incarcerated person might receive group therapy in prison. There are many different types of treatment providers, and licensing requirements vary from state to state. Besides psychologists and psychiatrists, there are clinical social workers, marriage and family therapists, and trained religious personnel who also perform counseling and therapy.

In Canada, mental health treatment funding is supported by a combination of public health insurance, private insurance, and out-of-pocket payments. Under the Canada Health Act, which mandates accessibility and universality, provincial and territorial health insurance plans must cover medically necessary hospital and physician services, including those for mental health (Government of Canada, 2021). However, not all mental health services, especially those provided outside hospitals or by non-physicians, are covered, which may necessitate private insurance or direct payments by individuals.

The landscape of mental health coverage began evolving significantly with the introduction of policies that push for parity (equality) between mental and physical health treatments. For example, several provinces have taken steps to ensure better coverage and access to mental health services. Ontario, through its Health Insurance Plan (OHIP), provides coverage for psychiatry and some psychological therapy sessions delivered by physicians, aligning with the principles of parity where treatment for mental health issues is covered under the same terms as physical health issues (Ontario Ministry of Health, 2020).

Additionally, the Mental Health Commission of Canada advocates for consistent and equitable treatment across all types of health insurance, promoting policies that ensure mental health services are funded on par with physical health services, reflecting the approach of the Mental Health Parity and Addiction Equity Act in the US (Mental Health Commission of Canada, 2020).

Types of Treatment

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One of the goals of therapy is to help a person stop repeating and reenacting destructive patterns and start looking for better solutions to difficult situations. This goal is reflected in the following poem:

Autobiography in Five Short Chapters **by Portia Nelson (1993)**

Chapter One
I walk down the street.
There is a deep hole in the sidewalk.
I fall in.
I am lost. . . . I am helpless.
It isn't my fault.
It takes forever to find a way out.

Chapter Two
I walk down the same street.
There is a deep hole in the sidewalk.
I pretend I don't see it.
I fall in again.
I can't believe I am in this same place.
But, it isn't my fault.
It still takes a long time to get out.

Chapter Three
I walk down the same street.
There is a deep hole in the sidewalk.
I *see* it is there.
I still fall in . . . it's a habit . . . but,
my eyes are open.
I know where I am.
It is *my* fault.
I get out immediately.

Chapter Four
I walk down the same street.
There is a deep hole in the sidewalk.
I walk around it.

Chapter Five
I walk down another street.

Three types of therapy are: traditional therapies, psychotherapy, and biomedical therapy. All help people with psychological disorders such as depression, anxiety, and schizophrenia. **Traditional therapies** incorporate a variety of practices developed over centuries within different cultures, often using natural remedies and holistic approaches to mental health healing. These therapies may include the use of herbs, massage, and rituals aimed at balancing the individual's physical, mental, and spiritual health. For example, Traditional Chinese Medicine utilises techniques like acupuncture and dietary therapy to correct imbalances in the body's energy, or Qi, while Indigenous healing methods might involve ceremonies, spiritual healings, and the use of medicinal plants, reflecting deep connections to the community and the natural world. **Psychotherapy** is a psychological treatment that employs various methods to help individuals overcome personal problems or attain personal growth. In modern practice, psychotherapy has evolved into what is known as psychodynamic therapy, which will be discussed later. **Biomedical therapy** involves medication and/or medical procedures to treat psychological disorders. In this discussion, we will first explore two types of traditional therapies: Traditional Chinese Medicine and Indigenous healing methods.

Traditional Therapies

Traditional Chinese Medicine

Traditional Chinese Medicine (TCM) offers a diverse range of treatments that have been investigated for their potential benefits in managing psychological disorders such as depression and anxiety. TCM employs therapies such as acupuncture, herbal medicine, Tai Chi, and Qi Gong, each of which has been studied to varying extents for its effects on mental health.

Acupuncture (very thin needles are inserted into specific points on the body) is particularly notable for its application in treating psychological disorders. Research suggests that it can effectively reduce symptoms of depression and anxiety. Clinical trials have indicated that acupuncture is safe and can provide clinically relevant benefits in reducing the severity of depression, particularly in patients who also experience anxiety and somatic symptoms (Yanfen She, 2022).

Herbal medicine is another significant component of TCM with a rich tradition of use in treating emotional disorders. Herbal formulas like Xiao Yao San have been systematically reviewed and shown to produce antidepressant effects in clinical settings. Studies suggest that these effects may be mediated through pathways such as the JNK signaling pathway in the hippocampus (Zhang et al., 2012; Zhao et al., 2020). The JNK signaling pathway is a series

of interactions within a cell that helps it respond to stress and inflammation. Think of it like a chain reaction that starts when the cell detects stress, leading to changes that help the cell survive or adapt to the situation. This pathway can influence how cells grow, repair themselves, or even how they die, which is important for keeping the body healthy and balanced.

Moreover, TCM practices such as **Tai Chi and Qi Gong** have been researched for their impact on mental health, with evidence suggesting that they can improve symptoms of anxiety and depression. These mind-body therapies are considered beneficial not only for general health but also for specific conditions such as Parkinson's disease, where they help in managing symptoms and enhancing life quality (Kamieniarz et al., 2021).

However, the research on TCM emphasises the need for a holistic approach and often points out the limitations of studying isolated components of this traditional system. The effectiveness of TCM may not be fully captured by conventional research methodologies focused on single treatments, highlighting the importance of an integrated approach to understanding and applying these practices in clinical settings.

Overall, TCM provides a valuable array of treatments that can be considered for inclusion in comprehensive mental health care strategies, especially for patients interested in non-pharmaceutical alternatives or complementary therapies.

Indigenous Traditional Therapies

Indigenous healing practices for psychological disorders encompass a diverse array of traditional therapies deeply woven into the fabric of cultural identity and community. These practices often include medicinal plants, spiritual healing, physical therapies, and communal ceremonies such as sweat lodges, drumming, and storytelling, which are integral to maintaining community bonds and spiritual wellness. Recognised increasingly for their value in addressing the impacts of colonisation and cultural loss, these therapies are crucial not only for treating mental illness but also for cultural reclamation and identity restoration (Connors & Maidman, 2001).

Research highlights the "two-eyed seeing" approach, advocating for the integration of Indigenous and Western healing methods to enhance mental health care's cultural competence. This integration has shown promise in improving resilience and effective coping during crises, suggesting that therapeutic practices aligning with an individual's cultural perspective can significantly bolster mental health outcomes (Connors & Maidman, 2001). For instance, studies in Northern Ontario have demonstrated that combining Indigenous healing practices with harm reduction strategies markedly improves outcomes for patients with substance use disorders and intergenerational trauma (Marsh et al., 2021).

Further research supports the integration of traditional Indigenous methods with Western therapies to address complex trauma, highlighting the importance of respecting historical and cultural dimensions in treatment approaches (Marsh et al., 2015). A comprehensive review also emphasises the potential of collaborative care models in primary healthcare, which facilitate the inclusion of Indigenous values and practices, thus promoting better health outcomes (Corso et al., 2020). Additional studies, such as those conducted in rural Nepal, advocate for integrating traditional and biomedical care pathways to enhance mental well-being by incorporating local cultural practices (Pham et al., 2021).

These findings collectively support the integration of Indigenous healing practices within modern healthcare frameworks, ensuring that treatments are culturally appropriate and respectful of traditional knowledge. Such approaches are gaining recognition for their effectiveness in not only addressing the symptoms of psychological disorders but also in healing the significant community and cultural wounds impacting Indigenous peoples' mental health.

Psychotherapies

Next let's consider the various psychotherapeutic orientations outlined in Table PY.1 (many of these orientations were discussed in the Introduction chapter).

Table PY.1. Various psychotherapy techniques

Type	Description	Example
Psychodynamic psychotherapy	Talk therapy based on belief that the unconscious and childhood conflicts impact behaviour	Patient talks about their past
Play therapy	Psychoanalytical therapy wherein interaction with toys is used instead of talk; used in child therapy	Patient (child) acts out family scenes with dolls
Behaviour therapy	Principles of learning applied to change undesirable behaviours	Patient learns to overcome fear of elevators through several stages of relaxation techniques
Cognitive therapy	Awareness of cognitive process helps patients eliminate thought patterns that lead to distress	Patient learns not to overgeneralise failure based on single failure
Cognitive-behavioural therapy	Work to change cognitive distortions and self-defeating behaviours	Patient learns to identify self-defeating behaviours to overcome an eating disorder
Feminist and anti-oppression therapies	Emphasises the role of social, political, and cultural contexts in contributing to individual psychological problems. Aims to empower clients by identifying and challenging systemic inequalities and personal lived experiences of oppression.	Patient discusses workplace gender discrimination with their therapist, who helps them understand how societal influences impact colleague behaviours and their own self-esteem and develop strategies to assert their rights and enhance their work environment.
Humanistic therapy	Increase self-awareness and acceptance through focus on conscious thoughts	Patient learns to articulate thoughts that keep her from achieving her goals

Integrative Approach to Psychotherapy Treatment

Up to this point we have considered the different approaches to **psychotherapy** under the assumption that a therapist will use only one approach with a given patient. But this is not the case; the most commonly practiced approach to therapy is an **integrative (eclectic) therapy**, an approach to treatment in which the therapist uses whichever techniques seem most useful and relevant for a given patient. For bipolar disorder, for instance, the therapist may use both psychological skills training to help the patient cope with the severe highs and lows, and also suggest that the patient consider biomedical drug therapies (Newman, Leahy, Beck, Reilly-Harrington, & Gyulai, 2002). Treatment for major depressive disorder usually involves antidepressant drugs as well as CBT to help the patient deal with particular problems and a sociocultural approach to provide important context for the patient's experiences (McBride, Farvolden, & Swallow, 2007).

Biomedical Therapies

Individuals can be prescribed biologically based treatments or psychotropic medications that are used to treat mental disorders. While these are often used in combination with psychotherapy, they also are taken by individuals not in therapy. This is known as **biomedical therapy**. Medications used to treat psychological disorders are called psychotropic medications and are prescribed by medical doctors, including psychiatrists. In Louisiana and New Mexico, psychologists are able to prescribe some types of these medications (American Psychological Association, 2014).

Different types and classes of medications are prescribed for different disorders. An individual with depression might be given an antidepressant, an individual with bipolar disorder might be given a mood stabiliser, and an individual with schizophrenia might be given an antipsychotic. A person suffering with complex post-traumatic stress disorder might be given a psychedelic. These medications treat the symptoms of a psychological disorder by altering the levels or effects of neurotransmitters. For example, each type of antidepressant affects a different neurotransmitter, such as SSRI (selective serotonin reuptake inhibitor) antidepressants that increase the level of the neurotransmitter serotonin, and SNRI (serotonin-norepinephrine reuptake inhibitor) antidepressants that increase the levels of both serotonin and norepinephrine. They can help people feel better so that they can function on a daily basis, but they do not cure the disorder. Some people may only need to take a psychotropic medication for a short period of time. Others with severe disorders like bipolar disorder or schizophrenia may need to take psychotropic medication for a long time.

Psychotropic medications are a popular treatment option for many types of disorders, and research suggests that they are most effective when combined with psychotherapy. This is especially true for the most common mental disorders, such as depressive and anxiety disorders (Cuijpers et al, 2014). When considering adding medication as a treatment option, individuals should know that some psychotropic medications have very concerning side effects. Table PY.2 (in the section ***Biological Approaches to Treatment***) shows the commonly prescribed types of medications, how they are used, and *some* of the potential side effects that may occur.

Electroconvulsive Therapy (ECT)

Another biologically based treatment that continues to be used, although infrequently, is electroconvulsive therapy (ECT) (formerly known by its unscientific name as electroshock therapy). It involves using an electrical current to induce seizures to help alleviate the effects of severe depression. The exact mechanism is unknown, although it does help alleviate

symptoms for people with severe depression who have not responded to traditional drug therapy (Pagnin, de Queiroz, Pini, & Cassano, 2004). About 85% of people treated with ECT improve (Reti, n.d.). However, the memory loss associated with repeated administrations has led to it being implemented as a last resort (Donahue, 2000; Prudic, Peyser, & Sackeim, 2000). A more recent alternative is transcranial magnetic stimulation (TMS), a procedure approved by the FDA in 2008 that uses magnetic fields to stimulate nerve cells in the brain to improve depression symptoms; it is used when other treatments have not worked (Mayo Clinic, 2012).

Treatment Modalities

There are several modalities of treatment: individual therapy, group therapy, couples therapy, and family therapy are the most common. In an **individual therapy** session, a client works one-on-one with a trained therapist. In **group therapy**, usually 5–10 people meet with a trained group therapist to discuss a common issue (e.g., divorce, grief, eating disorders, substance abuse, or anger management). **Couples therapy** involves two people in an intimate relationship who are having difficulties and are trying to resolve them. The couple may be dating, partnered, engaged, or married. The therapist helps them resolve their problems as well as implement strategies that will lead to a healthier and happier relationship. **Family therapy** is a special form of group therapy. The therapy group is made up of one or more families. The goal of this approach is to enhance the growth of each individual family member and the family as a whole.

Substance-Related and Addictive Disorders: A Special Case

Addiction is often viewed as a chronic disease that rewires the brain. This helps explain why relapse rates tend to be high, around 40%–60% (McLellan, Lewis, & O'Brien, & Kleber, 2000). The goal of treatment is to help an addict stop compulsive drug-seeking behaviours. Treatment usually includes behavioural therapy, which can take place individually or in a group setting. Treatment may also include medication. Sometimes a person has comorbid (more than one) disorders, which usually means that they have a substance-related disorder diagnosis and another psychiatric diagnosis, such as depression, bipolar disorder, or schizophrenia. The best treatment would address both problems simultaneously.

Inclusive Therapy Models: Sociocultural, Feminist, and Anti-Oppression Approaches

The sociocultural perspective examines behaviours and symptoms within the context of an individual's culture and background, emphasising the integration of cultural and religious beliefs into the therapeutic process. This approach is supported by evidence suggesting that cultural competency in therapy can significantly affect treatment outcomes (Chu et al., 2022).

Research indicates that ethnic minorities are less likely to access mental health services compared to their white counterparts. Barriers to treatment include not only lack of insurance, transportation, and time but also cultural views that stigmatise mental illness, fears about treatment, language barriers, and concerns about not being understood or respected by practitioners (Gopalkrishnan, 2018).

Feminist and anti-oppression therapies actively address the power dynamics and systemic inequalities that affect mental health by acknowledging and confronting gender, racial, and socioeconomic disparities. These approaches aim to empower clients by validating their experiences and fostering an egalitarian therapeutic relationship. By striving to understand and dismantle the biases and structural barriers clients face, these models facilitate a more inclusive and accessible mental health practice, enhancing engagement and satisfaction among marginalised groups (Brown, 2018).

Psychological Approaches to Treatment

LEANNE STEVENS; JENNIFER STAMP; KEVIN LEBLANC (EDITORS - ORIGINAL CHAPTER); AND JESSICA MOTHERWELL MCFARLANE (EDITOR - ADAPTED CHAPTER)

Treatment for psychological disorder begins when the individual who is experiencing distress visits a counselor or therapist, perhaps in a church, a community centre, a hospital, or a private practice. The therapist will begin by systematically learning about the patient's needs through a formal **psychological assessment**, which is an evaluation of the patient's psychological and mental health. During the assessment the psychologist may give personality tests such as the Minnesota Multiphasic Personal Inventory (MMPI-2), Millon Adolescent Clinical Inventory (MACI), or projective tests, and will conduct a thorough interview with the patient. The therapist may get more information from family members or school personnel. In addition to the psychological assessment, the patient is usually seen by a physician to gain information about potential Axis III (physical) problems. In some cases of psychological disorder — and particularly for sexual problems — medical treatment is the preferred course of action. For instance, men who are experiencing erectile dysfunction disorder may need surgery to increase blood flow or local injections of muscle relaxants. Or they may be prescribed medications (Viagra, Cialis, or Levitra) that provide an increased blood supply to the penis, and are successful in increasing performance in about 70% of men who take them.

After the medical and psychological assessments are completed, the therapist will make a formal diagnosis using the detailed descriptions of the disorder provided in the ***Diagnostic and Statistical Manual of Mental Disorders (DSM)***. The therapist will summarise the information about the patient on each of the five *DSM* axes, and the diagnosis will likely be sent to an insurance company to justify payment for the treatment.

If a diagnosis is made, the therapist will select a course of therapy that they feel will be most effective. One approach to treatment is **psychotherapy**, the professional treatment for psychological disorder through techniques designed to encourage communication of conflicts and insight. The fundamental aspect of psychotherapy is that the patient directly confronts the disorder and works with the therapist to help reduce it. Therapy includes assessing the patient's issues and problems, planning a course of treatment, setting goals for change, the treatment itself, and an evaluation of the patient's progress. Therapy is practiced by thousands of psychologists and other trained practitioners in Canada and around the world, and is responsible for billions of dollars of the health budget.

There is a stereotype that therapy must involve a patient lying on a couch with a therapist sitting behind and nodding sagely as the patient speaks. Though this approach to therapy (known as *psychoanalysis*) is still practiced, it is in the minority. It is estimated that there are over 400 different kinds of therapy practiced by people in many fields, and the most important of these are psychodynamic, humanistic, cognitive behavioural therapy, and eclectic (i.e., a combination of therapies). The therapists who provide these treatments include psychiatrists (who have a medical degree and can prescribe drugs) and clinical psychologists, as well as social workers, psychiatric nurses, and couples, marriage, and family therapists.

Watch this video: **Tricky Topics: Psychological Treatments (6 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=1194#oembed-1***

"Tricky Topics: Psychological Treatments" video by FirstYearPsych Dalhousie is licensed under the Standard YouTube Licence.

Here is the **Tricky Topics: Psychological Treatments transcript**.

Psychodynamic Therapy

Psychodynamic therapy (psychoanalysis) is a psychological treatment based on Freudian and neo-Freudian personality theories in which the therapist helps the patient explore the unconscious dynamics of personality. The analyst engages with the patient, usually in one-on-one sessions, often with the patient lying on a couch and facing away. The goal of the psychotherapy is for the patient to talk about their personal concerns and anxieties, allowing the therapist to try to understand the underlying unconscious problems that are causing the symptoms (the process of interpretation). The analyst may try out some interpretations on the patient and observe how they respond to them.

The patient may be asked to verbalise their thoughts through **free association**, in which the therapist listens while the client talks about whatever comes to mind, without any censorship or filtering. The client may also be asked to report on his or her dreams, and the therapist will use **dream analysis** to analyze the symbolism of the dreams in an effort to probe the unconscious thoughts of the client and interpret their significance. On the basis of the thoughts expressed by the patient, the analyst discovers the unconscious conflicts causing the patient's symptoms and interprets them for the patient.

The goal of psychotherapy is to help the patient develop **insight** — that is, an understanding of the unconscious causes of the disorder (Epstein, Stern, & Silbersweig, 2001), but the patient often shows resistance to these new understandings, using defence mechanisms to avoid the painful feelings in his or her unconscious. The patient might forget or miss appointments, or act out with hostile feelings toward the therapist. The therapist attempts to help the patient develop insight into the causes of the resistance. The sessions may also lead to **transference**, in which the patient unconsciously redirects feelings experienced in an important personal relationship toward the therapist. For instance, the patient may transfer feelings of guilt that come from the father or mother to the therapist. Some therapists believe that transference should be encouraged, as it allows the client to resolve hidden conflicts and work through feelings that are present in the relationships.

One problem with traditional psychoanalysis is that the sessions may take place several times a week, go on for many years, and cost thousands of dollars. To help more people benefit, modern psychodynamic approaches frequently use shorter-term, focused, and goal-oriented approaches. In these brief psychodynamic therapies, the therapist helps the client determine the important issues to be discussed at the beginning of treatment and usually takes a more active role than in classic psychoanalysis (Levenson, 2010).

Counter-transference and why psychotherapists on TV shows should not sleep with their patients

Counter-transference occurs when therapists project their own unresolved feelings, beliefs, or experiences onto their patients, usually in response to transference from the patient. This dynamic can be conscious or unconscious and often stems from the therapist's own emotional reactions to the themes and issues presented by the patient during therapy sessions. Effective therapists recognise and manage these reactions to prevent them from interfering with the therapeutic process. Instead, they use their understanding of counter-transference as a therapeutic tool to deepen their empathy and enhance their insight into the patient's experience, thereby facilitating a more informed and sensitive intervention. In marked contrast to what is popular shown on TV shows, therapists must recognise and address their counter-transference because it is crucial for maintaining professional boundaries and ensuring that the therapy focuses on the patient's needs and therapeutic goals. In short, TV therapists — and all professionals in real life — should never ever sleep with their patients.

Humanistic Therapies

Just as psychoanalysis is based on the personality theories of Freud and the neo-Freudians, **humanistic therapy** is *a psychological treatment based on the personality theories of Carl Rogers and other humanistic psychologists*. Humanistic therapy is based on the idea that people develop psychological problems when they are burdened by limits and expectations placed on them by themselves and others; the treatment emphasises the person's capacity for self-realisation and fulfillment. Humanistic therapies attempt to promote growth and responsibility by helping clients consider their own situations and the world around them and how they can work to achieve their life goals.

Carl Rogers developed **person-centred therapy** (or client-centred therapy), an approach to treatment in which the client is helped to grow and develop as the therapist provides a comfortable, nonjudgmental environment. In his book A Way of Being (1980), Rogers argued that therapy was most productive when the therapist created a positive relationship with the client — a therapeutic alliance. The **therapeutic alliance** is a relationship between the client and the therapist that is facilitated when the therapist is genuine (i.e., they create no barriers to free-flowing thoughts and feelings), when the therapist treats the client with unconditional positive regard (i.e., they value the client without any qualifications, displaying an accepting attitude toward whatever the client is feeling at the moment), and when the therapist develops empathy with the client (i.e., they actively listen to and accurately perceive the personal feelings that the client experiences).

The development of a positive therapeutic alliance has been found to be exceedingly important to successful therapy. The ideas of genuineness, empathy, and unconditional positive regard in a nurturing relationship, in which the therapist actively listens to and reflects the feelings of the client, is probably the most fundamental part of contemporary psychotherapy (Prochaska & Norcross, 2007).

Psychodynamic and humanistic therapies are recommended primarily for people suffering from generalised anxiety or mood disorders, and who desire to feel better about themselves overall. But the goals of people with other psychological disorders, such as phobias, sexual problems, and **obsessive-compulsive disorder (OCD)**, are more specific. A person with a social phobia may want to be able to leave their house, a person with a sexual dysfunction may want to improve their sex life, and a person with OCD may want to learn to stop letting their obsessions or compulsions interfere with everyday activities. In these cases it is not necessary to revisit childhood experiences or consider our capacities for self-realisation — we simply want to deal with what is happening in the present.

Psychotherapy

Play Therapy

Play therapy is often used with children since they are not likely to sit on a couch and recall their dreams or engage in traditional talk therapy. This technique uses a therapeutic process of play to "help clients prevent or resolve psychosocial difficulties and achieve optimal growth" (O'Connor, 2000, p. 7). The idea is that children play out their hopes, fantasies, and traumas while using dolls, stuffed animals, and sandbox figurines (Figure PY.6). Play therapy can also be used to help a therapist make a diagnosis. The therapist observes how the child interacts with toys (e.g., dolls, animals, and home settings) in an effort to understand the roots of the child's disturbed behaviour. Play therapy can be nondirective or directive. In nondirective play therapy, children are encouraged to work through their problems by playing freely while the therapist observes (LeBlanc & Ritchie, 2001). In directive play therapy, the therapist provides more structure and guidance in the play session by suggesting topics, asking questions, and even playing with the child (Harter, 1977).



Figure PY.6. Play therapy. *This type of play therapy is known as sandplay or sandtray therapy. Children can set up a three-dimensional world using various figures and objects that correspond to their inner state (Kalff, 1991). Figure 16.10 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Behaviour Therapy

In psychoanalysis, therapists help their patients look into their past to uncover repressed feelings. In behaviour therapy, a therapist employs principles of learning to help clients change undesirable behaviours, rather than digging deeply into one's unconscious. Therapists with this orientation believe that dysfunctional behaviours, like phobias and bedwetting, can be changed by teaching clients new, more constructive behaviours. Behaviour therapy employs both classical and operant conditioning techniques to change behaviour.

One type of behaviour therapy utilises classical conditioning techniques. Therapists using these techniques believe that dysfunctional behaviours are conditioned responses. Applying the conditioning principles developed by Ivan Pavlov, these therapists seek to recondition their clients and thus change their behaviour.

For example: Feng is eight years old and frequently wets his bed at night. Feng has been invited to several sleepovers but won't go because of this problem. Using a type of conditioning therapy, Feng begins to sleep on a liquid-sensitive bed pad that is connected to a sound alarm. When moisture touches the pad, it causes the alarm to sound, waking up Feng. When this process is repeated enough times, Feng develops an association between urinary relaxation and waking up, and this leads to the discontinuation of the bedwetting. Feng has now gone three weeks without wetting the bed and is looking forward to his first sleepover this weekend.

One commonly used classical conditioning therapeutic technique is **counterconditioning**; a client learns a new response to a stimulus that has previously elicited an undesirable behaviour. Two counterconditioning techniques are aversive conditioning and exposure therapy. Aversive conditioning uses an unpleasant stimulus to stop an undesirable behaviour. Therapists apply this technique to eliminate addictive behaviours, such as smoking, nail biting, and drinking. In aversion therapy, clients will typically engage in a specific behaviour (such as nail biting) and at the same time are exposed to something unpleasant, such as a mild electric shock or a bad taste. After repeated associations between the unpleasant stimulus and the behaviour, the client can learn to stop the unwanted behaviour.

Aversion therapy has been used effectively for years in the treatment of alcoholism (Davidson, 1974; Elkins, 1991; Streeton & Whelan, 2001). One common way this occurs is through a chemically based substance known as Antabuse. When a person takes Antabuse and then consumes alcohol, uncomfortable side effects result including nausea, vomiting, increased heart rate, heart palpitations, severe headache, and shortness of breath. Antabuse is repeatedly paired with alcohol until the client associates alcohol with unpleasant feelings, which decreases the client's desire to consume alcohol. Antabuse creates a conditioned aversion to alcohol because it replaces the original pleasure response with an unpleasant one.

In **exposure therapy**, a therapist seeks to treat clients' fears or anxiety by presenting them with the object or situation that causes their problem, with the idea that they will eventually get used to it. This can be done via reality, imagination, or virtual reality. Exposure therapy was first reported in 1924 by Mary Cover Jones, who is considered the mother of behaviour therapy. Jones worked with a boy named Peter who was afraid of rabbits. Her goal was to replace Peter's fear of rabbits with a conditioned response of relaxation, which is a response that is incompatible with fear (Figure PY.7). How did she do it? Jones began by placing a caged rabbit on the other side of a room with Peter while he ate his afternoon snack. Over the course of several days, Jones moved the rabbit closer and closer to where Peter was seated with his snack. After two months of being exposed to the rabbit while relaxing with his snack, Peter was able to hold the rabbit and pet it while eating (Jones, 1924).

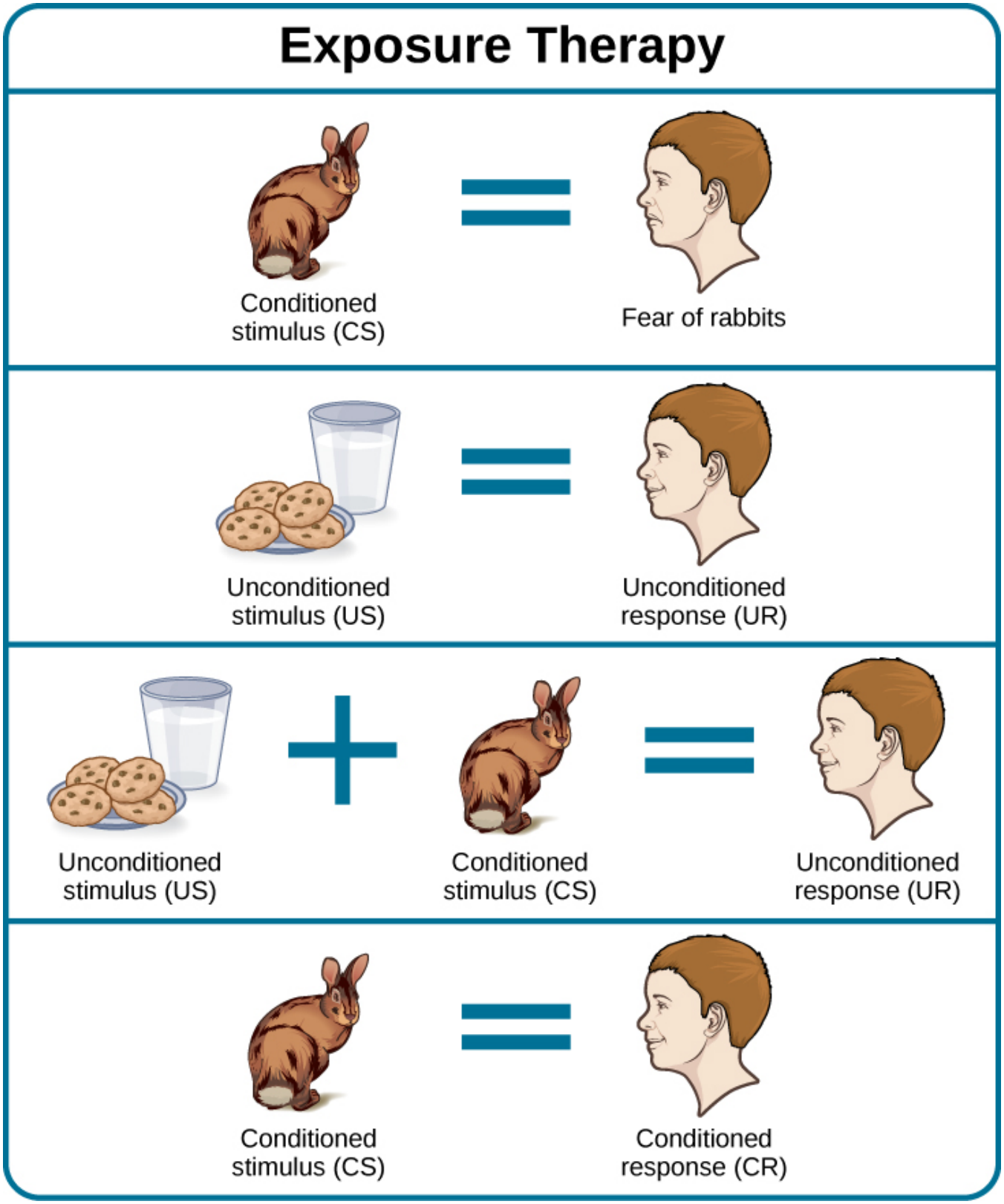

Figure PY.7. Exposure therapy. *Exposure therapy seeks to change the response to a conditioned stimulus (CS). An unconditioned stimulus is presented over and over just after the presentation of the conditioned stimulus. This figure shows conditioning as conducted in Mary Cover Jones' 1924 study. Figure 16.11 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

Thirty years later, Joseph Wolpe (1958) refined Jones's techniques, giving us the behaviour therapy technique of exposure therapy that is used today. A popular form of exposure therapy is systematic desensitization, wherein a calm and pleasant state is gradually associated with increasing levels of anxiety-inducing stimuli. The idea is that you can't be nervous and relaxed at the same time. Therefore, if you can learn to relax when you are facing environmental stimuli that make you nervous or fearful, you can eventually eliminate your unwanted fear response (Wolpe, 1958) (Figure PY.8).



(a)

Behavior	Fear Rating
Look at a photo of a spider.	15
Look at a real spider through clear glass.	35
Hold a box that contains a spider.	55
Watch a spider crawl across the floor.	65
Watch a spider crawl across your desk.	75
Hold a spider with gloved hands.	90
Hold a spider with bare hands.	100

(b)

Figure PY.8. Arachnophobia. *This person suffers from arachnophobia (fear of spiders). Through exposure therapy he is learning how to face his fear in a controlled, therapeutic setting. Figure 16.12 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

How does exposure therapy work? Jayden is terrified of elevators. Nothing bad has ever happened to Jayden on an elevator, but they're so afraid of elevators that they will always take the stairs. That wasn't a problem when Jayden worked on the second floor of an office building, but now they have a new job—on the 29th floor of a skyscraper in downtown Los Angeles. Jayden knows they can't climb 29 flights of stairs in order to get to work each day, so they decided to see a behaviour therapist for help. The therapist asks Jayden to first construct a hierarchy of elevator-related situations that elicit fear and anxiety. They range from situations of mild anxiety such as being nervous around the other people in the elevator, to the fear of getting an arm caught in the door, to panic-provoking situations such as getting trapped or the cable snapping. Next, the therapist uses progressive relaxation, teaching Jayden how to relax each of their muscle groups so that they achieve a drowsy, relaxed, and comfortable state of mind. Once Jayden's in this state, the therapist asks Jayden to imagine a mildly anxiety-provoking situation. Jayden is standing in front of the elevator thinking about pressing the call button.

If this scenario causes Jayden anxiety, then they lift their finger. The therapist would then tell Jayden to forget the scene and return to their relaxed state. The therapist repeats this scenario over and over until Jayden can imagine pressing the call button without anxiety.

Over time the therapist and Jayden use progressive relaxation and imagination to proceed through all of the situations on Jayden's hierarchy until they become desensitised to each one. After this, Jayden and the therapist begin to practice what Jayden only previously envisioned in therapy, gradually going from pressing the button to actually riding an elevator. The goal is that Jayden will soon be able to take the elevator all the way up to the 29th floor of their office without feeling any anxiety.

Sometimes, it's too impractical, expensive, or embarrassing to re-create anxiety-producing situations, so a therapist might employ virtual reality exposure therapy by using a simulation to help conquer fears. Virtual reality exposure therapy has been used effectively to treat numerous anxiety disorders such as the fear of public speaking, claustrophobia (fear of enclosed spaces), aviophobia (fear of flying), and post-traumatic stress disorder (PTSD), a trauma and stressor-related disorder (Gerardi, Cukor, Difede, Rizzo, & Rothbaum, 2010).

Using virtual reality to help patients with dementia

Watch this video from Global News that highlights work being done at York University using **virtual reality with patients with dementia**.

Psychotherapy: Cognitive Therapy

Cognitive therapy is a form of psychotherapy that focuses on how a person's thoughts lead to feelings of distress. The idea behind cognitive therapy is that how you think determines how you feel and act. Cognitive therapists help their clients change dysfunctional thoughts in order to relieve distress. They help a client see how they misinterpret a situation (cognitive distortion). For example, a client may overgeneralise. Because Rey failed one test in Psychology 101, Rey feels they are stupid and worthless. These thoughts then cause their mood to worsen. Therapists also help clients recognise when they blow things out of proportion. Because Rey failed their Psychology 101 test, they have concluded that they're going to fail the entire course and probably flunk out of college altogether. These errors in thinking have contributed to Rey's feelings of distress. Rey's therapist will help them challenge these irrational beliefs, focus on their illogical basis, and correct them with more logical and rational thoughts and beliefs.

Cognitive therapy was developed by psychiatrist Aaron Beck in the 1960s. His initial focus was on depression and how a client's self-defeating attitude served to maintain a depression despite positive factors in her life (Beck, Rush, Shaw, & Emery, 1979) (Figure PY.9). Through questioning, a cognitive therapist can help a client recognise dysfunctional ideas, challenge catastrophising thoughts about themselves and their situations, and find a more positive way to view things (Beck, 2011).

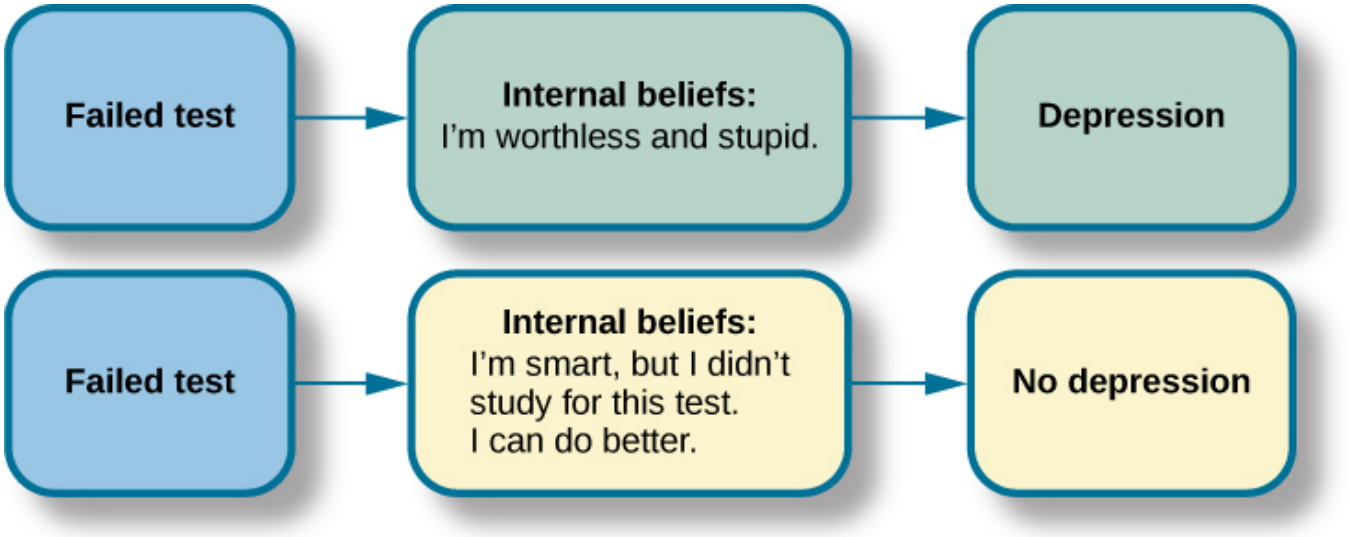

Figure PY.9. Emotional reactions. *Your emotional reactions are the result of your thoughts about the situation rather than the situation itself. For instance, if you consistently interpret events and emotions around the themes of loss and defeat, then you are likely to be depressed. Through therapy, you can learn more logical ways to interpret situations. Figure 16.13 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

More About Cognitive Therapy

Watch as **Dr. Aaron Beck explains Cognitive Therapy** and gives some examples of its use, to learn more.

Psychotherapy: Cognitive-Behavioural Therapy

Cognitive-behavioural therapists focus much more on present issues than on a patient's childhood or past, as in other forms of psychotherapy. One of the first forms of cognitive-behavioural therapy was rational emotive therapy (RET), which was founded by Albert Ellis and (like Beck's development of Cognitive Therapy) grew out of his dislike of Freudian psychoanalysis (Daniel, n.d.). Behaviourists such as Joseph Wolpe also influenced Ellis's therapeutic approach (National Association of Cognitive-Behavioural Therapists, 2009).

Cognitive-behavioural therapy (CBT) helps clients examine how their thoughts affect their behaviour. It aims to change cognitive distortions and self-defeating behaviours. In essence, this approach is designed to change the way people think as well as how they act. It is similar to cognitive therapy in that CBT attempts to make individuals aware of their irrational and negative thoughts and helps people replace them with new, more positive ways of thinking. It is also similar to behaviour therapies in that CBT teaches people how to practice and engage in more positive and healthy approaches to daily situations.

In total, hundreds of studies have shown the effectiveness of cognitive-behavioural therapy in the treatment of numerous psychological disorders such as depression, PTSD, anxiety disorders, eating disorders, bipolar disorder, and substance abuse (Beck Institute for Cognitive Behaviour Therapy, n.d.). For example, CBT has been found to be effective in decreasing levels of hopelessness and suicidal thoughts in previously suicidal teenagers (Alavi, Sharifi, Ghanizadeh, & Dehbozorgi, 2013). Cognitive-behavioural therapy has also been effective in reducing PTSD in specific populations, such as transit workers (Lowinger & Rombom, 2012).

Cognitive-behavioural therapy aims to change cognitive distortions and self-defeating behaviours using techniques like the ABC model. With this model, there is an:

- **A**ction (sometimes called an activating event), the
- **B**elief about the event, and the
- **C**onsequences of this belief.

Let's say Jude and Zain both go to a party. Jude and Zain have each met someone new at the party and both of them spend a few hours chatting with their new acquaintances. At the end of the party, both Jude and Zain ask the new person they've met for their phone number, but in both cases, the other person refuses. Both Jude and Zain are surprised, as they both thought things were going well. What might Jude and Zain tell themselves about why the person was not interested? Let's say Jude tells himself that he is a loser, or is ugly, or "has no game". Jude then gets depressed and decides not to go to another party, which starts a cycle that keeps him depressed. Zain, on the other hand, thinks that maybe it was bad breath and goes out and buys some breath mints, goes to another party, and meets someone new.

Jude's belief about what happened results in a consequence of further depression, whereas Zain's belief does not. Jude is internalising the attribution or reason for the rebuffs, which triggers his depression. On the other hand, Zain is externalising the cause, so their thinking does not contribute to feelings of depression.

Cognitive-behavioural therapy focuses on identifying and correcting maladaptive and automatic thoughts, known as **cognitive distortions**, which skew a person's perception of reality. Three common types of cognitive distortions are all-or-nothing thinking, overgeneralisation, and jumping to conclusions.

All-or-nothing thinking is marked by seeing situations in extremes, with no middle ground, often found in individuals experiencing depression. For example, after being rejected for a date, Jude might think, "No one will ever go out with me. I'm going to be alone forever", leading him to feel anxious and despondent about his future prospects.

Overgeneralisation involves drawing broad conclusions from a single, often minor, event. Jude might generalise a rejection by saying, "I am ugly, a loser, and no one is ever going to be interested in me", rather than seeing it as an isolated incident, thus magnifying the emotional impact of the rejection far beyond its actual significance.

Jumping to conclusions occurs when someone assumes a negative outcome without sufficient evidence to support such a belief. For example, when Carrigan does not hear back from Chao after leaving a message to meet for coffee, they might prematurely conclude that Chao dislikes them or is disinterested in friendship, despite many other plausible reasons for Chao's lack of response.

How effective is CBT? One client said this about his cognitive-behavioural therapy:

> *I have had many painful episodes of depression in my life, and this has had a negative effect on my career and has put considerable strain on my friends and family. The treatments I have received, such as taking antidepressants and psychodynamic counselling, have helped [me] to cope with the symptoms and to get some insights into the roots of my problems. CBT has been by far the most useful approach I have found in tackling these mood problems. It has raised my awareness of how my thoughts impact on my moods. How the way I think about myself, about others and about the world can lead me into depression. It is a practical approach, which does not dwell so much on childhood experiences, whilst acknowledging that it was then that these patterns were learned. It looks at what is happening now, and gives tools to manage these moods on a daily basis.* (Martin, 2007, n.p.)

Study hint: What is the difference between Cognitive therapy and Cognitive-Behavioural therapy?

Cognitive Therapy (CT): Focuses primarily on the "Thought" aspect. CT centers around identifying and changing dysfunctional thinking patterns and beliefs to improve emotional regulation and develop personal coping strategies. It helps clients recognise and change cognitive distortions that contribute to their psychological distress.

Cognitive-Behavioural Therapy (CBT): Includes both "Thought" and "Behaviour". CBT expands on CT by also targeting the behaviours associated with harmful thinking. This therapy not only works on changing distorted thinking but integrates behavioural techniques to alter actions that perpetuate problems. CBT addresses both the thought processes and the behaviours that are rooted in these thoughts, making it a comprehensive approach.

Biological Approaches to Treatment

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Like other medical problems, psychological disorders may in some cases be treated biologically. **Biomedical therapies** are treatments designed to reduce psychological disorder by influencing the action of the central nervous system. These therapies primarily involve the use of medications but also include direct methods of brain intervention, including **electroconvulsive therapy (ECT)**, **transcranial magnetic stimulation (TMS)**, and **psychosurgery**.

Drug Therapies

Psychologists understand that an appropriate balance of neurotransmitters in the brain is necessary for mental health. If there is a proper balance of chemicals, then the person's mental health will be acceptable, but psychological disorder will result if there is a chemical imbalance. The most frequently used biological treatments provide the patient with medication that influences the production and reuptake of neurotransmitters in the **central nervous system (CNS)**. The use of these drugs is rapidly increasing, and drug therapy is now the most common approach to treatment of most psychological disorders.

Unlike some medical therapies that can be targeted toward specific symptoms, current psychological drug therapies are not so specific; they don't change particular behaviours or thought processes, and they don't really solve psychological disorders. However, although they cannot "cure" disorders, drug therapies are nevertheless useful therapeutic approaches, particularly when combined with psychological therapy, in treating a variety of psychological disorders. The best drug combination for the individual patient is usually found through trial and error (Biedermann & Fleischhacker, 2009).

The major classes and brand names of drugs used to treat psychological disorders are shown in Table PY.2.

Table PY.2. Some commonly prescribed psychotropic medications

Type of Medication	Used to Treat	Brand Names of Commonly Prescribed Medications	How They Work	Side Effects
Antipsychotics (developed in the 1950s)	Schizophrenia and other types of severe thought disorders	Haldol, Mellaril, Prolixin, Thorazine	Treat positive psychotic symptoms such as auditory and visual hallucinations, delusions, and paranoia by blocking the neurotransmitter dopamine	Long-term use can lead to tardive dyskinesia (involuntary movements of the face and body), and extrapyramidal symptoms (muscle stiffness, tremors similar to Parkinson's disease).
Atypical Antipsychotics (developed in the late 1980s)	Schizophrenia and other types of severe thought disorders	Abilify, Risperdal, Clozaril	Treat negative symptoms of schizophrenia (like withdrawal and apathy) and sometimes positive symptoms (like hallucinations) by targeting both dopamine and serotonin receptors.	May cause weight gain, diabetes, and high cholesterol levels; other side effects include constipation, dry mouth, blurred vision, drowsiness, and dizziness.
Anti-depressants	**SSRIs** (Selective Serotonin Reuptake Inhibitors): Depression and anxiety **SNRIs** (Serotonin-Norepinephrine Reuptake Inhibitors): depression and anxiety **NRIs** (Norepinephrine Reuptake Inhibitors): depression and smoking cessation	**SSRIs:** Prozac, Zoloft, Celexa, Lexapro, Paxil. **SNRIs**: Effexor, Cymbalta, Pristiq. **NRIs:** Wellbutrin, Zyban, Strattera.	**SSRIs** increase serotonin levels in the brain (a neurotransmitter that helps regulate mood). **SNRIs** increase both serotonin and norepinephrine (a neurotransmitter related to alertness and energy). **NRIs** primarily increase norepinephrine levels.	**SSRIs:** headache, nausea, weight gain, drowsiness, reduced sex drive. **SNRIs:** nausea, dizziness, and sweating. **NRIs**: dry mouth, constipation, and dizziness.

Type of Medication	Used to Treat	Brand Names of Commonly Prescribed Medications	How They Work	Side Effects
Anti-anxiety agents	**anxiety** and **agitation** that occur in OCD, PTSD, panic disorder, and social phobia **insomnia**	**Benzodiazepines for anxiety disorders:** Rivotril, Xanax, Ativan, Lectopam, Serax, Librium, Tranxene, Valium. **Benzodiazepines for insomnia:** Ativan, Mogadon, Serax, Restoril, Halcion, Dalmane.	Depress central nervous system activity. This means they reduce the activity of the brain and nerves, making the body feel more relaxed and calm. They do this by enhancing the effects of a neurotransmitter called GABA (gamma-aminobutyric acid), which is naturally calming and helps reduce feelings of anxiety and stress.	Drowsiness, dizziness, headache, fatigue, lightheadedness. Severe withdrawal symptoms from regular use of benzodiazepines in high doses may include agitation, paranoia, delirium and seizures.
Mood Stabilisers	Bipolar disorder	Lithium, Depakote, Lamictal, Tegretol	**Lithium** moderates neurotransmitter signaling (helps stabilise mood swings). **Depakote** and **Lamictal** regulate neurotransmitter levels and electrical activity in neurons, calming overactivity. **Tegretol** stabilises mood by inhibiting sodium channels (reduces excessive nerve activity).	Excessive thirst, irregular heartbeat, itching/rash, swelling (face, mouth, and extremities), nausea, loss of appetite
Stimulants	ADHD	Adderall, Ritalin	Improve ability to focus on tasks and maintain attention by increasing dopamine and norepinephrine levels (brain chemicals that help regulate attention and alertness).	Decreased appetite, difficulty sleeping, stomachache, headache

Type of Medication	Used to Treat	Brand Names of Commonly Prescribed Medications	How They Work	Side Effects
Psychedelics	Depression, PTSD, anxiety, addiction	Psilocybin (Magic Mushrooms), LSD, DMT, Ayahuasca	Primarily affect serotonin receptors, which can alter perception, mood, and cognitive processes	Altered sensory perception, psychological distress, nausea

Antipsychotic Medications

Until the middle of the 20th century, schizophrenia was inevitably accompanied by the presence of positive symptoms, including bizarre, disruptive, and potentially dangerous behaviour. As a result, schizophrenics were locked in asylums to protect them from themselves and to protect society from them. In the 1950s, a drug called chlorpromazine (Thorazine) was discovered that could reduce many of the positive symptoms of **schizophrenia**. Chlorpromazine was the first of many antipsychotic drugs.

Antipsychotic drugs (neuroleptics) are drugs that treat the symptoms of schizophrenia and related psychotic disorders. Today there are many antipsychotics, including Thorazine, Haldol, Clozaril, Risperdal, and Zyprexa. Some of these drugs treat the positive symptoms of schizophrenia, and some treat the positive, negative, and cognitive symptoms.

The discovery of chlorpromazine and its use in clinics has been described as the single greatest advance in psychiatric care, because it has dramatically improved the prognosis of patients in psychiatric hospitals worldwide. Using antipsychotic medications has allowed hundreds of thousands of people to move out of asylums into individual households or community mental health centres, and in many cases to live near-normal lives.

Antipsychotics reduce the positive symptoms of schizophrenia by reducing the transmission of dopamine at the synapses in the limbic system, and they improve negative symptoms by influencing levels of serotonin (Marangell, Silver, Goff, & Yudofsky, 2003). Despite their effectiveness, antipsychotics have some negative side effects, including restlessness, muscle spasms, dizziness, and blurred vision. In addition, their long-term use can cause permanent neurological damage, a condition called **tardive dyskinesia** that causes uncontrollable muscle movements, usually in the mouth area (National Institute of Mental Health, 2008). Newer antipsychotics treat more symptoms with fewer side effects than older medications do (Casey, 1996).

Antidepressant Medications

Antidepressant medications are designed to improve mood and are predominantly used in treating depression. They are also effective in managing anxiety disorders, phobias, and obsessive-compulsive disorders. These drugs typically modify the production and uptake of neurotransmitters like serotonin, norepinephrine, and dopamine, crucial for regulating emotion. While the detailed mechanisms are not fully understood, it is recognised that enhancing neurotransmitter levels in the central nervous system can significantly reduce symptoms of depression (Cipriani et al., 2018).

Historically, depression treatment included **tricyclic antidepressants (TCAs)** and **monoamine oxidase inhibitors (MAOIs)**, which increase neurotransmitter availability but are associated with severe side effects, including cardiovascular risks and dietary restrictions due to potential severe interactions with certain foods.

Today, **selective serotonin reuptake inhibitors** (SSRIs) such as Prozac, Zoloft, and Celexa are the most commonly prescribed antidepressants. These drugs predominantly block the reuptake of serotonin, increasing its concentration in the central nervous system. SSRIs are preferred due to their relatively safe profile and fewer side effects compared to TCAs and MAOIs. However, they also can have significant side effects; patients may experience issues such as gastrointestinal disturbances, sexual dysfunction, and emotional blunting (Hieronymus et al., 2016).

Concerns about SSRIs potentially increasing the risk of suicidal thoughts among teens and young adults continue to be debated, with newer studies urging caution and a balanced approach to prescribing these medications in vulnerable populations (Cipriani et al., 2018). The onset of antidepressant effects can be slow, often requiring several weeks to months to be effective, necessitating tailored treatment plans for individual patients. This slow ramping up to full dose can leave patients under-medicated and suffering with their symptoms for weeks.

Serotonin-norepinephrine reuptake inhibitors (SNRIs) like Effexor and Cymbalta, and norepinephrine reuptake inhibitors (NRIs) such as Wellbutrin, are also popular. SNRIs are known to enhance both serotonin and norepinephrine levels, improving mood and energy, while NRIs primarily increase norepinephrine, helpful in treating depression and aiding smoking cessation. These classes of antidepressants also have side effects and may cause nausea, dizziness, and insomnia (Fornaro et al., 2019).

Recent research has also explored the therapeutic potentials of psychedelics such as psilocybin, LSD, DMT, and Ayahuasca for treating various psychiatric disorders including depression, PTSD and anxiety. These substances interact with serotonin receptors in the brain and have shown promise in altering perception, mood, and cognitive processes, although they can also induce significant sensory and psychological alterations (Carhart-Harris et al., 2017).

Using Stimulants to Treat ADHD

Attention-deficit/hyperactivity disorder (ADHD) is frequently treated with biomedical therapy, usually along with **cognitive behavioural therapy (CBT)**. The most commonly prescribed drugs for ADHD are psychostimulants, including Ritalin, Adderall, and Dexedrine. Short-acting forms of the drugs are taken as pills and last between 4 and 12 hours, but some of the drugs are also available in long-acting forms (skin patches) that can be worn on the hip and last up to 12 hours. The patch is placed on the child early in the morning and worn all day.

Stimulants improve the major symptoms of ADHD, including inattention, impulsivity and hyperactivity, often dramatically, in about 75% of the children who take them (Greenhill, Halperin, & Abikof, 1999). But the effects of the drugs wear off quickly. Additionally, the best drug and best dosage vary from child to child, so it may take some time to find the correct combination.

It may seem surprising to you that a disorder that involves hyperactivity is treated with a psychostimulant, a drug that normally increases activity. The answer lies in the dosage. When large doses of stimulants are taken, they increase activity, but in smaller doses the same stimulants improve attention and decrease motor activity (Zahn, Rapoport, & Thompson, 1980).

The most common side effects of psychostimulants in children include decreased appetite, weight loss, sleeping problems, and irritability as the effect of the medication tapers off. Stimulant medications may also be associated with a slightly reduced growth rate in children, although in most cases growth isn't permanently affected (Spencer, Biederman, Harding, & O'Donnell, 1996).

Watch this video: **Tricky Topics: Biological Treatments of Psychological Disorders (8 minutes)**

One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=1196#oembed-1***

"Tricky Topics: Biological Treatments of Psychological Disorders" video by FirstYearPsych Dalhousie is licensed under the Standard YouTube Licence.

Here is the **Tricky Topics: Biological Treatments of Psychological Disorders transcript**.

Mood Stabilisers: Lithium

Patients who are suffering from bipolar disorder are not helped by the **SSRIs** or other antidepressants because their disorder also involves the experience of overly positive moods. Treatment is more complicated for these patients, often involving a combination of antipsychotics and antidepressants along with mood stabilising medications (McElroy & Keck, 2000). The most well-known mood stabilser, lithium carbonate (or lithium), is used widely to treat mania associated with bipolar disorder. Available in Canada for more than 60 years, the medication is used to treat acute manic episodes and as a long-term therapy to reduce their frequency and severity. Anticonvulsant medications can also be used as mood stabilisers. Another drug, Depakote, has also proven very effective, and some bipolar patients may do better with it than with lithium (Kowatch et al., 2000).

People who take lithium must have regular blood tests to be sure that the levels of the drug are in the appropriate range. Potential negative side effects of lithium are loss of coordination, slurred speech, frequent urination, and excessive thirst. Though side effects often cause patients to stop taking their medication, it is important that treatment be continuous, rather than intermittent. Recently, Health Canada updated safety information and treatment recommendations for lithium after finding that taking lithium carries a risk of high blood calcium, or hypercalcemia, and is sometimes associated with a hormone disorder known as hyperparathyroidism (The Canadian Press, 2014). There is no cure for bipolar disorder, but drug therapy does help many people.

Anti-anxiety Medications

Antianxiety medications are drugs that help relieve fear or anxiety. They work by increasing the action of the neurotransmitter GABA. The increased level of GABA helps inhibit the action of the sympathetic division of the autonomic nervous system, creating a calming experience.

The most common class of antianxiety medications is the tranquilizers, known as benzodiazepines. These drugs, which are prescribed millions of times a year, include Ativan, Valium, and Xanax. The benzodiazepines act within a few minutes to treat mild anxiety disorders but also have major side effects. They are addictive, frequently leading to tolerance, and they can cause drowsiness, dizziness, and unpleasant withdrawal symptoms including relapses into increased anxiety (Otto et al., 1993). Furthermore, because the effects of the benzodiazepines are very similar to those of alcohol, they are very dangerous when combined with it.

Psychedelic-assisted therapy

Psychedelic-assisted therapy is emerging as a promising treatment option for various mental health disorders, notably treatment-resistant depression and **PTSD**. Conducted under stringent clinical supervision, this innovative therapeutic approach integrates the controlled use of psychedelic substances like psilocybin and MDMA into psychotherapy sessions, designed to facilitate profound psychological insights and emotional processing.

Recent research highlights the effectiveness of these therapies. Significant reductions in depression symptoms have been documented following psilocybin-assisted therapy, with sustained effects over time (Davis et al., 2020). Psilocybin activates serotonin receptors in the brain, which appears to "reset" neural circuits that contribute to depressive symptoms. Similarly, MDMA has shown promise in facilitating emotional breakthroughs in PTSD treatment by enhancing neurotransmitter activity — serotonin, norepinephrine, and dopamine — that elevates mood and diminishes the fear response, allowing patients to engage more effectively with therapeutic interventions (Mitchell et al., 2021).

The safety of psychedelic therapy is well-documented in clinical research, with a noted low abuse potential and absence of overdose fatalities (Johnson et al., 2017). Common side effects are generally transient and include nausea and headaches, manageable within a clinical setting. Strict adherence to therapeutic dosing and protocols reduces MDMA's neurocognitive effects (Jerome et al., 2020).

Given the potent nature of psychedelic substances, regulatory guidelines are rigorous. Treatment is restricted to controlled environments with professional oversight to ensure patient safety and maximise therapeutic outcomes (Feduccia et al., 2018).

As research progresses and regulatory frameworks evolve, psychedelic-assisted therapy may offer a viable alternative to conventional treatments, particularly for patients who have not responded to traditional therapy modalities. This approach represents a significant paradigm shift in the treatment of mental health disorders, combining established psychotherapeutic techniques with the therapeutic potential of psychedelic substances.

Chapter Resources

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Chapter Attribution

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CHAPTER 12. PSYCHOLOGICAL WELL-BEING

Elisa Niunin



Figure WB.1. Well-being. *Well-being by Marie Bartlett is licensed under a CC BY 4.0 Licence.*

Imagine it's the last month of the semester and you see the deadlines piling up: three essays due in the next four weeks, two exams worth 60% of your grade, and a last quiz right before exam session. How are you feeling? Most likely, you and many other students in this situation would feel overwhelmed, tired, and frustrated. These emotions can be summarized by saying that you feel stressed. Stress is a daily part of life, as much as you might not want it to be. However, not all stress is negative and unhealthy (distress). Some of it is motivating and energizing (eustress). The first half of this chapter will introduce you to stress, coping strategies, and a branch of psychology that focuses on your health. Now, imagine that your stress has been dealt with in a healthy and adaptive way and the semester is finally over. You can meet up with your friends, watch the shows you've been putting off, and take a vacation. How are you feeling now? I'd bet that you're feeling happiness in some way or another.

Happiness has many definitions and can be obtained in many ways, but overall, it involves enjoyment, satisfaction, and an absence of essays and exams to worry about! While a lot of branches of psychology focus on the negative aspects of life and personality, positive psychology focuses on what makes you feel good and how to reach your own optimal definition of happiness. The second half of this chapter will cover the elements of happiness, positive psychology, and the negativity bias.

Stress and Health

JESSICA MOTHERWELL MCFARLANE

What is Stress?

Stress, a prevalent aspect of modern life, especially for university students grappling with academic pressures, financial burdens, and personal challenges, is a complex phenomenon influenced by both external situations and our internal responses. It encompasses a range of experiences from feeling overwhelmed by exams and deadlines to navigating societal pressures, all of which can significantly impact our mental and physical health. Broadly defined, stress can be viewed from two perspectives: specific external triggers or our physical and emotional reaction to these demands (Lyon, 2012), underscoring the intricate interplay between our environment and how we perceive and cope with challenges.

The term **stress**, as it relates to the human condition, first emerged in scientific literature in the 1930s, but it did not enter our everyday language until the 1970s (Lyon, 2012). Today, we often use the term loosely in describing a variety of unpleasant feeling states; for example, we often say we are stressed out when we feel frustrated, angry, conflicted, overwhelmed, or fatigued. Despite the widespread use of the term, stress is a fairly vague concept that is difficult to define with precision.

Researchers have struggled to agree on an acceptable definition of stress. Broadly, there are two primary ways of conceptualising stress: (1) the stimulus-based definition and (2) the response-based definition. The **stimulus-based definition** views stress as a result of specific external events or situations, such as a high-stress job or long commutes, which act as stimuli, triggering stress reactions. However, this approach has been critiqued for not accounting for individual differences in perception and reaction to these stimuli. On the other hand, the **response-based definition** focuses on the physical and emotional responses that occur when faced with demanding or threatening situations, like increased arousal. This perspective emphasises the physiological aspect of stress but can overlook the fact that such responses can also be triggered by positive or non-threatening events.

How to Cope with Stress

While there are many different ways to cope with stress, the coping strategies are usually grouped into two categories: problem-focused coping and emotion-focused coping. **Problem-focused coping** puts an emphasis on finding a solution to the problem at hand (Folkman, 2013). You might look for information, ask for advice, or problem-solve. On the other hand, **emotion-focused coping** allows you to deal with the emotions that result from the stress. Some strategies include asking for support, using humor to make light of the situation, or daydreaming. Both kinds of coping have their pros and cons, depending on how they are used. When a situation can be controlled, problem-focused coping is more often used. For instance, if you are stressed about an exam, taking time to study in advance can help you cope with the stress. However, in a situation that cannot be influenced, such as the passing of a family member, it is better to accept and cope with the situation by using emotion-focused coping. People generally use a mix of these strategies and tend to switch between them depending on the situation (Folkman, 2013).

Stress: The Good and the Bad

Stress is often seen as something negative, but it can also be helpful. Stress can push us to do important things like study for exams, go to the doctor, exercise, and work hard. Selye, a scientist in 1974, said that stress isn't always bad. He explained that stress can be a good thing that helps improve our lives. He called this good stress "eustress" (from a Greek word meaning "good"). **Eustress** is the kind of stress that makes you feel positive and can be good for your health and performance.

> Stress manifests in two primary forms: **eustress**, which is positive and can motivate and energise us, leading to improved performance and well-being, and **distress**, which is negative, overwhelming, and can lead to burnout, decreased performance, and health issues. Understanding the difference between these two types of stress is crucial for managing stress effectively, allowing us to harness the motivating aspects of eustress while minimising the harmful effects of distress on our mental and physical health. Eustress can make you do better and feel good; distress can make you do worse and harm your health.

A moderate amount of stress can be beneficial in challenging situations. For example, athletes may be motivated and energised by pre-game stress, and students may experience similar beneficial stress before a major exam. Indeed, research shows that moderate stress

can enhance both immediate and delayed recall of educational material. Male participants in one study who memorised a scientific text passage showed improved memory of the passage immediately after exposure to a mild stressor as well as one day following exposure to the stressor (Hupbach & Fieman, 2012).

But when stress exceeds this optimal level, it is no longer a positive force; it becomes excessive and debilitating, or what Selye termed **distress** (from the Latin dis = "bad"). People who reach this level of stress feel burned out; they are fatigued and exhausted, and their performance begins to decline. If the stress level remains excessive, health may begin to erode as well (Everly & Lating, 2002).

Stress and Performance

Figure WB.2 shows us that as stress increases, so does performance and well-being, up to a point. This is eustress. When stress reaches the best level (the highest point of a curve), performance is at its best. You feel fully energised and focused, and you work efficiently. But if stress goes beyond this best level, it becomes too much and harmful; this is distress. People with too much stress feel burned out and tired, and their performance drops. If the stress level stays too high, it can even harm health. For example, students who are very stressed about a test might find it hard to concentrate, which can affect their test scores.

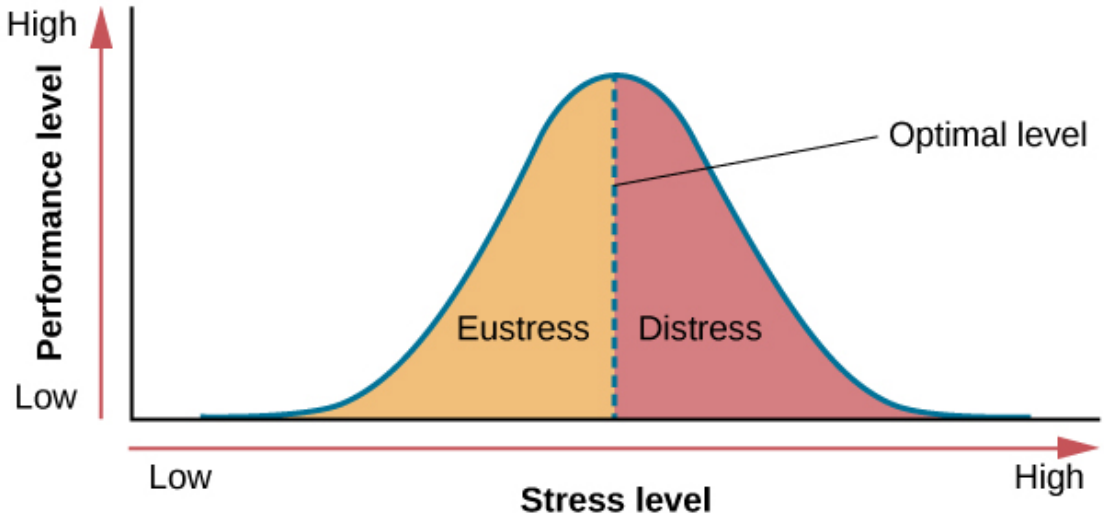

Figure WB.2. Stress and performance. *As the stress level increases from low to moderate, so does performance (eustress). At the optimal level (the peak of the curve), performance has reached its peak. If stress exceeds the optimal level, it will reach the distress region, where it will become excessive and debilitating, and performance will decline (Everly & Lating, 2002).* ***Alt. text:*** *A bell-curve graph with a line labeled "Optimal level" at the center. The curve shows "eustress" on the left and "distress" on the right. The x-axis is "Stress level" (low to high) and the y-axis is "Performance level" (low to high). Performance rises with stress up to the optimal level, then stress shifts from eustress to distress.*
Source: *Figure 14.4 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

A graph features a bell curve that has a line going through the middle labeled “Optimal level.” The curve is labelled “eustress” on the left side and “distress” on the right side. The x-axis is labeled “Stress level” and moves from low to high, and the y-axis is labeled “Performance level” and moves from low to high.” The graph shows that stress levels increase with performance levels and that once stress levels reach optimal level, they move from eustress to distress.

Stress in Our Lives

Stress is a common experience. We all deal with it in different ways. It can feel like a heavy load, like when you have to drive in a blizzard, wake up late for an important job interview, run out of money, or aren’t ready for a big test. Stress is an experience that can include symptoms like a faster heart rate, headaches, gastrointestinal problems, and difficulty concentrating or making decisions. We may react to stress in unhealthy ways by drinking alcohol, smoking, or engaging in other dubious behaviours we hope will reduce the stress. While stress can sometimes be good, it can also lead to health problems, contributing to illnesses and diseases. Stress can cause physical reactions like a fast heartbeat or headaches, make it hard to think or decide, and lead to behaviours like drinking or smoking.



Figure WB.3. Driving during a blizzard. *Stress is an experience that can include symptoms like a faster heart rate, headaches, gastrointestinal problems, and difficulty concentrating or making decisions.* ***Alt. text:*** *A driver focuses on the road while operating a vehicle.* ***Source:*** *Driving during a blizzard by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

Health Psychology and Stress

The scientific study of how stress and other psychological factors impact health is part of health psychology. Health psychology is a subfield of psychology that focuses on understanding the importance of psychological influences on health and illness, and how people respond when they become ill (Taylor, 1999). Health psychology emerged as a discipline in the 1970s, a time of increasing awareness of the role behavioural and lifestyle factors play in the development of illnesses and diseases (Straub, 2007). In addition to studying the connection between stress and illness, health psychologists investigate issues such as the reasons people make certain lifestyle choices, e.g., smoking or eating unhealthy food, despite knowing the potential adverse health implications of such behaviours.

Health psychologists also work on creating and testing ways to help people change unhealthy behaviours. A key part of their job is to figure out which groups of people are more likely to have health problems because of the way they think or act. For instance, they might study how stress affects different age groups, like young adults versus older adults. By

understanding who gets more stressed and how it changes over time, health psychologists can identify which age group might be more at risk for health issues like high blood pressure or anxiety disorders.

Watch this video: **The Upside of Stress (4.5 minutes)**



One or more interactive elements has been excluded from this version of the text. You can view them online here: ***https://opentextbooks.concordia.ca/psyc205/?p=1066#oembed-1***

"The Upside of Stress" video by BrainCraft is licensed under the Standard YouTube Licence.

Cannon and the Fight-or-Flight Response

Stress, a universal experience, has intrigued scientists for nearly a century. A key figure in this exploration is Walter Cannon, an American physiologist whose groundbreaking work in the early 20th century has significantly shaped our understanding of how the body reacts to stress. Cannon's insights into the fight-or-flight response have provided a foundational understanding of the body's physiological mechanisms when confronted with stress.

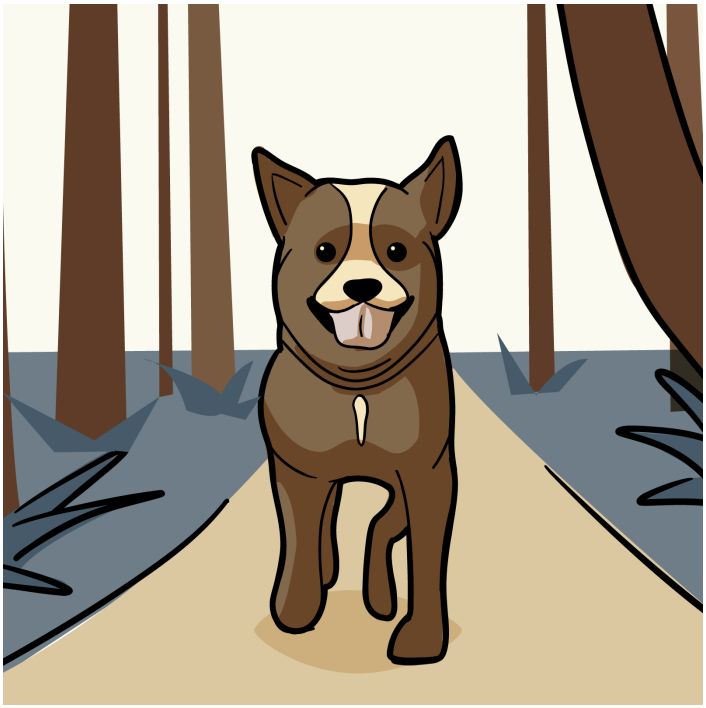

Figure WB.4. Flight-or-fight response. *A dog jumps onto the path, barking and giving mixed signals. Is it going to bite you or just saying hello? Your fight-or-flight response will likely kick in to give you extra alertness and energy to deal with the possible threat.* ***Alt. text:*** *A dog walking down a trail.* ***Source:*** *Flight-or-fight response by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

To illustrate Cannon's fight-or-flight model, imagine you are back again, hiking in a forest when suddenly a large, barking dog appears. The dog, emerging from behind a stand of trees, stops about 50 yards from you. It notices you, barks louder, and starts moving in your direction. You think, "This is definitely not good," and experience a series of physical reactions:

- Your pupils dilate.
- Your heart races and speeds up.
- You start breathing heavily and sweating.
- You feel butterflies in your stomach.
- Your muscles tense up, readying you to take action.

Cannon proposed that this reaction, termed the **fight-or-flight response**, occurs when a person experiences intense emotions, especially those associated with a perceived threat (Cannon, 1932). During the fight-or-flight response, the body is rapidly aroused by the activation of both the sympathetic nervous system and the endocrine system (Figure WB.5). This arousal prepares the person to either confront or escape the perceived threat.

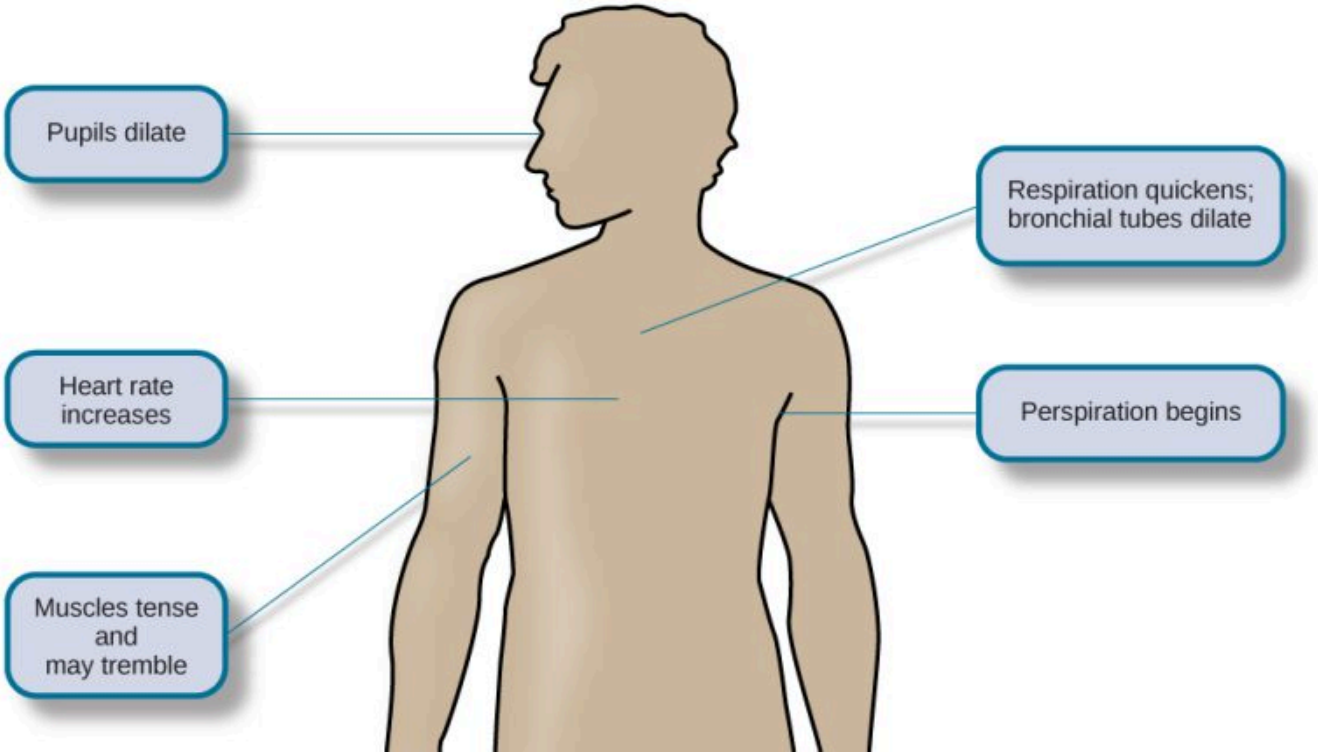

Figure WB.5. Fight-or-flight response in the body. *This diagram illustrates the fight-or-flight response, showing a human body and highlighting various physiological reactions, such as increased heart rate, dilated pupils, and quickened respiration.* ***Alt. text:*** *An illustration of the basic outline of a human body and indicates the body's various responses to fight or flight, including: pupils dilate, heart rate increases, muscles tense and may tremble, respiration quickens, bronchial tubes dilate, and perspiration begins.* ***Source:*** *Figure 14.8 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

In conclusion, Cannon's concept of the fight-or-flight response has been instrumental in advancing our understanding of stress physiology. By identifying the body's innate mechanism for maintaining homeostasis in the face of threats, Cannon's work has laid the groundwork for further research into how we respond to stress. This response, crucial for survival, highlights the body's remarkable ability to adapt to and manage challenging situations, a testament to the complex and dynamic nature of human physiology.

Having explored Cannon's pivotal work on the immediate, fight-or-flight response to stress, we now turn to another seminal figure in stress research, Hans Selye. While Cannon focused on the body's acute reaction to stress, Selye's work delves into the prolonged effects

of stress on the body. His concept of the General Adaptation Syndrome (GAS) offers a broader perspective, examining how our bodies cope with sustained stress over time. This shift from the immediate to the enduring effects of stress marks a significant development in our understanding of how stress impacts us.

Selye and the General Adaptation Syndrome

> ***Content Disclosure:*** *This section discusses historical research methods involving animal testing that are now considered unethical. These studies by Hans Selye were pivotal in stress research but raise important ethical concerns.*

Selye initially focused on sex hormones in rats, but he incidentally discovered that prolonged exposure to stressors — such as extreme cold, surgical injury, and excessive muscular exercise — led to adrenal enlargement, thymus and lymph node shrinkage, and stomach ulceration in the rats. Selye realised that these health issues were part of a set of body reactions that occur over time under stress, regardless of the stressor's nature. He termed this the **general adaptation syndrome**, a universal response of the body to stress.

It is important to note that Selye's experiments, while groundbreaking, involved methods that would not meet current ethical standards. The distress and harm inflicted on the rats in his labs raises significant ethical concerns. Additionally, the extrapolation of these findings to human populations should be approached with caution.

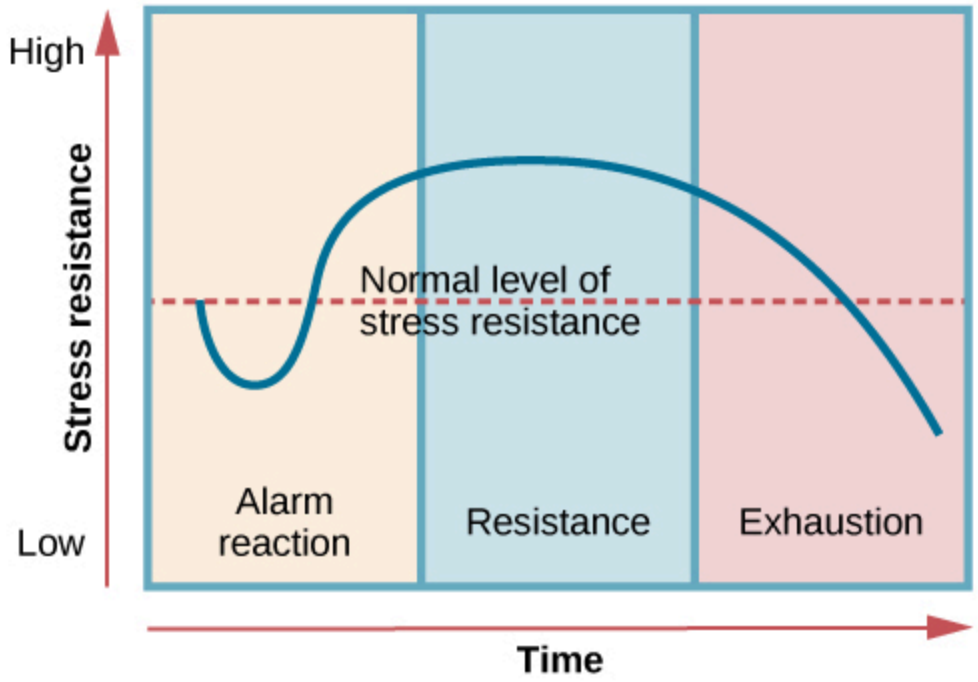

Figure WB.6. Selye's general adaptation syndrome. *This graph illustrates the three stages of Selye's general adaptation syndrome: alarm reaction, resistance, and exhaustion. Prolonged stress ultimately results in exhaustion.* ***Alt. text:*** *Graph of Selye's general adaptation syndrome with three stages: alarm, resistance, and exhaustion. X-axis = Time, Y-axis = Stress resistance. In alarm, resistance drops then spikes. In resistance, it stays high but declines gradually. In exhaustion, it drops rapidly.* ***Source:*** *Figure 14.10 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

In summary, Selye's general adaptation syndrome model illustrates how our bodies may respond to stress in stages: initially with a burst of energy, then adapting, and finally, potentially breaking down if the stress continues for too long.

Life Changes as Stressors

Life changes, whether perceived as positive or negative, can act as significant stressors. The Social Readjustment Rating Scale (SRRS), developed by Holmes and Rahe in 1967, highlights how events like marriage, divorce, job loss, or moving to a new home require an individual to make substantial adjustments, thereby inducing stress. These life changes are assigned "life change units" (LCUs) to quantify their potential impact on a person's health. Interestingly, the scale suggests that not only negative events but also positive ones, such as promotions or the birth of a child, can produce stress due to the changes they bring to one's life.

Table WB.1. Some stressors on the social readjustment rating scale

Life event	Life change units
Death of a close family member	63
Personal injury or illness	53
Dismissal from work	47
Change in financial state	38
Change to different line of work	36
Outstanding personal achievement	28
Beginning or ending school	26
Change in living conditions	25
Change in working hours or conditions	20
Change in residence	20
Change in schools	20
Change in social activities	18
Change in sleeping habits	16
Change in eating habits	15
Minor violation of the law	11

Table adapted from Holmes and Rahe (1967). The higher the number the more stressful the event.

The Social Readjustment Rating Scale (SRRS) provides researchers a simple, easy-to-administer way of assessing the amount of stress in people's lives, and it has been used in hundreds of studies (Thoits, 2010). Despite its widespread use, the scale has been subject to criticism.

Understanding that life changes can be stressful regardless of their nature underscores the importance of developing coping mechanisms and support systems. It also highlights the subjective nature of stress, as individuals may perceive and react to the same event differently based on their personal resources, past experiences, and social support networks. Recognising and addressing the stress associated with life changes is crucial for maintaining mental health and well-being. This awareness can empower individuals to seek help when needed and to approach life's transitions with strategies that promote resilience and adaptation.

Happiness & Positive Psychology

JESSICA MOTHERWELL MCFARLANE

Elements of Happiness

Psychologists say happiness has three parts: the pleasant life, the good life, and the meaningful life (Seligman, 2002; Seligman, Steen, Park, & Peterson, 2005). **The pleasant life** is about enjoying everyday pleasures that bring fun and excitement, like beach walks or a satisfying love life. **The good life** happens when we use our unique skills and get really into our work or hobbies. **The meaningful life** comes from using our talents for a greater cause, like helping others or improving the world. Generally, the happiest people focus on all three parts (Seligman et al., 2005).

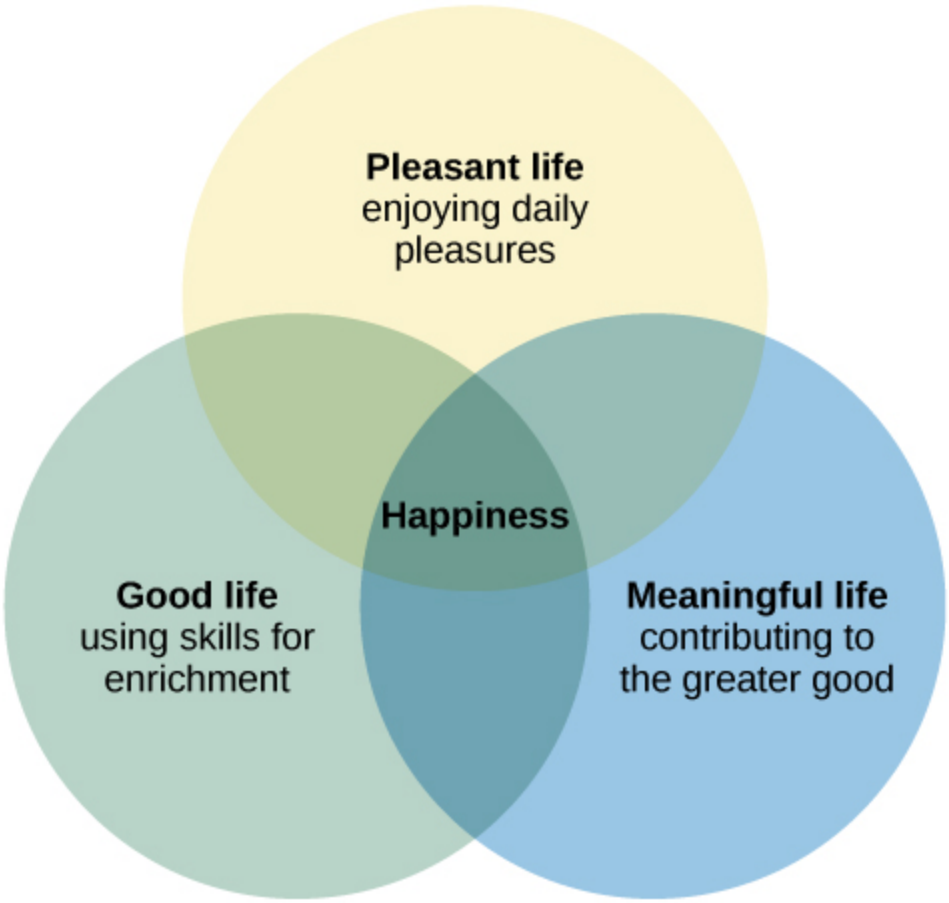

Figure WB.7. Happiness. *Happiness is an enduring state of well-being involving satisfaction in the pleasant, good, and meaningful aspects of life.* ***Alt. text:*** *A Venn diagram features three circles: one labelled "Good life: using skills for enrichment," one labelled "Pleasant life: enjoying daily pleasures," and another labelled: Meaningful life: contributing to the greater good." All three circles overlap at a section labelled "Happiness".* ***Source:*** *Figure 14.25 as found in Psychology 2e by OpenStax is licensed under a CC BY 4.0 Licence.*

To put it simply, **happiness** is a lasting feeling of joy, contentment, and the sense that your life is valuable (Lyubomirsky, 2001). It's more than just feeling good temporarily; it's about feeling good in the long run, known as subjective well-being.

Can We Make Ourselves Get Happier?

Some studies show that we can actually change our happiness levels for the better. For example, well-designed happiness programs can help people feel happier for a long time, not just for a moment. These programs can work for individuals, groups, or whole societies (Diener et al., 2006). One study found that simple activities like writing down three good things each day made people happier for over six months (Seligman et al., 2005).

If we measure happiness across societies, it can tell policy makers whether or not people are happy, and why. Research shows that a country's average level of happiness is linked to six things: the country's wealth (GDP), support from others, choices in how to live one's life, a long, healthy life, government and businesses that people trust, and personal generosity (Helliwell et al., 2025). Understanding why people are happy or not can help governments create programs to make their societies happier (Diener et al., 2006). Decisions about important issues like poverty, taxes, healthcare, housing, clean environment, and income differences should consider how they will affect people's happiness.

It's important to know that we're not always great at predicting our future emotions, a concept called **affective forecasting** (Wilson & Gilbert, 2003). For instance, most newlyweds think they'll stay as happy as they are or become even happier, but a study found that their happiness actually went down over four years (Lavner, Karner, & Bradbury, 2013). We also often guess wrong about how big life events will change our happiness. For example, we might think winning the lottery or dating a famous person would make us forever happy, or that we'd be forever sad if we had a bad accident or a breakup.

But, just as our senses adjust to new situations (like our eyes getting used to bright light after exiting from a dark movie theatre), our emotions adjust to big changes in our lives (Brickman & Campbell, 1971; Helson, 1964). Initially, something good or bad can make us feel very happy or very sad. But over time, we get used to these changes, and our happiness level often goes back to what it was before. So, even exciting events like winning the lottery or your favourite team winning a big game eventually become normal (Brickman, Coats, & Janoff-Bulman, 1978). This is called **hedonic adaptation**. Those who are more resilient are able to bounce back and feel positive emotions even as they are experiencing stress (Tugade & Fredrickson, 2004).

Positive Psychology

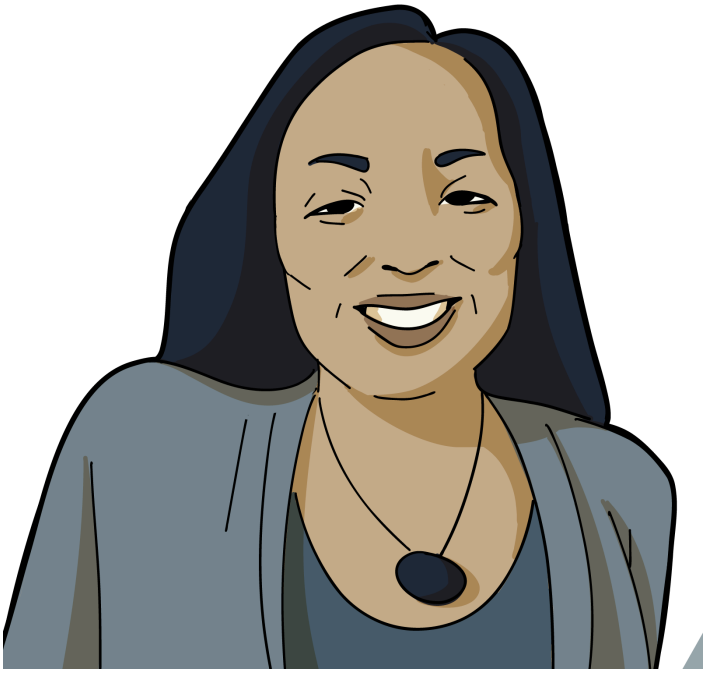

Figure WB.8. Positive psychology. *Positive psychology aims to enhance the well-being and flourishing of individuals by understanding and promoting enduring aspects of human experience that contribute to a fulfilling life (Compton, 2005).* ***Alt. text:*** *A woman smiling.* ***Source:*** *Positive psychology by Rachel Lu is licensed under a CC BY-NC-SA Licence.*

Positive psychology, pioneered by Seligman in 1998, represents a significant shift in the focus of psychological research and practice. Unlike traditional psychology, which often centres on addressing mental illness and emotional difficulties, **positive psychology** aims to enhance the well-being and flourishing of individuals by understanding and promoting enduring aspects of human experience that contribute to a fulfilling life (Compton, 2005). This field explores valuable experiences like well-being, contentment and happiness. Positive Psychology also examines positive traits, such as the ability to love, have courage, be creative, develop wisdom, be kind, forgive, show positive emotions, improve immune system health, develop character virtues and enjoy life. (Compton, 2005).

The scope of positive psychology includes research areas like altruism (being of service to others), empathy, creativity, and the impact of positive emotions on immune system functioning, as well as how savouring life's moments and developing virtues contribute to authentic happiness. Positive Psychology also focuses on how to resolve conflict and foster peace and well-being at the community and global level (Cohrs, Christie, White, & Das, 2013).

PERMA Model + Flow

Seligman's PERMA model is a way to understand what makes life most fulfilling and happy. "PERMA" stands for Positive Emotions, Engagement, Relationships, Meaning, and Accomplishment. These five aspects plus **Flow** (when you're really into something you're doing, so much that you forget about time and everything else around you) are key ingredients for a good life, according to positive psychology, a branch of psychology that focuses on what makes life worth living.

- **Positive Emotions**: Feeling good and experiencing joy, gratitude, optimism, and other positive feelings that uplift us.
- **Engagement**: Being deeply involved and absorbed in activities that challenge and utilize our skills and interests.
- **Relationships**: Building strong, supportive connections with others that bring love, belonging, and social support.
- **Meaning**: Finding a sense of purpose and understanding that we are part of something bigger than ourselves.
- **Accomplishment**: Pursuing goals, overcoming challenges, and achieving success that contributes to a sense of fulfillment and pride.

Both flow and engagement help us feel more connected to what we are doing and give us a sense of satisfaction. They are crucial for our well-being because they make us feel alive and part of something bigger. When we experience flow and engagement, we are using our strengths and abilities to their fullest, which is a key part of being happy and fulfilled.

Rewiring for Happiness: Overcoming the Brain's Negativity Bias

Understanding how to rewire our brains for happiness involves recognising a concept known as the negativity bias. This term refers to our brain's tendency to give more attention and weight to negative experiences than to positive ones (Hanson & Mendius, 2009; Rozin & Royzman, 2001). This bias isn't merely a result of our genetic makeup; it's also shaped by our

experiences throughout life. It manifests in various ways, including our stronger reactions to negative events and our tendency to recall unpleasant experiences more vividly than pleasant ones (Monterrubio, Andriotis, & Rodríguez-Muñoz, 2020; Everly Jr. & Lating, 2019).

While our negativity bias has roots in our evolutionary past — serving as a survival mechanism by making us more alert to potential threats — its usefulness extends into modern life. Our negativity bias can prompt us to evaluate risks carefully and make decisions that protect us from harm. This cautious approach can be beneficial in complex social situations and professional environments, where anticipating challenges and preparing for possible mistakes or complications can lead to better outcomes.

However, the harms caused by our negativity bias are significant and can affect various aspects of our lives. Overemphasis on negative experiences can cause us to experience chronic stress, anxiety, and depression. It can distort our perceptions, making us more likely to see threats where none exist and undervalue positive aspects of our lives. This skewed perspective can hinder our personal growth, strain our relationships, and reduce our overall life satisfaction. Furthermore, in professional settings, a strong negativity bias might stifle creativity and innovation, as the fear of failure or criticism can prevent us from taking the necessary creative risks.

It's crucial for us to balance our in born negativity bias with a conscious effort to acknowledge and savour positive experiences. By doing so, we can lessen the impact of negativity bias on our mental health and overall well-being. Developing a more balanced perspective allows us to enjoy a fuller, more satisfying life in which we're not focused just on avoiding the bad but also embracing the good. By actively working to balance our perspective, we can mitigate these negative effects. This involves practices such as mindfulness, gratitude journaling, and positive reframing, which help us to notice and appreciate the positive aspects of our experiences. Over time, these practices can help rewire our brains to become more attuned to positivity, fostering a healthier, more resilient mindset.

The “Pursuit” of Happiness?

The term “pursuit of happiness” describes how some people with individualistic values think about happiness. They can often believe that happiness is something they need to chase after or work hard to get. They think being free, showing who they really are, and achieving their goals will make them happy. But this idea also means that happiness is something you have to chase, and you might not always catch it.

In other parts of the world, like Asia, Africa, and Latin America, and in Indigenous cultures, people see happiness differently. For these collectivistic cultures, happiness isn’t really about chasing after things. Instead, it’s about how people feel about their life as it is. They find happiness in living in the moment and being part of their community. It’s not about doing specific things to be happy; it’s more about feeling content with where you are and who you’re with.

Chapter Resources

JESSICA MOTHERWELL MCFARLANE

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Glossary

Glossary

JORDEN A. CUMMINGS AND LEE SANDERS

Note: Many of these definitions are taken or based upon the writing of the original authors. See the ***Source Chapter Attributions*** *page for more information.*

A
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A

Ability Model: An approach that views EI as a standard intelligence that utilizes a distinct set of mental abilities that (1) are intercorrelated, (2) relate to other extant intelligences, and (3) develop with age and experience.

Abnormal Psychology: The application of psychological science to understanding and treating mental disorders.

Absolute Threshold of a Sensation: The intensity of a stimulus that allows an organism to just barely detect it.

Access: Conscious experience that recalls experiences from memory.

Accommodation: Helps determine visual depth. As the lens changes its curvature to focus on distant or close objects, information relayed from the muscles attached to the lens helps us determine an object's distance.

Accommodation: Learning new information and thus changing the schema.

Action Potential: The change in electrical charge that occurs in a neuron when a nerve impulse is transmitted.

Activation-Synthesis Theory of Dreaming: A prominent neurobiological theory of dreaming that states dreams don't actually mean anything, and people construct dream stories after they wake up to make sense of nonsensical brain impulses.

Active Imagination: Activating our imaginal processes in waking life in order to tap into the unconscious meanings of our symbols.

Adaptations: Internal mechanisms that are products of natural selection and helped our ancestors get around the world, survive, and reproduce. Evolved solutions to problems that historically contributed to reproductive success.

Addiction: When the user powerfully craves the drug and is driven to seek it out, over and over again, no matter what the physical, social, financial, and legal cost.

Adherence: Accurately and regularly following medical orders and recommendations.

Adolescence: The years between the onset of puberty and the beginning of adulthood.

Adoption Study: A behavior genetic research method that involves comparison of biologically related people, including twins, who have been reared either separately or apart. Often includes a comparison of adopted children to their adoptive and biological parents.

Adrenal Glands: Two triangular glands found atop each kidney. Responsible for the production of hormones that regulate salt and water balance in the body and secrete epinephrine and norepinephrine when a person experiences excitement, threat, or stress. The two glands are also involved in metabolism, the immune system, and sexual development and function.

Adrenaline: A hormone that increases heart rate, elevates blood pressure, and boosts energy supplies.

Affect: The experience of a feeling or emotion.

Affective Forecasting: Predictions of one's future feelings.

Agonist: A drug that has chemical properties similar to a particular neurotransmitter and thus mimics the effects of the neurotransmitter.

Agoraphobia: Anxiety about being in places or situations from which escape might be difficult or embarrassing, or in which help may not be available.

Agreeableness: A core trait that includes dispositional characteristics as being sympathetic, generous, forgiving, and helpful, and behavioral tendencies toward harmonious social relations and likeability. The tendency to agree and go along with others rather than to assert one's own opinions and choices.

Alcohol: A colorless liquid, produced by the fermentation of sugar or starch, that is the intoxicating agent in fermented drinks.

Altruism: Helping with the aim of improving the wellbeing of others.

Alzheimer's Disease: A form of dementia that, over a period of years, leads to a loss of emotions, cognitions, and physical functioning, and that is ultimately fatal.

Ambivalent Attachment Style: When a child is wary about the situation in general, particularly the stranger, and stays close or even clings to the mother rather than exploring the toys.

Ambivalent Sexism: Recognizes the complex nature of gender attitudes, in which women are often associated with positive and negative qualities.

Amnesia: A memory disorder that involves the inability to remember information.

Amniotic Sac: The fluid-filled reservoir in which the embryo will live until birth, and which acts as both a cushion against outside pressure and as a temperature regulator.

Amphetamine: A stimulant that produces increased wakefulness and focus, along with decreased fatigue and appetite.

Amplitude: The height of a sound wave. Determines how much energy sound contains.

Amygdala: Located within the limbic system. This structure consists of two "almond-shaped" clusters and is primarily responsible for regulating our perceptions of, and reactions to, aggression and fear.

Anchoring: The bias to be affected by an initial anchor, even if the anchor is arbitrary, and to insufficiently adjust our judgments away from that anchor.

Anima: An archetype symbolizing the unconscious female component of the male psyche.

Animus: An archetype symbolizing the unconscious male component of the female psyche.

Anonymity: Protecting a participant's identity by not collecting or disclosing any personally identifiable information.

Antagonist: A drug that reduces or stops the normal effects of a neurotransmitter.

Anterograde Amnesia: The inability to transfer information from short-term into long-term memory, making it impossible to form new memories after the onset of amnesia.

Antianxiety Medications: Drugs that help relieve fear or anxiety by increasing the action of the neurotransmitter GABA.

Antidepressant Medications: Drugs designed to improve moods.

Antipsychotic Drugs (Neuroleptics): Drugs that treat the symptoms of schizophrenia and related psychotic disorders.

Antisocial Personality Disorder (APD): A pervasive pattern of violation of the rights of others that begins in childhood or early adolescence and continues into adulthood.

Anxiety Disorders: Psychological disturbances marked by irrational fears, often of everyday objects and situations.

Anxiety: The nervousness or agitation that we sometimes experience, often about something that is going to happen.

APA Ethical Code: A set of 150 ethical standards that psychologists and students in psychology are expected to follow in their activities including clinical work, teaching, and research.

Aphasia: A condition in which language functions are severely impaired.

Applied Research: Research that investigates issues that have implications for everyday life and provides solutions to everyday problems.

Appreciation Effects: Having people around us makes us feel good about ourselves.

Aptitude Tests: Tests designed to measure one's ability to perform a given task.

Archetypes: Primordial images that reflect basic patterns or universal themes common to us all.

Arithmetic Mean (M): The sum of all the scores of the variable divided by the number of participants in the distribution; Arithmetic Average.

Arousal Cost–Reward Model: Focuses on the aversive feelings aroused by seeing another in need.

Arousal: Our experiences of the bodily responses created by the sympathetic division of the autonomic nervous system.

Assimilation: Using already developed schemas to understand new information.

Association Areas: The area within the cortex where sensory and motor information is combined and associated with stored knowledge. Responsible for most of the things that make humans seem human and are involved in higher mental functions, such as learning, thinking, planning, judging, moral reflecting, figuring, and spatial reasoning.

Associative Shifting: It is possible to shift any response from occurring with one stimulus to occurring with another stimulus.

At-Risk Research: Research that exposes participants to harm that is greater than that found in everyday circumstances (i.e., greater than minimal risk) and must be reviewed by the full Institutional Review Board committee.

Attachment: The emotional bonds that we develop with those with whom we feel closest, and particularly the bonds that an infant develops with the mother or primary caregiver.

Attention: A state of focused awareness on a subset of the available perceptual information.

Attitudes: Opinions, feelings, and beliefs about a person, concept, or group. Our evaluations of things that can bias us toward having a particular response to it.

Attraction: Being sexually interested in another person.

Audience Design: Constructing utterances to suit the audience's knowledge.

Auditory Cortex: Located in the temporal cortex. Responsible for hearing and language.

Authoethnography: A narrative approach to introspective analysis.

Authoritarian Parents: Demanding but not responsive.

Authoritative Parents: Demanding but they also responsive to the needs and opinions of the child.

Autobiographical Memory: Memory for the events of one's life.

Automatic Behavior: An unconscious behavior that is not self-censored and is typically spontaneous.

Automatic Empathy: A social perceiver unwittingly taking on the internal state of another person, usually because of mimicking the person's expressive behavior and thereby feeling the expressed emotion.

Automatic: A behavior or process that is unintentional, uncontrollable, occurs outside of conscious awareness, or is cognitively efficient.

Autonomic Nervous System (ANS): A division of the peripheral nervous system (PNS) that regulates autonomic processes, or internal activities of the human body including heart rate, breathing, digestion, salivation, perspiration, urination, and sexual arousal.

Autonomy: A fundamental right that describes a person's ability to make his or her own decisions freely without being coerced by others.

Availability Heuristic: The tendency to make judgments of the frequency or likelihood that an event occurs on the basis of the ease with which it can be retrieved from memory.

Availability: The ease of getting a specific response.

Aversion Therapy: A type of behaviour therapy in which positive punishment is used to reduce the frequency of an undesirable behaviour.

Aversive Racism: The tendency for people to dislike admitting their own racial biases to themselves or others.

Avoidance Learning: A learned response to avoid an unpleasant stimulus or event.

Avoidant Attachment Style: When a child avoids or ignores his or her mother, showing little emotion when the mother departs or returns.

Axon: A long, segmented fibre within the neuron that transmits information away from the cell body toward other neurons or to the muscles and glands.

B

Babbling: the beginning stages of speech. Occurs at about seven months, babies engage in intentional vocalizations that lack specific meaning.

Balance: Putting less effort into a focal goal by working towards other goals.

Barbiturates: depressants that are commonly prescribed as sleeping pills and painkillers.

Basic Research: Research that answers fundamental questions about behavior.

Basic-Level Category: the neutral, preferred category for a given object, at an intermediate level of specificity.

Behavioral Genetics: A variety of research techniques that scientists use to learn about the genetic and environmental influences on human behaviour by comparing the traits of biologically and nonbiologically related family members

Behavioral Medicine: Focuses on the application of research on health predictors and risk factors, or interventions that prevent and treat illness.

Behaviour Therapy: Psychological treatment that is based on principles of learning.

Behaviourism: a school of psychology that is based on the premise that it is not possible to objectively study the mind, and therefore that psychologists should limit their attention to the study of behaviour itself. Focuses on observable behaviour as a means to studying the human psyche.

Belmont Report: a set of federal guidelines created in 1978 after the Tuskegee study that articulates ethical guidelines for research.

Beneficence: an ethical principle from the Belmont Report that emphasizes the importance of maximizing benefits and minimizing harm to research participants and society.

Benevolent Sexism: Refers to the perception that women need to be protected, supported, and adored by men.

Benzodiazepines: a family of depressants used to treat anxiety, insomnia, seizures, and muscle spasms.

Beta Effect: the perception of motion that occurs when different images are presented next to each other in succession.

Bias (i.e., test bias): a test that predicts outcomes better for one group than it does for another.

Biases: the systematic and predictable mistakes that influence the judgment of even very talented human beings.

Bilingualism: the ability to speak two languages.

Binocular Depth Cues: depth cues that are created by retinal image disparity and require the coordination of both eyes.

Bio-Psycho-Social Model of Illness: A way of understanding disorder that assumes that disorder is caused by biological, psychological, and social factors.

Biofeedback: A stress reduction technique where the individual is shown bodily information that is not normally available to them, and then taught strategies to alter this signal.

Biological Drive: A drive powering human behaviour including hunger, thirst, and intimacy.

Biological Psychology: School of psychology interested in measuring biological, physiological, or genetic variables in an attempt to relate them to psychological or behavioural variables.

Biological Rhythms: regularly occurring cycles of behaviours.

Biomedical Approach to Reducing Disorders: An approach that is based on the use of medications to treat mental disorders as well as the employment of brain intervention techniques.

Biomedical Model of Health: Posits that physical or pathogenic factors primarily contribute to illness.

Biomedical Therapies: Treatments designed to reduce psychological disorder by influencing the action of the central nervous system.

Biopsychosocial Model of Health: Posits that biology, psychology, and social factors are just as important in the development of disease as biological causes.

Bipolar Disorder: A psychological disorder characterized by swings in mood from overly "high" to sad and hopeless, and back again, with periods of near-normal mood in between.

Black Box Model: An interaction of stimuli, consumer characteristics, decision processes, and consumer responses.

Blatant Biases: Conscious beliefs, feelings, and behavior that people are perfectly willing to admit, which mostly express hostility toward other groups while unduly favoring one's own group.

Blind Spot: a hole in one's vision due to a lack of photoreceptor cells. Occurs the optic nerve leaves the retina.

Blind to Condition: when the experimenter or the participants do not know which conditions the participants are assigned to.

Blind to the Research Hypothesis: When research participants are not aware of what is being studied.

Blindsight: a condition in which people are unable to consciously report on visual stimuli but nevertheless are able to accurately answer questions about what they are seeing.

Blocking: in classical conditioning, the finding that no conditioning occurs to a stimulus if it is combined with a previously conditioned stimulus during conditioning trials. Suggests that information, surprise value, or prediction error is important in conditioning.

Blood Alcohol Content (BAC): a measure of the percentage of alcohol found in a person's blood. This measure is typically the standard used to determine the extent to which a person is intoxicated, as in the case of being too impaired to drive a vehicle.

Borderline Personality Disorder (BPD): A psychological disorder characterized by a prolonged disturbance of personality accompanied by mood swings, unstable personal relationships, identity problems, threats of self-destructive behaviour, fears of abandonment, and impulsivity.

Bounded Awareness: the systematic ways in which we fail to notice obvious and important information that is available to us.

Bounded Ethicality: the systematic ways in which our ethics are limited in ways we are not even aware of ourselves.

Bounded Rationality: model of human behavior that suggests that humans try to make rational decisions but are bounded due to cognitive limitations.

Bounded Self-Interest: the systematic and predictable ways in which we care about the outcomes of others.

Bounded Willpower: the tendency to place greater weight on present concerns rather than future concerns.

Brain Lateralization: The idea that the left and the right hemispheres of the brain are specialized to perform different functions.

Brain Stem: The oldest and innermost region of the brain that is designed to control the most basic functions of life, including breathing, attention, and motor responses.

Broca's Area: an area in front of the left hemisphere near the motor cortex responsible for language production.

Bruxism: a sleep disorder in which the sufferer grinds their teeth during sleep.

Bystander Intervention: A phenomenon in which people intervene to help others, including strangers.

C

Caffeine: a bitter psychoactive drug found in the beans, leaves, and fruits of plants.

Cannon-Bard Theory of Emotion: A theory proposed by Walter Cannon and Philip Bard that states that the experience of an emotion is accompanied by physiological arousal.

Cartesian Catastrophe: the idea that mental processes taking place outside conscious awareness are impossible.

Case Studies: descriptive records of one or more individual's experience and behavior.

Cataplexy: a symptom of narcolepsy where an individual loses muscle tone, resulting in a partial or complete collapse.

Categories: networks of associated memories that have features in common with each other – a fundamental part of human nature.

Categorize: to sort or arrange different items into classes or categories.

Category Prototype: the member of the category that is most average or typical of the category.

Category: a set of entities that are equivalent in some way. Usually the items are similar to one another.

Central Executive: the part of working memory that directs attention and processing.

Central Nervous System (CNS): The collection of neurons that make up the brain and the spinal cord. Is the major controller of the body's functions, charged with interpreting sensory information and responding to it with its own directives.

Central Tendency: the point in the distribution around which the data are centred. Typically measured using the arithmetic mean.

Cerebellum: (i.e., little brain) Consists of two wrinkled ovals behind the brain stem. It functions to coordinate voluntary movement.

Cerebral Cortex: The outer bark-like layer of our brain that allows us to so successfully use language, acquire complex skills, create tools, and live in social groups. The aspect of the brain that sets humans apart from other animals.

Challenge: Seeing change and new experiences as exciting opportunities to learn and develop.

Chameleon Effect: A phenomenon that occurs when individuals nonconsciously mimic the postures, mannerisms, facial expressions, and other behaviors of their interaction partners.

Character Strengths: A psychological and intellectual virtue.

Childhood: The period between infancy and the onset of puberty.

Chromosomes: Multiple strands of DNA (deoxyribonucleic acid) that are grouped together.

Chronic Disease: Illnesses that persist over time.

Chunking: the process of organizing information into smaller groupings (chunks), thereby increasing the number of items that can be held in short term memory.

Cilia: a bundle of fibres that are located on each of the hair cells found in the cochlea.

Circadian Rhythm: the strongest and most important biorhythm. It guides the daily waking and sleeping cycle in many animals and is influenced by exposure to sunlight as well as daily schedule and activity. Biologically, it includes changes in body temperature, blood pressure and blood sugar.

Classical Conditioning Effects: how we learn, often without effort or awareness, to associate neutral stimuli with another stimulus, which creates a naturally occurring response.

Classical Conditioning: A type of learning in which we develop responses to certain stimuli that are not naturally occurring.

Classical Conditioning: the procedure in which an initially neutral stimulus (the conditioned stimulus, or CS) is paired with an unconditioned stimulus (or US). The result is that the conditioned stimulus begins to elicit a conditioned response (CR). Classical conditioning

is nowadays considered important as both a behavioral phenomenon and as a method to study simple associative learning. Same as Pavlovian conditioning. Describes stimulus-stimulus associative learning.

Client- or Person-Centred Therapy: relies on clients' capacity for self-direction, empathy, and acceptance to promote clients' development.

Clock Time: the hour on the timepiece that governs the beginning and ending of activities.

Cocaine: an addictive drug obtained from the leaves of the coca plant.

Cochlea: a snail-shaped liquid-filled tube in the inner ear that contains the cilia.

Cochlear Implant: a device made up of a series of electrodes that are placed inside the cochlea.

Cocktail Party Phenomenon: the ability to focus one's auditory attention on a stimulus while filtering out other competing stimuli.

Codeine: an analgesic that is weaker and less addictive than morphine and heroin. Also a member of the opiate family.

Cognition: the processes of acquiring and using knowledge.

Cognitive Accessibility: the extent to which knowledge is activated in memory, and thus likely to be used in cognition and behavior.

Cognitive Appraisal: The cognitive interpretations that accompany emotions.

Cognitive Behavioural Therapy (CBT): A structured approach to treatment that attempts to reduce psychological disorders through systematic procedures based on cognitive and behavioural principles.

Cognitive Biases: errors in memory or judgment that are caused by the inappropriate use of cognitive processes

Cognitive Psychology: A field of psychology that studies mental processes, including perception, thinking, memory, and judgement.

Cognitive Therapy: A psychological treatment that helps clients identify incorrect or distorted beliefs that are contributing to disorder.

Cognitive-Behavioural Therapy (CBT): Focuses on helping individuals challenge their patterns and beliefs and replace erroneous thinking with more realistic and effective thoughts, thus decreasing self-defeating emotions and behaviour and breaking what can otherwise become a negative cycle.

Cohort Effects: Refer to the possibility that differences in cognition or behaviour at two points in time may be caused by differences that are unrelated to the changes in age.

Collective Unconscious: An aspect of the unconscious that manifests in universal themes that run through all human life.

Collectivism: Emphasizes connectedness among people and the importance of working towards common goals. A norm in East Asian cultures that are centered around interdependence, including developing harmonious social relationships with others.

Color Blindness: the inability to detect green and/or red colors.

Commitment: Results from the perceived value and attainability of a goal. The tendency to see the world as interesting and meaningful.

Common Ground: information that is shared by people who engage in a conversation.

Common-Causal Variable: a variable that is not part of the research hypothesis but that causes both the predictor and the outcome variable and thus produces the observed correlation between them.

Community Learning: Occurs when children serve as both teachers and learners.

Community Mental Health Services: Psychological treatments and interventions that are distributed at the community level.

Comorbidity: Occurs when people who suffer from one disorder also suffer at the same time from other disorders.

Competence: The recognition of one's own abilities relative to other children.

Complexes: Usually unconscious and repressed emotionally toned symbolic material that is incompatible with consciousness.

Compulsions: Repetitive behaviours.

Concept: the mental representation of a category.

Conception: Occurs when an egg from the mother is fertilized by a sperm from the father.

Conceptual Replication: scientific attempt to copy the scientific hypothesis used in an earlier study in an effort to determine whether the results will generalize to different samples, times, or situations. The same – or similar – results are an indication that the findings are generalizable.

Conceptual Variables: abstract ideas that form the basis of research hypotheses.

Concrete Operational Stage: Marked by more frequent and more accurate use of transitions, operations, and abstract concepts.

Conditioned Compensatory Response: in classical conditioning, a conditioned response that opposes, rather than is the same as, the unconditioned response. It functions to reduce the strength of the unconditioned response. Often seen in conditioning when drugs are used as unconditioned stimuli.

Conditioned Response (CR): the response that is elicited by the conditioned stimulus after classical conditioning has taken place.

Conditioned Stimulus (CS): an initially neutral stimulus (like a bell, light, or tone) that elicits a conditioned response after it has been associated with an unconditioned stimulus.

Cones: visual neurons that are specialized in detecting fine detail and colors.

Confederate: An actor working with the researcher. Most often, this individual is used to deceive unsuspecting research participants.

Confidentiality: refers to an agreement between researchers and participants that states that the researcher(s) will not reveal participants' personal information without their consent or legal authorization.

Confirmation Bias: the tendency to verify and confirm our existing memories rather than to challenge and disconfirm them. A result of our schemas influencing how we seek out and interpret new information. Confirmation bias influences memory in such a way that information that fits our schemas is better remembered than information that disconfirms our schemas.

Conformity: a process in which people change their beliefs and behaviours to be similar to those of the people that they care about.

Conformity: The tendency to act and think like the people around us.

Confounding Variables: variables other than the independent on which the participants in one experimental condition differ systematically from those in the other condition.

Conscientiousness: The tendency to be careful, on-time for appointments, to follow rules, and to be hardworking.

Conscious: Having knowledge of something external or internal to oneself; being aware of and responding to one's surroundings. The ability to accurately report on a stimuli's existence (or its nonexistence) more than 50% of the time.

Consciousness: The awareness or deliberate perception of a stimulus. OR our subjective awareness of ourselves and our environment.

Consent Form: a written document in which informed consent is outlined and obtained from clients and participants.

Consolidation: the process occurring after encoding that is believed to stabilize memory traces.

Construct Validity: Tests that actually measure intelligence rather than something else; the extent to which the variables used in the research adequately assess the conceptual variables they were designed to measure.

Context-Dependent Learning: an increase in retrieval when the external situation in which information is learned matches the situation in which it is remembered.

Context: stimuli that are in the background whenever learning occurs. For instance, the Skinner box or room in which learning takes place is the classic example of a context. However, "context" can also be provided by internal stimuli, such as the sensory effects of drugs (e.g., being under the influence of alcohol has stimulus properties that provide a context) and mood states (e.g., being happy or sad). It can also be provided by a specific period in time—the passage of time is sometimes said to change the "temporal context."

Contextual Information: the information surrounding language that help us interpret language. Examples include the knowledge that we have and that we know that other people have, and nonverbal expressions such as facial expressions, postures, gestures, and tone of voice.

Continual-Activation Theory: Proposes that dreaming is a result of brain activation and synthesis.

Continuous Distributions: A distribution in which most scores fall somewhere in the middle, with smaller numbers showing more extreme levels.

Contralateral Control: How the brain is wired such that in most cases the left hemisphere receives sensations from and controls the right side of the body, and vice versa.

Control: The belief in one's own ability to control or influence events.

Controlled Behavior: a conscious behavior that is self-censored.

Convergence: the inward turning of our eyes that is required to focus on objects that are less than about 50 feet away from us.

Convergent Thinking: thinking that is directed toward finding the correct answer to a given problem.

Cornea: a clear covering that protects the eye and begins to focus the incoming light.

Corpus Callosum: The region that normally connects the two halves of the brain and supports communication between the hemispheres.

Correlational Research: research designed to discover relationships among variables and to allow the prediction of future events from present knowledge; involves the measurement of two or more relevant variables and an assessment of the relationships between or among those variables.

Cortisol: A primary stress hormone that increases sugars (glucose) in the bloodstream, enhances the brain's use of glucose, and increases the availability of substances that repair tissues.

Cost–Benefit Analysis: The process that potential helpers engage in to determine the costs and benefits associated with helping. Or, when costs are compared with the benefits in a research project to determine the ethical standing of that research project.

Counterconditioning: A second incompatible response (relaxation) is conditioned to an already conditioned response (the fear response).

Counterfactual Thinking: the tendency to think about and experience events according to "what might have been".

Couples Therapy: Treatment in which two people who are cohabitating, married, or dating meet together with the practitioner to discuss their concerns and issues about their relationship.

Critical Period: a time in which learning can easily occur.

Cross-Cultural Psychology: Research that uses standard scales to compare cultural groups.

Cross-Cultural Studies: Research that uses standard forms of measurement to compare people from different cultures and identify their differences.

Cross-Sectional Research Design: Research designs in which age comparisons are made between samples of different people at different ages at one time.

Crystallized Intelligence: General knowledge about the world, as reflected in semantic knowledge, vocabulary, and language.

Crystallized Intelligence: the accumulated knowledge of the world we have acquired throughout our lives.

Cue Overload Principle: the principle stating that the more memories that are associated to a particular retrieval cue, the less effective the cue will be in prompting retrieval of any one memory.

Cues: a stimulus that has a particular significance to the perceiver (e.g., a sight or a sound that has special relevance to the person who saw or heard it).

Cultural Differences: Refers to the differences across cultures.

Cultural Display Rules: Rules that are learned early in life that specify the management and modification of our emotional expressions according to social circumstances.

Cultural Intelligence: The ability to understand why members of other cultures act in the ways they do.

Cultural Psychology: Attempts to understand and appreciate culture from the point of view of the people within it.

Cultural Relativism: The principle of regarding and valuing the practices of a culture from the point of view of that culture.

Cultural Scripts: How a person is taught how to behave according to regional cultural norms; people can have multiple cultural scripts.

Cultural Similarities: Refers to the similarities across cultures.

Culture of Honor: A cultural background that emphasizes personal or family reputation and social status.

Culture: It is a collective understanding of the way the world works, shared by members of a group and passed down from one generation to the next. Represents the common set of social norms, including religious and family values and other moral beliefs, shared by the people who live in a geographical region.

Curvilinear Relationship: relationships that change in direction and thus are not described by a single straight line.

D

Daily Hassles: Everyday minor stressors that can raise blood pressure, alter stress hormones, and suppress the immune system function. Our everyday interactions with the environment that are essentially negative.

Data: any information that is collected through formal observation or measurement that is used within a research study.

Debriefing: refers to the process of informing research participants as soon as possible after the study about its purpose, disclosing any deception involved, and minimizing harm or misunderstandings that result from participating.

Decay: the fading of memories with the passage of time.

Deception: occurs whenever research participants are not completely and fully informed about the nature of the research project before participating in it.

Decibel: a unit of relative loudness.

Declaration of Helsinki: an ethics code that was created in 1964 by the World Medical Council.

Declarative Memory: conscious memories for facts and events.

Deep Structure of an Idea: how the idea is represented in the fundamental universal grammar that is common to all languages.

Deficiency Needs: The bottom four levels of Maslow's pyramid, including physiological, safety, and social needs.

Deliberative Phase: A person must decide which of many potential goals to pursue at a given point in time.

Delusions: False beliefs not commonly shared by others within one's culture and maintained even though they are obviously out of touch with reality.

Dementia: A progressive neurological disease that includes loss of cognitive abilities significant enough to interfere with everyday behaviours.

Dendrite: A branching treelike fibre that collects information from other cells and sends the information to the soma.

Dependence: a need to use a drug or other substance regularly.

Dependent Variable: a measured variable that is expected to be influenced by the experimental manipulations.

Depressants: a class of drugs (psychoactive) that slow down the body's physiological and mental processes. Also reduces the activity of the CNS.

Depression: a psychological disorder that affects millions of people worldwide and is known to be caused by biological, social, and cultural factors.

Depth Cues: messages from our bodies and the external environment that supply us with information about space and distance.

Depth Perception: the ability to perceive three-dimensional space and to accurately judge distance.

Derailment: The shifting from one subject to another, without following any one line of thought to conclusion.

Descriptive Norms: We act the way most people—or most people like us—act.

Descriptive Research: designed to provide a snapshot of the current state of affairs.

Descriptive Statistics: used to analyze descriptive research results by summarizing the distribution of scores.

Development: The physiological, behavioural, cognitive, and social changes that occur throughout human life, which are guided by both genetic predispositions (nature) and by environmental influences (nurture).

Developmental Intergroup Theory: Postulates that adults' heavy focus on gender leads children to pay attention to gender as a key source of information about themselves and others, to seek out any possible gender differences, and to form rigid stereotypes based on gender that are subsequently difficult to change

Diagnostic and Statistical Manual of Mental Disorders (DSM): A document that provides a common language and standard criteria for the classification of mental disorders.

Dialectical Behavioral Therapy (DBT): Essentially a cognitive therapy, but it includes a particular emphasis on attempting to enlist the help of the patient in his or her own treatment.

Dichotic Listening: an experimental task in which two messages are presented to different ears.

Difference Threshold (or Just Noticeable Difference [JND]): the change in a stimulus that can just barely be detected by the organism.

Diffusion of Responsibility: A phenomenon in which bystanders are relived of personal responsibility and do not intervene because they know that someone else could help.

Direct Effects of Social Support: Having people we can trust and rely on helps us directly by allowing us to share favours when we need them.

Directional Goals: When we want a situation to turn out a particular way or our belief to be true.

Discrimination: When a person is biased against an individual, simply because of the individual's membership in a social category.

Discriminative Stimulus: in operant conditioning, a stimulus that signals whether the response will be reinforced. It is said to "set the occasion" for the operant response.

Disorganized Attachment Style: When a child has no consistent way of coping with the stress of the strange situation.

Dispersion: the extent to which the scores are all tightly clustered around the central tendency.

Dissociation: the heightened focus on one stimulus or thought such that many other things around you are ignored; a disconnect between one's awareness of their environment and the one object the person is focusing on.

Dissociative Amnesia: A psychological disorder that involves extensive, but selective, memory loss, but in which there is no physiological explanation for the forgetting.

Dissociative Amnesia: loss of autobiographical memories from a period in the past in the absence of brain injury or disease.

Dissociative Disorder: A condition that involves disruptions or breakdowns of memory, awareness, and identity.

Dissociative Fugue: A psychological disorder in which an individual loses complete memory of his or her identity and may even assume a new one, often far from home.

Dissociative Identity Disorder: A psychological disorder in which two or more distinct and individual personalities exist in the same person, and there is an extreme memory disruption regarding personal information about the other personalities.

Distinctiveness: the principle that unusual events (in a context of similar events) will be recalled and recognized better than uniform (nondistinctive) events.

Distractor Task: a task that is designed to make a person think about something unrelated to an impending decision.

Distribution: the central tendency and spread of data for a particular variable

Divergent Thinking: the ability to generate many different ideas for or solutions to a single problem.

Divided Attention: A person's ability to focus on two or more things at one time; the ability to flexibly allocate attentional resources between two or more concurrent tasks.

DNA Methylation: Covalent modifications of mammalian DNA occurring via the methylation of cytosine, typically in the context of the CpG dinucleotide.

DNA Methyltransferases (DNMTs): Enzymes that establish and maintain DNA methylation using methyl-group donor compounds or cofactors. The main mammalian DNMTs are DNMT1, which maintains methylation state across DNA replication, and DNMT3a and DNMT3b, which perform de novo methylation.

Double-Blind Experiment: both the researcher and the participants are blind to condition.

Down Syndrome: a chromosomal disorder leading to intellectual disability caused by the presence of all or part of an extra 21st chromosome.

Dream Analysis: The therapist listens while the client describes his or her dreams and then analyzes the symbolism of the dreams in an effort to probe the unconscious thoughts of the client and interpret their significance.

Dreams: The succession of images, thoughts, sounds, and emotions that passes through our minds while sleeping; Specific expressions of the unconscious that have a definite, purposeful structure indicating an underlying idea or intention.

Drive State: An affective experience (something you feel) that motivates organisms to fulfill goals that are generally beneficial to their survival and reproduction.

Dualism: a term used by Descartes that states that the mind is fundamentally different from the mechanical body; the idea that the mind, a nonmaterial entity, is separate from (although connected to) the physical body.

Durability Bias: The tendency for people to overestimate how long positive and negative events will affect them.

Dysthymia: A condition characterized by mild, but chronic, depressive symptoms that last for at least two years.

E

Early Adulthood: Roughly the ages between 25 and 45.

Echoic Memory: auditory sensory memory. Decays slower than iconic memory (4 seconds).

Eclectic Therapy: An approach to treatment in which the therapist uses whichever techniques seem most useful and relevant for a given patient.

EEG (Electroencephalography): the recording of the brain's electrical activity over a period of time by placing electrodes on the scalp.

Effect Size: A measure of the effectiveness of treatment.

Ego-Depletion: The exhaustion of resource that occurs from resisting a temptation.

Egocentric: The inability to readily see and understand other people's viewpoints.

Egoism: Being primarily concerned with one's own cost–benefit outcomes.

Eidetic Imagery (or Photographic Memory): a type of memory that allows people the ability to report details of an image over long periods of time.

Elaborative Encoding: process new information in ways that make it more relevant or meaningful.

Electroconvulsive Therapy (ECT): A medical procedure designed to alleviate psychological disorder in which electric currents are passed through the brain, deliberately triggering a brief seizure.

Electroencephalography (EEG): A technique that records the electrical activity produced by the brain's neurons through the use of electrodes that are placed around the research participant's head.

Electromagnetic Energy: pulses of energy waves that can carry information from place to place.

Embodied: becoming so closely in touch with the environment that the person's body and the sensed environment becomes linked with our cognition, such that the world around us becomes part of our brain.

Embryo: A zygote that attaches to the wall of the uterus.

Emotion Regulation: The ability to control and productively use one's emotions.

Emotion-Focused Coping: Regulates the emotions that come with stress.

Emotion: A mental and physiological feeling state that directs attention and guides behavior.

Emotional Intelligence (EI): the ability to monitor one's own and others' feelings and emotions, to discriminate among them, to use this information to guide one's thinking and actions, and to effectively control one's own emotions. EI includes four specific abilities: perceiving, using, understanding, and managing emotions.

Empathic Concern: When potential helpers become primarily interested in increasing the well-being of the victim, even if the helper must incur some costs that might otherwise be easily avoided.

Empathy–Altruism Model: Posits that the key for altruism is empathizing with the victim, that is, putting oneself in the shoes of the victim and imagining how the victim must feel.

Empirical Methods: refer to a set of methods used by scientists and include the processes of collecting and organizing data and drawing conclusions about those data.

Empirical: to be based on systematic collection and analysis of data.

Encoding Specificity Principle: the hypothesis that a retrieval cue will be effective to the extent that information encoded from the cue overlaps or matches information in the engram or memory trace.

Encoding: The initial experience of perceiving and learning events. It is the process by which we place the things that we experience into memory. The pact of putting information into memory.

Enculturation: Refers to the ways people learn about and shared cultural knowledge.

Endocrine System: The chemical regulator of the body that consists of glands that secrete hormones.

Engrams: a term indicating the change in the nervous system representing an event; also, memory trace.

Epigenetics: The study of heritable changes in gene expression or cellular phenotype caused by mechanisms other than changes in the underlying DNA sequence. Epigenetic marks include covalent DNA modifications and posttranslational histone modifications.

Epigenome: The genome-wide distribution of epigenetic marks.

Episodic Memory: Memory of autobiographical events that can be explicitly stated with a particular time and place. OR The firsthand experiences that we have had.

Error Management Theory (EMT): A theory of selection under conditions of uncertainty in which recurrent cost asymmetries of judgment or inference favor the evolution of adaptive cognitive biases that function to minimize the more costly errors.

Escape Learning: A learned behaviour to terminate an unpleasant stimulus.

Estrogen: One of two female sex hormones secreted by the ovaries. Estrogen is involved in the development of female sexual features, including breast growth, the accumulation of body fat around the hips and thighs, and the growth spurt that occurs during puberty. Also involved in pregnancy and the regulation of the menstrual cycle.

Ethical Review Board (ERB): a committee of at least five members whose goal it is to determine the cost-benefit ratio of research conducted within in institution. Also known as an Institutional Review Board (IRB).

Ethics: a broad area within psychology that is concerned with what it means to be moral and how to act morally.

Ethnocentric Bias: The researcher who designs the study might be influenced by personal biases that could affect research outcomes, without even being aware of it.

Ethnographic Studies: Research in which the scientist spends time observing a culture and conducting interviews.

Eugenics: the proposal that one could improve the human species by encouraging or permitting reproduction of only those people with genetic characteristics judged desirable.

Euphoria: an intense feeling of pleasure, excitement or happiness.

Eureka Experience: when a creative product enters consciousness.

Eustress: Stress that is not necessarily debilitative and could be potentially facilitative to a person's sense of well-being, capacity, or performance.

Evaluative Priming Task: An implicit test that measures how quickly the participant labels the valence of the attitude object when it appears immediately after a positive or negative image.

Event Time: scheduling is determined by the flow of the activity. Events begin and end when, by mutual consensus, participants "feel" the time is right.

Evolution: Certain traits and behaviors developing over time because they are advantageous to our survival.

Evolutionary Psychology: A branch of psychology that applies the Darwinian theory of natural selection to human and animal behaviour. Seeks to develop and understand ways of expanding the emotional connection between individuals and the natural world, thereby assisting individuals with developing sustainable lifestyles and remedying alienation from nature.

Exact (or Direct) Replication: scientific attempt to exactly copy the scientific methods used in an earlier study in an effort to determine whether the results are consistent. The same – or similar – results are an indication that the findings are accurate.

Excitation Transfer: The phenomenon that occurs when people who are already experiencing arousal from one event tend to also experience unrelated emotions more strongly.

Excitatory: Neurotransmitters that make the cell more likely to fire.

Exemplar: an example in memory that is labeled as being in a particular category.

Exempt Research: research projects in which the federal regulations do not apply given its nature (e.g., using data from public sources).

Existential Therapy: focuses on "man in the world" by emphasizing the choices to be made in the present and future and enabling a new freedom and responsibility to act.

Expectation Fulfillment Theory: posits that dreaming serves to discharge emotional arousals that haven't been expressed during the day.

Experimental Research: research in which initial equivalence among research participants in more than one group is created, followed by a manipulation of a given experience for these groups and a measurement of the influence of the manipulation.

Experimenter Bias: a situation in which the experimenter subtly treats the research participants in the various experimental conditions differently, resulting in an invalid confirmation of the research hypothesis.

Explicit Attitude: An attitude that a person verbally or overtly expresses.

Explicit Memory: A type of memory that is conscious. Includes memories that are intentionally recollected, typically information that are factual such as previous experiences and concepts. Knowledge or experiences that can be consciously remembered. There are two types of explicit memory – episodic and semantic.

Exposure Therapy: A behavioural therapy based on the classical conditioning principle of extinction, in which people are confronted with a feared stimulus with the goal of decreasing their negative emotional responses to it.

External Locus of Control: When a person believes that his or her achievements and outcomes are determined by fate, luck, or other. If the person does not succeed, he or she believes it is due to external forces outside of the person's control.

External Validity: the extent to which the results of a research design can be generalized beyond the specific way the original experiment was conducted.

Extinction: decrease in the strength of a learned behavior that occurs when the conditioned stimulus is presented without the unconditioned stimulus (in classical conditioning) or when the behavior is no longer reinforced (in instrumental conditioning). The term describes both the procedure (the US or reinforcer is no longer presented) as well as the result of the procedure (the learned response declines). Behaviors that have been reduced in strength through extinction are said to be "extinguished."

Extraversion: The tendency to be talkative, sociable, and to enjoy others; the tendency to have a dominant style.

Extravert: A person who is outer-directed.

Extrinsic Motivation: Motivation that comes from the benefits associated with achieving a goal.

F

Facets: More specific, lower-level units of personality.

Facial Feedback Hypothesis: Proposes that the movement of our facial muscles can trigger corresponding emotions.

Factor Analysis: A statistical method that helps to determine whether a small number of dimensions underlie a larger system.

Facts: objective statements that are determined to be accurate through empirical study.

False Memories: memory for an event that never actually occurred, implanted by experimental manipulation or other means.

False-Belief Test: an experimental procedure that assesses whether a perceiver recognizes that another person has a false belief—a belief that contradicts reality.

Falsified Data (or Faked Data): data that are fabricated, or made up, by researchers intentionally trying to pass off research results that are inaccurate. This is a serious ethical breach and can even be a criminal offense

Family Study: Starts with one person who has a trait of interest — for instance, a developmental disorder such as autism — and examines the individual's family tree to determine the extent to which other members of the family also have the trait.

Family Therapy: Involves families meeting together with a therapist; in some cases, the meeting is precipitated by a particular problem with one family member.

Farsighted: an image is focused behind the retina, rather than on the retina. Occurs when the light rays bend incorrectly.

Fear Conditioning: a type of classical or Pavlovian conditioning in which the conditioned stimulus (CS) is associated with an aversive unconditioned stimulus (US), such as a foot shock. As a consequence of learning, the CS comes to evoke fear. The phenomenon is thought to be involved in the development of anxiety disorders in humans.

Feature Detector Neurons: Specialized neurons, located in the visual cortex, that respond to the strength, angles, shapes, edges, and movements of a visual stimulus.

Federal Policy for the Protection of Human Subjects: a set of laws that were created from the Belmont Report that guides the conduct of research that is conducted, supported, or regulated by the federal government.

Feeling Function: Creative, warm, intimate.

Fetal Alcohol Syndrome (FAS): A condition caused by maternal alcohol drinking that can lead to numerous detrimental developmental effects.

Fight-or-Flight Response: A reflex that prepares the body to respond to danger in the environment; An emotional and behavioral reaction to stress that increases the readiness for action.

Fitness: refers to the extent to which having a given characteristic helps the individual organism survive and reproduce at a higher rate than do other members of the species who do not have the characteristic.

Flashbulb Memory: vivid and emotional personal memories of receiving the news of some momentous (and usually emotional and unusual) event that people believe they can remember very well.

Flexible Correction Model: the ability for people to correct or change their beliefs and evaluations if they believe these judgments have been biased (e.g., if someone realizes they only thought their day was great because it was sunny, they may revise their evaluation of the day to account for this "biasing" influence of the weather).

Flooding: A therapeutic technique in which a client is exposed to the source of his or her fear all at once.

Flourish: To grow and function successfully.

Flow: A state of optimal performance.

Fluid Intelligence: The ability to think and acquire information quickly and abstractly. The capacity to learn new ways of solving problems and performing activities.

Flynn Effect: the observation that scores on intelligence tests worldwide have increased substantially over the past decades.

Foils: any member of a lineup (whether live or photograph) other than the suspect.

Forgiveness: Creates a possibility for a relationship to recover from the damage caused by the offending party's offense.

Formal Operational Stage: Marked by the ability to think in abstract terms and to use scientific and philosophical lines of thought.

Four-Branch Model: an ability model developed by Drs. Peter Salovey and John Mayer that includes four main components of EI, arranged in hierarchical order, beginning with basic psychological processes and advancing to integrative psychological processes. The branches are (1) perception of emotion, (2) use of emotion to facilitate thinking, (3) understanding emotion, and (4) management of emotion.

Fovea: the central point of the retina.

Framing: the bias to be systematically affected by the way in which information is presented, while holding the objective information constant.

Free Association: The therapist listens while the client talks about whatever comes to mind, without any censorship or filtering.

Frequency Theory of Hearing: proposes that whatever the pitch of a sound wave, nerve impulses of a corresponding frequency will be sent to the auditory nerve.

Frequency: the wavelength of the sound wave. Measured in terms of the number of waves that arrive per second.

Frontal Lobe: A portion of the brain located behind the forehead, also known as the motor cortex, that is involved in motor skills, higher level cognition (thinking, planning, memory, and judgment), and expressive language.

Functional Fixedness: occurs when people's schemas prevent them from using an object in new and non-traditional ways.

Functional Magnetic Resonance Imaging (fMRI): A type of brain scan that uses a magnetic field to create images of brain activity in each brain area. Detects the amount of blood flow in each brain region and is an indicator of neural activity.

Functionalism (or School of Functionalism): School of psychology aimed at understanding why animals and humans have developed the particular psychological aspects that they currently possess

Fundamental Attribution Error: The consistent way we attribute people's actions to personality traits while overlooking situational influences.

G

Gamification: A growing approach to behaviour modification today that involves applying game incentives such as prompts, competition, badges, and rewards to ordinary activities.

Gate Control Theory of Pain: proposes that pain is determined by the operation of two types of nerve fibres in the spinal cord.

Gender Constancy: By the third birthday, children can consistently identify their own gender and learn that gender is constant and can't change simply by changing external attributes.

Gender Discrimination: Differential treatment on the basis of gender.

Gender Identity: Refers to a person's psychological sense of being male or female.

Gender Roles: The behaviors, attitudes, and personality traits that are designated as either masculine or feminine in a given culture.

Gender Schema Theory: Argues that children are active learners who essentially socialize themselves.

Gender Stereotypes: The beliefs and expectations people hold about the typical characteristics, preferences, and behaviors of men and women.

Gender: Refers to the cultural, social, and psychological meanings that are associated with masculinity and femininity.

Gene Selection Theory: The modern theory of evolution by selection by which differential gene replication is the defining process of evolutionary change.

Gene: A specific deoxyribonucleic acid (DNA) sequence that codes for a specific polypeptide or protein or an observable inherited trait. This basic biological unit transmits characteristics from one generation to the next.

General Adaptation Syndrome (GAS) Model: Describes three distinct phases of physiological change that occur in response to long-term stress: alarm, resistance, and exhaustion.

General Intelligence Factor (g): a construct that the different abilities and skills measured on intelligence tests have in common.

Generalization: the extent to which relationships among conceptual variables can be demonstrated in a wide variety of people and a wide variety of manipulated or measured variables.

Generalized Anxiety Disorder (GAD): A psychological disorder diagnosed in situations in which a person has been excessively worrying about money, health, work, family life, or relationships.

Generativity: speakers of a language can compose sentences to represent new ideas that they have never before been exposed to.

Genotype: The DNA content of a cell's nucleus, whether a trait is externally observable or not.

Gestalt Therapy: Focuses on the skills and techniques that permit an individual to be more aware of his or her feelings.

Gestalt: a meaningfully organized whole; a whole is more than the sum of its parts.

Gland: A gland in the endocrine system that is made up of a groups of cells that function to secrete hormones.

Glial Cells: (i.e., glia) Cells that surround and link to the neurons, protecting them, providing them with nutrients, and absorbing unused neurotransmitters.

Glutamate: a neurotransmitter and a form of the amino acid glutamic acid, is perhaps the most important neurotransmitter in memory.

Goal-Directed Behavior: instrumental behavior that is influenced by the animal's knowledge of the association between the behavior and its consequence and the current value of the consequence. Sensitive to the reinforcer devaluation effect.

Goal: The cognitive representation of a desired state or mental idea of how we would like things to turn out.

Gratitude: A feeling of appreciation or thankfulness in response to receiving a benefit.

Group Therapy: Psychotherapy in which clients receive psychological treatment together with others.

Growth Need: the fifth level of Maslow's pyramid that allows people to reach his or her fullest potential.

H

Habit: instrumental behavior that occurs automatically in the presence of a stimulus and is no longer influenced by the animal's knowledge of the value of the reinforcer. Insensitive to the reinforcer devaluation effect.

Habituation Procedure: When a baby is placed in a high chair and presented with visual stimuli while a video camera records the infant's eye and face movements.

Habituation: The decreased responsiveness toward a stimulus after it has been presented numerous times in succession.

Hallucinations: Imaginary sensations that occur in the absence of a real stimulus or which are gross distortions of a real stimulus.

Hallucinogens: psychoactive drugs/substances that, when ingested, alter a person's sensations and perceptions, often by creating hallucinations that are not real or distorting their perceptions of time.

Hardiness Theoretical Model: Refers to the resilient stress response patterns in individuals and groups.

Health Behaviors: Behaviors that can improve or harm health.

Helpfulness: People high in helpfulness believe they can be effective with the help they give they are more likely to be helpful in the future.

Helping: Prosocial behaviour that involves providing assistance to another person or group who is in need of help.

Heritability Coefficient: An easily misinterpreted statistical construct that purports to measure the role of genetics in the explanation of differences among individuals. The heritability coefficient varies from 0 to 1 and is meant to provide a single measure of genetics' influence of a trait.

Heritability of the Characteristic: refers to the proportion of the observed differences of characteristics among people that is due to genetics.

Heritability: (i.e., genetic influence) Is indicated when the correlation coefficient for identical twins exceeds that for fraternal twins, indicating that shared DNA is an important determinant of personality.

Heroin: a strong addictive drug derived from opium; twice as addictive than morphine.

Hertz: vibrations per second.

Heuristics: Cognitive (or thinking) strategies that simplify decision making by reducing complex problem-solving to simpler, rule-based decisions. These information processing strategies are useful in many cases but may lead to errors when misapplied. Two frequently applied heuristics include the representativeness heuristic and the availability heuristic.

HEXACO Model: Posits that one important class of individual differences was omitted from the Five-Factor Model: Honesty-Humility.

High-Stakes Testing: Situations in which test scores are used to make important decisions about individuals.

Highlight: Prioritizing and putting greater effort towards goals.

Hindsight Bias: refers to the tendency to think that we could have predicted something that has already occurred that we probably would not have been able to predict.

Hippocampus: Located within the limbic system and consists of two "horns" that curve back from the amygdala. Important for the storage of information in long-term memory.

Histone Acetyltransferases (HATs) and Histone Deacetylases (HDACs): HATs are enzymes that transfer acetyl groups to specific positions on histone tails, promoting an "open" chromatin state and transcriptional activation. HDACs remove these acetyl groups, resulting in a "closed" chromatin state and transcriptional repression.

Histone Modifications: Posttranslational modifications of the N-terminal "tails" of histone proteins that serve as a major mode of epigenetic regulation. These modifications include acetylation, phosphorylation, methylation, sumoylation, ubiquitination, and ADP-ribosylation.

Holist: Believing the whole is more than the sum of the parts.

Homeostasis: The natural balance in the body's system. The tendency of an organism to maintain this stability across all the different physiological systems in the body.

Honeymoon Effect: The tendency for newlyweds to produce unrealistically positive ratings.

Hormone: A chemical that moves throughout the body to help regulate emotions and behaviours.

Host Personality: The personality in control of the body most of the time.

Hostile Sexism: Refers to the negative attitudes of women as inferior and incompetent relative to men.

Hostility: A pattern of arousal that involves becoming easily upset, angry, and having a negative personality style.

Hot Cognition: The mental processes that are influenced by desires and feelings.

HPA Axis: A physiological response to stress involving interactions among the (H) hypothalamus, the (P) pituitary, and the (A) adrenal glands.

Hue: the shade of a color.

Human Factors: the field of psychology that uses psychological knowledge, including the principles of sensation and perception, to improve the development of technology.

Human Intelligence: the ability to think, to learn from experience, to solve problems, and to adapt to new situations.

Humanistic Psychology: holds a hopeful, constructive view of human beings and of their substantial capacity to be self-determining.

Humanistic Therapy: A psychological treatment that emphasizes the person's capacity for self-realization and fulfillment.

Humility: A clear and accurate sense of one's abilities and achievements; the ability to acknowledge one's mistakes, imperfections, gaps in knowledge, and limitations.

Hypnosis: the state of consciousness whereby a person is highly responsive to the suggestions of another; this state usually involves a dissociation with one's environment and an intense focus on a single stimulus, which is usually accompanied by a sense of relaxation. OR a trancelike state of consciousness, usually induced by a procedure known as hypnotic induction, which consists of heightened suggestibility, deep relaxation, and intense focus

Hypnotherapy: The use of hypnotic techniques such as relaxation and suggestion to help engineer desirable change such as lower pain or quitting smoking.

Hypothalamus: A brain region that is located in the lower, central part of the brain that is responsible for synthesizing and secreting hormones and plays an important role in eating behavior.

Hypothalamus: Part of the limbic system, located just under the thalamus. A brain structure that contains a number of small areas that perform a variety of functions, including the regulation of hunger and sexual behaviour, as well as linking the nervous system to the endocrine system via the pituitary gland. Helps regulate body temperature, hunger, thirst, and sex, and responds to the satisfaction of these needs by creating feelings of pleasure.

Hypothesis: A proposed explanation for phenomenon that researchers test through research.

I

Iconic Memory: visual sensory memory. Decays rapidly (250 milliseconds).

Identical Elements Theory of Transfer: The more similar the situations are, the greater the amount of information that will transfer.

Identical Twins: Two individual organisms that originated from the same zygote and therefore are genetically identical or very similar. The epigenetic profiling of identical twins discordant for disease is a unique experimental design as it eliminates the DNA sequence-, age-, and sex-differences from consideration.

Identifiability: Identification or placement of a situation is a first response of the nervous system, which can recognize it.

Illusions: occurs when the perceptual processes that normally help us correctly perceive the world around us are fooled by a particular situation so that we see something that does not exist or that is incorrect.

Imaginary Audience: Refers to when teenagers are so highly self-conscious that they feel that everyone is constantly watching them.

Impact Bias: The tendency for a person to overestimate the intensity of their future feelings.

Implemental Phase: Planning specific actions related to the goal and involves having a mindset that is conducive to the effective implementation of a goal.

Implicit Association Test (IAT): A measure that assesses how quickly the participant pairs a concept with an attribute. A computer reaction time test measures a person's automatic associations with concepts. For instance, the IAT could be used to measure how quickly a person makes positive or negative evaluations of members of various ethnic groups.

Implicit Attitude: An attitude that a person does not verbally or overtly express.

Implicit Learning: occurs when we acquire information without intent that we cannot easily express.

Implicit Measures of Attitudes: Measures that infer the participant's attitude rather than having the participant explicitly report it.

Implicit Memory: a type of long-term memory that does not require conscious thought to encode. It's the type of memory one makes without intent. Or, a memory that is acquired and used unconsciously. Implicit memories can affect a person's thoughts and behaviors. Also the influence of experience on behavior, even if the individual is not aware of those influences.

Implicit Motives: Goals in which a person is not consciously aware of and that cannot be assessed via self-report.

Inattentional Blindness: the failure to notice a fully visible object when attention is devoted to something else.

Incidence: refers to the estimated frequency or occurrence (prevalence) of a psychological disorder within a population.

Incidental Learning: any type of learning that happens without the intention to learn.

Independent Self: Views people as unique with a stable collection of personal traits that drive behavior; people tend to express their emotions to influence others.

Independent Variable: the causing variable that is created (manipulated) by the experimenter.

Individual Differences: the variations among people on physical or psychological dimensions.

Individualism: Emphasizes the uniqueness between people, personal freedom, and individual expression of opinions and decision-making. Norms in Western cultures that center on valuing the self and one's independence from others.

Individuation: The process of integrating the conscious with the unconscious, synergizing the many components of the psyche.

Infancy: The developmental stage that begins at birth and continues to one year of age.

Information Processor: A system for taking information in one form and transforming it into another.

Informational Influence: People go along with the crowd because people are often a source of information.

Informed Consent: information given before a participant begins a research session, designed to explain the research procedures and inform that participant of his or her rights during the investigation.

Ingroup: group to which a person belongs.

Inhibitory: Neurotransmitters that make the cell less likely to fire.

Insight: An understanding by the patient of the unconscious causes of his or her symptoms.

Insomnia: persistent difficulty falling or staying asleep.

Instincts: Complex inborn patterns of behaviors that help ensure survival and reproduction.

Institutional Review Board (IRB): a committee of at least five members whose goal it is to determine the cost-benefit ratio of research conducted within in institution. Also known as an Ethical Review Board (ERB).

Instrumental Conditioning: process in which animals learn about the relationship between their behaviors and their consequences. Also known as operant conditioning.

Integrative Psychology: Psychology that combines the nature and actions of mind, body, and spirit.

Intellectual Disability: a generalized disorder ascribed to people who have an IQ below 70, who have experienced deficits since childhood, and who have trouble with basic life skills, such as dressing and feeding themselves and communicating with others

Intentional Learning: any type of learning that happens when motivated by intention.

Intentional: an agent's mental state of committing to perform an action that the agent believes will bring about a desired outcome.

Intentionality: the quality of an agent's performing a behavior intentionally—that is, with skill and awareness and executing an intention (which is in turn based on a desire and relevant beliefs).

Interdependent Self. Views people as being different in each new social context and the social context as the primary drivers of behavior; people tend to control and suppress their emotions to adjust to others.

Interference: other memories get in the way of retrieving a desired memory

Internal Locus of Control: When a person believes that his or her achievements and outcomes are determined by his or her own decisions and efforts. If the person does not succeed, he or she believes it is due to his or her own lack of effort.

Internal Validity: the extent to which we can trust the conclusions that have been drawn about the causal relationship between the independent and dependent variables.

Interneuron: The most common type of neuron and is located primarily within the CNS. Responsible for communication among neurons. Interneurons allow the brain to combine the multiple sources of available information to create a coherent picture of the sensory information being conveyed.

Interpersonal Functions of Emotion: The role that emotions play between individuals within a group.

Interpersonal Intelligence: the capacity to understand the emotions, intentions, motivations, and desires of other people.

Interpretation: The therapist uses the patient's expressed thoughts to try to understand the underlying unconscious problems.

Intersexual Selection: A process of sexual selection by which evolution (change) occurs as a consequences of the mate preferences of one sex exerting selection pressure on members of the opposite sex.

Intrapersonal Functions of Emotion: The role that emotions play within each of us individually.

Intrapersonal Intelligence: the capacity to understand oneself, including one's emotions.

Intrasexual Competition: A process of sexual selection by which members of one sex compete with each other, and the victors gain preferential mating access to members of the opposite sex.

Intrinsic Motivation: A drive that powers human behaviour that results from the joy of the task itself. Motivation that comes from the benefits associated with the process of pursing a goal.

Introspection: A method used by structuralists to attempt to create a map of consciousness by asking research participants to describe exactly what they experience as they work on mental tasks. Asking research participants to describe exactly what they experience as they work on mental tasks.

Introvert: A person who is inner-directed.

Intuitive: Sees many possibilities in situations; goes with hunches; impatient with earthy details; impractical; sometimes not present.

Inverted U Hypothesis: Asserts that, up to a point, stress can be growth inducing but that there is a turning or tipping point when stress just becomes too much and begins to become debilitative.

IQ: A measure of intelligence that is adjusted for age.

Iris: The coloured part of the eye that controls the size of the pupil by constricting or dilating in response to light intensity.

J

James-Lange Theory of Emotion: A theory proposed by William James and Carl Lange that states that arousal and emotion are not independent, but rather that emotion depends on the pattern of arousal.

Jet Lag: The state of being fatigued and/or having difficulty adjusting to a new time zone after traveling a long distance (across multiple time zones).

Job Analysis: determining what knowledge, skills, abilities, and personal characteristics (KSAPs) are required for a given job.

Joint Attention: two people attending to the same object and being aware that they both are attending to it.

Justice: an ethical principle from the Belmont Report that emphasizes distributing risks and benefits fairly across different groups within society.

K

Kin Selection: The favoritism shown for helping our blood relatives.

Knocked Out: The action that certain genes will be eliminated during the creation of DNA.

L

Lack of Executive Control: Difficulty comprehending information and using it to make decisions.

Language: a system of communication that uses symbols in a regular way to create meaning. Gives the ability communicate our intelligence to others by talking, reading, and writing.

Late Adulthood: The final life stage, beginning in the 60s.

Latent Content: Content within dreams that relates to deep unconscious wishes or fantasies. Or, the hidden psychological meaning of a dream.

Laws: (in relation to psychology) principles that are so general as to apply to all situations in a given domain of inquiry.

Law of Disuse: The longer an association is unused, the weaker it becomes.

Law of Effect: The idea that instrumental or operant responses are influenced by their effects. Responses that are followed by a pleasant state of affairs will be strengthened and those that are followed by discomfort will be weakened. Nowadays, the term refers to the idea that operant or instrumental behaviors are lawfully controlled by their consequences.

Law of Readiness: A quality in responses and connections that results in readiness to act.

Law of Recency: The most recent response is most likely to reoccur.

Law of Use: The more often an association is used, the stronger it becomes.

Lens: a structure that focuses the incoming light on the retina.

Lesions: Areas of the brain that are damaged by surgeries, strokes, falls, automobile accidents, gunshots, tumors, etc.

Letter of Recommendation Effect: The tendency for informants to produce unrealistically positive ratings.

Levels of Analysis: The different levels at which scientists might understand a single event.

Levels of Explanation: the perspectives that are used to understand behaviour, with lower levels being tied closely to biological influences, middle levels being tied closely to the abilities and characteristics of individual people, and the highest level relating to social groups, organizations, and cultures.

Lexical Hypothesis: States that all important personality characteristics should be reflected in the language that we use to describe other people.

Limbic System: A brain area, located between the brain stem and the two cerebral hemispheres, that governs emotion and memory. The system includes the amygdala, the hypothalamus, and the hippocampus.

Limited Capacity: the notion that humans have limited mental resources that can be used at a given time.

Limiting Condition: when the results from a research study are different across cultures.

Linear Relationship: when the association between variables on a scatter plot can be easily approximated with a straight line.

Linguistic Intergroup Bias: a tendency for people to characterize positive things about their ingroup using more abstract expressions, but negative things about their outgroups using more abstract expressions.

Linguistic Relativity: the idea that language and its structures influence and limit human thought.

Long-Term Memory: memory storage that can hold information for days, months, and years. There are three processes that are central to long-term memory – encoding, storage, and retrieval.

Long-Term Potentiation (LTP): the strengthening of the synaptic connections between neurons as result of frequent stimulation.

Longitudinal Research Designs: Research designs in which individuals in the sample are followed and contacted over an extended period of time, often over multiple developmental stages.

Loudness: the degree of sound volume.

M

Ma: Roughly translates to the "space" between things, or the "pause" (a Japanese term).

Maintenance Rehearsal: the process of repeating information mentally or out loud with the goal of keeping it in memory.

Major Depressive Disorder (Clinical Depression): A mental disorder characterized by an all-encompassing low mood accompanied by low self-esteem and loss of interest or pleasure in normally enjoyable activities.

Major Life Stressors: Large stressful events (e.g., a family death, a natural disaster) that increase the likelihood of getting sick.

Maladaptive: The extent to which a behavior causes distress (e.g., pain and suffering) and dysfunction (impairment in one or more important areas of functioning) to the individual.

Mandala: A symbol of wholeness, completeness, and perfection, and symbolized the self.

Manifest Content: Superficial and meaningless content within dreams; or, the literal dream as it is remembered (i.e., literal actions that occur during dreams).

Maximum Observed Score: the largest observed value of the variable.

Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT): a 141-item performance assessment of EI that measures the four emotion abilities (as defined by the four-branch model of EI) with a total of eight tasks.

McGurk Effect: an error in perception that occurs when we misperceive sounds because the audio and visual parts of the speech are mismatched.

Means: Activities and objects that help us attain goals.

Measured Variables: variables consisting of numbers that represent the conceptual variables.

Medial Temporal Lobes: inner region of the temporal lobes that includes the hippocampus.

Median: the score in the center of the distribution, meaning that 50% of the scores are greater than the median and 50% of scores are les than the median.

Meditation: techniques in which the individual focuses on something specific, such as an object, a word, or one's breathing, with the goal of ignoring external distractions, focusing on one's internal state, and achieving a state of relaxation and well-being.

Medulla: The area of the brain stem that controls heart rate and breathing.

Melatonin: A hormone associated with increased drowsiness and sleep.

Memory Stages: there are three major memory stages – sensory, short-term, and long-term.

Memory Traces: a term indicating the change in the nervous system representing an event.

Memory: the ability to store and retrieve information over time.

Menarche: The first menstrual period, typically experienced at around 12 or 13 years of age.

Menopause: The cessation of the menstrual cycle, which usually occurs at around age 50.

Mere-Exposure Effects: the result of developing a more positive attitude towards a stimulus after repeated instances of mere exposure to it.

Meta-Analysis: A statistical technique that uses the results of existing studies to integrate and draw conclusions about those studies.

Metacognition: Conscious thought about thought processes. Describes the knowledge and skills people have in monitoring and controlling their own learning and memory.

Methodologies: Research study design principles.

Middle Adulthood: Roughly the ages between 45 and 65.

Mimicry: Copying others' behavior, usually without awareness.

Mind–Body Connection: The role that different feelings can have on our body's function.

Mindfulness: a state of heightened focus on the thoughts passing through one's head, as well as a more controlled evaluation of those thoughts (e.g., do you reject or support the thoughts you're having?).

Minimal Risk Research: research that exposes participants to risks that do not exceed that found in daily life and/or routine health examinations.

Minimum Observed Score: the smallest observed value of the variable.

Mirror Neurons: neurons identified in monkey brains that fire both when the monkey performs a certain action and when it perceives another agent performing that action.

Misattribution of Arousal: The tendency for people to incorrectly label the source of the arousal that they are experiencing.

Misinformation Effect: when erroneous information occurring after an event is remembered as having been part of the original event. New information influences existing memories creating errors within our memory. Is caused by exposure to incorrect information between the original event (e.g., a crime) and later memory test (e.g., an interview, lineup, or day in court).

Mixed and Trait Models: approaches that view EI as a combination of self-perceived emotion skills, personality traits, and attitudes.

Mock Witnesses: a research subject who plays the part of a witness in a study.

Mode: the value that occurs most frequently in the distribution.

Molecular Genetics: The study of which genes are associated with which personality traits.

Monamine Oxidase Inhibitors (MAOIs): The original antidepressants that work by increasing the amount of serotonin, norepinephrine, and dopamine at the synapses.

Monochronic (M-time): typically used among people and organizations in clock-time cultures, where it is important to focus on one activity at a time.

Monocular Depth Cues: depth cues that help us perceive depth using only one eye.

Mood (or Affective) Disorders: Psychological disorders in which the person's mood negatively influences his or her physical, perceptual, social, and cognitive processes.

Mood-Congruent Memory: The tendency to recall memories similar in valence to our current mood.

Mood: The positive or negative feelings that are in the background of our everyday experiences.

Moon Illusion: the moon is perceived to be about 50% larger when it is near the horizon than when it is seen overhead, despite the fact that in both cases the moon is the same size and casts the same size retinal image.

Morality: Standards of behaviour that are generally agreed on within a culture to be right or proper.

Morpheme: a string of one or more phonemes that makes up the smallest units of meaning in a language.

Morphine: a strong addictive drug derived from opium; however, less addictive than heroin.

Motivated Skepticism: When we are skeptical of evidence that goes against what we want to believe despite the strength of the evidence.

Motivation Theory: Posits that all work consists of simple, uninteresting tasks, and that the only viable method to get people to undertake these tasks is to provide incentives and monitor them carefully.

Motivation: A psychological driving force that initiates and directs behavior.

Motor Cortex: The part of the cortex that controls and executes movements of the body by sending signals to the cerebellum and the spinal cord.

Motor Neuron (or Efferent Neuron): A type of neuron that transmits information to the muscles and glands.

Mueller-Lyer Illusion: one line segment looks longer than another, even though they are both actually the same length. The result of the failure of monocular depth cues.

Multiple Regression: a statistical technique, based on correlation coefficients among variables, that allows predicting a single outcome variable from more than one predictor variable.

Multiple Response: An animal will try multiple responses (trial and error) if the first response does not lead to a specific state of affairs.

Multiply Determined: behaviour, for example, that is produced by many factors that occur at different levels of explanation.

Myelin Sheath: A layer of fatty tissue surrounding the axon of a neuron that both acts as an insulator and allows faster transmission of the electrical signal.

Myers-Briggs Type Indicator: A psychometric questionnaire designed to measure psychological preferences in how people perceive the world and make decisions.

Mystery: Life is a great mystery.

N

Narcolepsy: a disorder characterized by extreme daytime sleepiness with frequent episodes of nodding off.

Natural Improvement: The possibility that people might get better over time, even without treatment.

Natural Selection: Differential reproductive success as a consequence of differences in heritable attributes.

Naturalistic Observations: research based on the observation of everyday events.

Nature Approach to Language: the belief that human brains contain a language acquisition device that includes a universal grammar that underlies all human language

Nearsighted: an image is focused in front of the retina, rather than on the retina. Occurs when the light rays bend incorrectly.

Need for Closure: The desire to come to a firm conclusion.

Need to Belong: The human need to make friends, start families, and spend time together.

Negative Linear Relationship: when above-average values for one variable tend to be associated with below-average values for the other variable.

Negative Reinforcement: Taking something negative away in order to increase a response.

Negative State Relief Model: People sometimes help in order to make themselves feel better.

Nerves: Bundles of interconnected neurons that fire in synchrony to carry messages.

Nervous System: A collection of hundreds of billions of specialized and interconnected cells through which messages are sent between the brain and the rest of the body.

Neural Correlates of Consciousness (NCC): Seeks to link activity within the brain to subjective human experiences in the physical world.

Neurogenesis: The generation or growth of new brain cells, specifically when neurons are created from neural stem cells.

Neuroimaging: the use of various techniques to provide pictures of the structure and function of the living brain.

Neuron: A cell in the nervous system that is responsible for receiving and transmitting information.

Neurophilosophy: Views neuronal correlates of consciousness as its cause, and consciousness as a state-dependent property of some undefined complex, adaptive, and highly interconnected biological system.

Neuroplasticity: The brain's ability to change its structure and function in response to experience or damage. Enables our ability to remember new things and adjust to new experiences.

Neurosis: A force that shatters the personality of the patient.

Neuroticism: The tendency to frequently experience negative emotions such as anger, worry, and sadness, as well as being interpersonally sensitive.

Neurotransmitter: A chemical that relays signals from terminal buttons and across the synapses between neurons to receiving dendrites using a lock and key type system.

Nicotine: a psychoactive drug found in tobacco and other members of the nightshade family of plants, where it acts as a natural pesticide.

No Relationship: when there is no relationship at all between the two variables, variables are then said to be independent.

Node of Ranvier: A series of breaks between the sausage-like segments of the myelin sheath that allow electrical charges to move down the axon.

Non-Rapid Eye Movement (non-REM) Sleep: a deep sleep, characterized by very slow brainwaves, that is further subdivided into three stages: N1, N2, and N3. A sleep state that processes conscious-related memory (declarative memory).

Nonassociative Learning: occurs when a single repeated exposure leads to a change in behavior.

Nonconscious: Refers to when a person is unaware of why he or she is pursuing a goal and may not even realize that he or she is pursing it.

Nonlinear Relationship: relationships between variables that cannot be described with a straight line.

Nonshared Environment: Is indicated when identical twins do not have similar traits. These influences refer to experiences that are not accounted for either by heritability or by shared environmental factors. Nonshared environmental factors are the experiences that make individuals within the same family less alike.

Nonspecific Treatment Effects: Occur when the patient gets better over time simply by coming to therapy, even though it doesn't matter what actually happens at the therapy sessions.

Nonverbal Communication: Communication that does not involve words.

Normal Distribution (or Bell Curve): the pattern of scores usually observed in a variable that clusters around its average. The bulk of the scores fall toward the middle, with many fewer scores falling at the extremes.

Normal Distribution: a data distribution in which most scores fall within the centre of the distribution and are symmetrical and bell-shaped.

Normative Influence: People go along with the crowd because they are concerned about what others think of them.

Nuremberg Code: a set of 10 ethics principles written in 1947 for human participants that emphasizes the importance of informed consent and weighing risks against benefits.

O

Obedience: Following orders or requests from people in authority.

Object Permanence: The child's ability to know that an object exists even when the object cannot be perceived.

Objective: to be free from personal bias or emotions.

Observational Learning: learning by observing the behavior of others.

Obsessions: Repetitive thoughts.

Obsessive-Compulsive Disorder (OCD): A psychological disorder that is diagnosed when an individual continuously experiences distressing or frightening thoughts and engages in obsessions (repetitive thoughts) or compulsions (repetitive behaviours) in an attempt to calm these thoughts.

Occipital Lobe: A portion of the brain, also known as the visual cortex, that is involved in interpreting visual stimuli and information.

Olfactory Membrane: located within the upper nasal passage and embedded with 10 to 20 million receptor cells.

Olfactory Receptor Cells: embedded within the olfactory membrane. Topped with tentacle-like protrusions that contain receptor proteins.

Open Ended Questions: Research questions that ask participants to answer in their own words.

Openness: The tendency to appreciate new art, ideas, values, feelings, and behaviors.

Operant Conditioning: A type of learning that refers to how an organism operates on the environment or how it responds to what is presented to it in the environment. Describes stimulus-response associative learning. Also see instrumental conditioning.

Operant: a behavior that is controlled by its consequences. The simplest example is the rat's lever-pressing, which is controlled by the presentation of the reinforcer.

Operational Definition: a precise statement of how a conceptual variable is turned into a measured variable.

Opioids: chemicals that increase activity in opioid receptor neurons in the brain and in the digestive system, producing euphoria, analgesia, slower breathing, and constipation.

Opium: the dried juice of the unripe seed capsule of the opium poppy.

Opponent-Process Color Theory: a theory that proposes that we analyze sensory information not in terms of three colours but rather in three sets of "opponent colours": red-green, yellow-blue, and white-black.

Optic Nerve: a collection of millions of ganglion neurons that sends vast amounts of visual information, via the thalamus, to the brain.

Optimism: The general tendency to expect positive outcomes.

Ossicles: three tiny bones located within the middle ear. Includes the hammer, the anvil, and the stirrup.

Other-Oriented Empathy: A characteristic that involves having a strong sense of social responsibility, the ability to empathize with and feel emotionally tied to those in need, understand the problems the victim is experiencing, and have a heightened sense of moral obligation to be helpful.

Outcome Research: Studies that assess the effectiveness of medical treatments to determine the effectiveness of different therapies.

Outgroup: group to which a person does not belong.

Outliers: one or more extreme scores which lay far outside the distribution.

Oval Window: the membrane covering the opening of the cochlea.

Ovaries: The female sex glands that are located in the pelvis. The ovaries produce eggs and secrete the female hormones estrogen and progesterone.

Overconfidence: the tendency for people to be too certain about their ability to accurately remember events and to make judgments.

Overconfident: the bias to have greater confidence in your judgment than is warranted based on a rational assessment.

Overextensions: the use of a given word in a broader context than appropriate. Generally a mistake made by children.

Overlearning: continuing to practice and study even when we think that we have mastered the material.

Ovulation: When an ovum, or egg (the largest cell in the human body), which has been stored in one of the mother's two ovaries, matures and is released into the fallopian tube.

P

Pace of Life: the speed at which changes and events occur for individuals. Dependent on individual temperament, cultural norms, between places, at different times, during different activities.

Pancreas: Part of the endocrine system. Secretes hormones designed to keep the body supplied with fuel to produce and maintain stores of energy.

Panic Disorder: A psychological disorder characterized by sudden attacks of anxiety and terror that have led to significant behavioural changes in the person's life.

Paradigm: Prevailing model that guides an area of study.

Parasympathetic Nervous System or Parasympathetic Division: A division of the autonomic nervous system that tends to calm the body by slowing the heart and breathing and by allowing the body to recover from the activities that are caused by the sympathetic system. Works to bring the body back to its normal state after a fight-or-flight response.

Parathyroid Gland: The area responsible for determining how quickly the body uses energy and hormones (in conjunction with the thyroid gland), and controls the amount of calcium in the blood and bones.

Parenting Styles: Parental behaviours that determine the nature of parent-child interactions and that guide their interaction with the child.

Parietal Lobe: A portion of the brain that xtends from the middle to the back of the skull, also known as the somatosensory cortex, that is involved in the processing of other tactile sensory information (information about touch).

Pavlovian Conditioning: see classical conditioning.

Pearson Correlation Coefficient (*r*): the most common statistical measure of the strength of linear relationships among variables.

People's (Folk) Explanations of Behavior: people's natural explanations for why somebody did something, felt something, etc. (differing substantially for unintentional and intentional behaviors).

Perception of Social Support: The perception that a person has positive social relationships with others.

Perception: the organization and interpretation of sensations.

Perceptual Constancy: the ability to perceive a stimulus as constant despite changes in sensation.

Perceptual Learning: occurs when aspects of our perception changes as a function of experience.

Performance Assessment: a method of measurement associated with ability models of EI that evaluate the test taker's ability to solve emotion-related problems.

Periodic Limb Movement Disorder: a sleep disorder that involves sudden involuntary movement of limbs.

Peripheral Nervous System (PNS): The collection of neurons that link the central nervous system (CNS) to the body's sense receptors, muscles, and glands. Divided into the somatic and autonomous nervous systems.

Permissive Parents: Tend to make few demands and give little punishment, but they are responsive in the sense that they generally allow their children to make their own rules.

Person-Centred Therapy (or Client-Centred Therapy): An approach to treatment in which the client is helped to grow and develop as the therapist provides a comfortable, non-judgmental environment.

Person-Situation Debate: Places the power of personality against the power of situational factors as determinants of the behavior that people exhibit.

Person' Mental Age: age at which a person is performing intellectually.

Persona: The mask or image a person presents to the world.

Personal Distress: Helpers who do not empathize with a victim may experience feelings of being worried and upset and will have an egoistic motivation for helping.

Personal Selection: the use of structured tests to select people who are likely to perform well at given jobs.

Personal Unconscious: An aspect of the psyche does not usually enter an individual's awareness but appears in overt behaviour or in dreams.

Personal: The damaging impact of stress on physical and mental health.

Personality Disorder: A disorder characterized by inflexible patterns of thinking, feeling, or relating to others that cause problems in personal, social, and work situations.

Personality Traits: Reflect basic personality dimensions on which people differ.

Personality: The characteristic ways that people differ from one another.

Phenomenal: In the moment conscious experience.

Phenotype: The pattern of expression of the genotype or the magnitude or extent to which it is observably expressed—an observable characteristic or trait of an organism, such as its morphology, development, biochemical or physiological properties, or behavior.

Phi Phenomenon: to perceive a sensation of motion caused by the appearance and disappearance of objects that are near each other.

Phobia: A specific fear of a certain object, situation, or activity.

Phoneme: the smallest unit of sound that makes a meaningful difference in a language.

Photo Spreads: a selection of normally small photographs of faces given to a witness for the purpose of identifying a perpetrator.

Physiological Adaptations: Adaptations that occur in the body as a consequence of one's environment.

Pineal Gland: Located in the middle of the brain and secretes melatonin (a hormone that helps regulate the wake-sleep cycle).

Pinna: the external and visible part of the ear. Draws in sound waves and guide them into the auditory canal.

Pitch: the perceived frequency of a sound.

Pituitary Gland: A pea-sized gland located near the centre of the brain that also known as the "master gland". The pituitary gland is responsible for controlling the body's growth, as well as secreting hormones that signal the ovaries and testes to make sex hormones and influence our responses to pain. The gland also controls ovulation and the menstrual cycle in women and is important in regulating behaviour.

Place Theory of Hearing: proposes that different areas of the cochlea respond to different frequencies.

Placebo Effects: Improvements that occur as a result of the expectation that one will get better rather than from the actual effects of a treatment.

Placenta: An organ that allows the exchange of nutrients between the embryo and the mother, while at the same time filtering out harmful material.

Planning Fallacy: The tendency to underestimate how much time it will take to complete a task.

Plasticity: the brain's ability to develop new neural connections.

Pluralistic Ignorance: Relying on others to define the situation and to then erroneously conclude that no intervention is necessary when help is actually needed.

Polychronic (P-time): typically used among people and organizations in event-time cultures, where there is a preference for focusing on several things at once.

Pons: A structure in the brain stem that helps control the movements of the body, playing a particularly important role in balance and walking.

Positive Affective States: Pleasant emotional arousal or feelings.

Positive Linear Relationship: when above-average values from one variable also tend to have above-average values for the other variable

Positive Psychology: A branch of psychology that focuses the on the strengths, virtues, and talents that contribute to successful functioning and enable individuals and communities to **flourish.** Also a self-help movement that has concepts grounded in emotion and intuition.

Positive Reinforcement: Adding something in order to increase a response.

Post-Traumatic Stress Disorder (PTSD): A psychological disorder that is diagnosed when an individual experiences high levels of anxiety along with reexperiencing the trauma (flashbacks), and a strong desire to avoid any reminders of the event.

Pre-Screening: identifying and excluding participants who are at high risk.

Preconscious: Those thoughts that are unconscious at the particular moment in question, but that are not repressed and are available for recall and easily capable of becoming conscious.

Prediction Error: when the outcome of a conditioning trial is different from that which is predicted by the conditioned stimuli that are present on the trial (i.e., when the US is surprising). Prediction error is necessary to create Pavlovian conditioning (and associative learning generally). As learning occurs over repeated conditioning trials, the conditioned stimulus increasingly predicts the unconditioned stimulus, and prediction error declines. Conditioning works to correct or reduce prediction error.

Prejudice: Refers to how a person feels about an individual based on their group membership.

Preoperational Stage: At about two years of age, and until about seven years of age, children begin to use language and to think more abstractly about objects, with capacity to form mental images.

Preoptic Area: A region in the anterior hypothalamus (front of the hypothalamus) that strongly influences male sexual behavior.

Preparedness: the idea that an organism's evolutionary history can make it easy to learn a particular association. Because of preparedness, you are more likely to associate the taste of tequila, and not the circumstances surrounding drinking it, with getting sick. Similarly, humans are more likely to associate images of spiders and snakes than flowers and mushrooms with aversive outcomes like shocks.

Prepotency of Elements: A subject can filter out irrelevant aspects of a problem and focus on and respond to significant elements of a problem.

Prevalence: The frequency of occurrence of a given condition in a population at a given time.

Prevention: Emphasizes safety, responsibility, and security needs, and views goals as "oughts."

Primacy Effect: a tendency to better remember stimuli that are presented early in a list.

Primary Appraisal: Determining whether the stressor poses a threat.

Primary Mental Abilities: seven clusters of abilities – word fluency, verbal comprehension, spatial ability, perceptual speed, numerical ability, inductive reasoning, and memory.

Primary Prevention: Prevention in which all members of the community receive the treatment.

Primary Sex Characteristics: The sex organs concerned with reproduction.

Prime: Cues in a person's immediate environment that activate a goal

Primed: When concepts and behaviors have been repeatedly associated with each other, one of them is made more cognitively accessible.

Priming: Process by which exposing people to one stimulus makes certain thoughts, feelings, or behaviours more salient**.** The activation of certain thoughts or feelings that make them easier to think of and act upon.

Privacy: refers to people's right to decide what information about them is shared with others.

Pro-Social: Benefits to promoting and maintaining human life.

Proactive Interference: occurs when earlier learning impairs our ability to encode information that we try to learn later.

Problem Restructuring: To restructure or reorganize the representation of the problem and capitalize on relevant information not previously noticed, switch strategies, or rearrange problem information in a manner more conducive to solution pathways.

Problem-Focused Coping: Actively addressing the event that is causing stress in an effort to solve the issue at hand.

Procedural Memory: Memory for the performance of particular types of action.; our often unexplainable knowledge of how to do things.

Progesterone Female sex hormones.

Progress: Describes the perception of a reduced discrepancy between the current state and desired end state.

Projection: a social perceiver's assumption that the other person wants, knows, or feels the same as the perceiver wants, know, or feels.

Projective Hypothesis: Posits that if a person is asked to describe or interpret ambiguous stimuli—that is, things that can be understood in a number of different ways—their responses will be influenced by nonconscious needs, feelings, and experiences.

Promotion: Emphasizes hopes, accomplishments, and advancement needs, and views goals as "ideals."

Proprioception: the ability to sense the position and movement of our body parts.

Prosocial Behavior: Behavior that benefit another person or group.

Prosocial Personality Orientation: Personality characteristics that are highly correlated with prosocial behavior.

Protocol: a written detailed description of a research project involving human participants that is reviewed by an independent committee for ethical approval.

Psychiatric Service Dogs: Dogs that are trained to help people with mental disorders.

Psychoactive Drug: a chemical that changes our states of consciousness, and particularly our perceptions and moods.

Psychoanalysis: A process used within the psychodynamic approach that involves exploring unconscious drives by using talk therapy and dream analysis to deeply and thoroughly explore a person's early sexual experiences and current sexual desires. A type of analysis that involves attempting to affect behavioural change through having patients talk about their difficulties.

Psychodynamic Psychology: Approach to understanding human behaviour that focuses on the role of unconscious thoughts, feelings, and memories.

Psychodynamic Therapy (Psychoanalysis): A psychological treatment based on Freudian and neo-Freudian personality theories in which the therapist helps the patient explore the unconscious dynamics of personality.

Psychological Adaptations: Mechanisms of the mind that evolved to solve specific problems of survival or reproduction; conceptualized as information processing devices.

Psychological Approach to Reducing Disorders: An approach that involves providing help to individuals or families through psychological therapy.

Psychological Assessment: An evaluation of the patient's psychological and mental health.

Psychological Disorder: An ongoing dysfunctional pattern of thought, emotion, and behaviour that causes significant distress, and that is considered deviant in that person's culture or society.

Psychological Essentialism: the belief that members of a category have an unseen property that causes them to be in the category and to have the properties associated with it.

Psychologist-Practitioners: psychologists who use existing research to enhance the everyday life of others, including clinical, counselling, industrial-organizational, and school psychologists.

Psychology: the scientific study of the mind and behaviour.

Psychoneuroimmunology: Focused on understanding how psychological factors can "get under the skin" and influence our physiology in order to better understand how factors like stress can make us sick.

Psychophysics: the branch of psychology that studies the effects of physical stimuli on sensory perceptions and mental states.

Psychosis: A psychological condition characterized by a loss of contact with reality.

Psychosomatic Medicine: Focused on understanding how psychological factors can "get under the skin" and influence our physiology in order to better understand how factors like stress can make us sick.

Psychosurgery: Surgery that removes or destroys brain tissue in the hope of improving disorder; reserved for the most severe cases.

Psychotherapy: The professional treatment for psychological disorder through techniques designed to encourage communication of conflicts and insight.

Puberty: A developmental period in which hormonal changes cause rapid physical alterations in the body, culminating in sexual maturity.

Punisher: A stimulus that decreases the strength of an operant behavior when it is made a consequence of the behavior.

Punishment: Adding something aversive in order to decrease a behaviour.

Pupil: a small opening in the centre of the eye.

Q

Quantitative Genetics: Scientific and mathematical methods for inferring genetic and environmental processes based on the degree of genetic and environmental similarity among organisms.

Quantitative Law of Effect: a mathematical rule that states that the effectiveness of a reinforcer at strengthening an operant response depends on the amount of reinforcement earned for all alternative behaviors. A reinforcer is less effective if there is a lot of reinforcement in the environment for other behaviors.

R

Radical Behaviourism: The philosophy of the science of behaviour.

Random Assignment to Conditions: a procedure in which the condition that each participant is assigned to is determined through a random process.

Range: a simple measure of the dispersion where you subtract the minimum from the maximum observed score.

Rapid Eye Movement (REM) Sleep: A sleep state characterized by the presence of quick eye movements and dreaming, and that processes the unconscious-related memory (procedural memory).

Reappraisal: Describes the process of continually reappraising both the nature of the stressor and the resources available for responding to the stressor.

Recall Memory Test: a measure of explicit memory that involves bringing from memory information that has previously been remembered.

Recency Effect: the tendency to better remember stimuli that are presented later in a list.

Reciprocal Altruism: If helping someone now increases the chances that a person will be helped later, then his or her overall chances of survival are increased.

Reciprocity: Describes how giving to others put them in the frame of mind to give back.

Recoding: the ubiquitous process during learning of taking information in one form and converting it to another form, usually one more easily remembered.

Recognition Memory Test: a measure of explicit memory that involves determining whether information has been seen or learned before.

Reductionist: Believing the simple is the source of the complex.

Reference Group Effect: People base their self-perceptions, in part, on how they compare to others in their sociocultural reference group.

Reflex: An involuntary and nearly instantaneous movement in response to a stimulus.

Refractory Period: A brief time after the firing of the axon in which the axon cannot fire again because the neuron has not yet returned to its resting potential.

Reinforcement: Any stimulus which strengthens or increases the probability of a specific response.

Reinforcer Devaluation Effect: the finding that an animal will stop performing an instrumental response that once led to a reinforcer if the reinforcer is separately made aversive or undesirable.

Reinforcer: any consequence of a behavior that strengthens the behavior or increases the likelihood that it will be performed it again.

Rejecting-Neglecting Parents: Undemanding and unresponsive.

Relearning: a measure of memory that assesses how much more quickly information is processed or learned when it is studied again after it has already been learned but then forgotten.

Reliability: The consistency of test scores across repeated assessments; the consistency of a measured variable.

Reliable: tests that are consistent over time.

REM Sleep Behaviour Disorder: a condition in which people (usually middle-aged or older men) engage in vigorous and bizarre physical activities during REM sleep in response to intense, violent dreams.

Renewal Effect: recovery of an extinguished response that occurs when the context is changed after extinction. Especially strong when the change of context involves return to the context in which conditioning originally occurred. Can occur after extinction in either classical or instrumental conditioning.

Replicate: to repeat, add to, or modify (usually in relation to previous research findings).

Replication: the process of repeating previous research, which forms the basis of all scientific inquiry.

Representativeness Heuristic: Basing one's judgments on information that seems to represent, or match, what we expect will happen, while ignoring other potentially more relevant statistical information. The tendency for people to arrive at a decision quickly by simply judging the likelihood of the object belonging to a category, based on how similar it is to one's mental representation of that category.

Repressed: a term coined by Sigmund Freud that refers to memories that remain outside consciousness.

Research Confederate: A person working with a researcher who acts as a research participant or bystander.

Research Design: the specific method a researcher uses to collect, analyze, and interpret data.

Research Hypothesis: a specific and falsifiable prediction about the relationship between or among two or more variables.

Research Participant: A person being studied as part of a research program.

Research Psychologists: Psychologists who use scientific methods to create new knowledge about the causes of behaviour.

Resilience: The ability to bounce back from adversity.

Resistance: The patient's use of defence mechanisms to avoid the painful feelings in his or her unconscious.

Respect for Persons: an ethical guideline from the Belmont Report that recognizes the importance using informed consent as a way to allow people to fully exercise their rights as autonomous people.

Response Bias: a behavioural tendency to respond "yes" to the trials, which is independent of sensitivity.

Response by Analogy: Responses from a related or similar context may be used in a new context.

Response: Describes stress as a physiological response pattern.

Resting Potential: A state in which the interior of the neuron contains a greater number of negatively charged ions than does the area outside the cell.

Restless Legs Syndrome: a sleep disorder in which the sufferer reports an itching, burning, or otherwise uncomfortable feeling in his legs, usually exacerbated when resting or asleep.

Reticular Formation: A long, narrow network of neurons that run through the medulla and the pons. Its job is to filter out some of the stimuli that are coming into the brain from the spinal cord, to relay the remainder of the signals to other areas of the brain, and to play a role in walking, eating, sexual activity, and sleeping.

Retina: the layer of tissue at the back of the eye that contains photoreceptor cells.

Retrieval: the process of accessing, reactivating, and utilizing information that has been stored in memory.

Retroactive Interference: occurs when learning something new impairs our ability to retrieve information that was learned earlier. OR The phenomenon whereby events that occur after some particular event of interest will usually cause forgetting of the original event.

Retrograde Amnesia: a memory disorder that produces an inability to retrieve memories for facts and events that occurred before the onset of amnesia.

Reuptake: A process in which neurotransmitters that are in the synapse are reabsorbed into the transmitting terminal buttons, ready to again be released after the neuron fires.

Reward Value: Affects an organism's motivation to consume food and is sensitive to the level of hunger experienced.

Reward-Punishment Drive: A drive powering human behaviour that produces the expected performance results.

Right-Wing Authoritarianism (RWA): Describes a belief that endorses respect for obedience and authority in the service of group conformity.

Risk Factors: The social, environmental, and economic vulnerabilities that make it more likely than average that a given individual will develop a disorder.

Rituals: Cultural behaviors that teach people what is important.

Rods: visual neurons that specialize in detecting black, white, and gray colours.

S

Saccades: the thousands of tiny movements made by the eye every minute.

Safety Ratio: One way to determine how dangerous a recreational drug may be. Based on the dose that is likely to be fatal divided by the normal dose needed to feel the effects of the drug.

Sample Size: number of participants in a study. Sample size is important because it can influence the confidence scientists have in the accuracy and generalizability of their results

Sample: the people chosen to participate in the research.

Sapir-Whorf Hypothesis: the hypothesis that the language that people use determines their thoughts.

Satiation: The decline of hunger and the eventual termination of eating behavior.

Scatter Plot: a visual image of the relationship between two variables.

Schema: A mental model, or representation, of any of the various things we come across in our daily lives.

Schemas (also known as Schematas): also known as a memory template, created through repeated exposure to a particular class of objects or events. Patterns of knowledge in long-term memory that help people remember, organize, and respond to information.

Schizophrenia: A serious psychological disorder marked by delusions, hallucinations, loss of contact with reality, inappropriate affect, disorganized speech, social withdrawal, and deterioration of adaptive behaviour.

School of Functionalism: a school in psychology that aims to understand why animals and humans have developed the particular psychological aspects that they currently possess.

Scientific Management: Focuses on scientific study of productivity in the workplace.

Scientific Method: the set of assumptions, rules, and procedures that scientists use to conduct empirical research.

Seasonal Affective Disorder (SAD): depression experienced most often during the dark winter months than during the lighter summer months, which can be reduced by exposure to bright lights.

Secondary Appraisal: The individual's evaluation of the resources or coping strategies at his or her disposal for addressing any perceived threats.

Secondary Sex Characteristics: Features that distinguish the two sexes from each other but are not involved in reproduction.

Secure Attachment Style: When a child explores freely while the mother is present and engages with the stranger.

Secure Base: Allows monkeys and human babies to feel safe.

Selective Attention: the ability to select certain stimuli in the environment to process, while ignoring distracting information.

Selective Forgetting: Letting go of certain ideas or concepts that may be inhibiting the problem-solving process.

Selective Serotonin Reuptake Inhibitors (SSRIs): The antidepressants most prescribed today that are designed to selectively block the reuptake of serotonin at the synapse, thereby leaving more serotonin available in the central nervous system.

Self-Actualize: To reach the fullest potential as a human being.

Self-Categorization Theory: People categorize people into categories and tend to favor the groups with people like us and incidentally disfavor the others.

Self-Concept: A knowledge representation or schema that contains knowledge about us.

Self-Construal: The way people define the way they "fit" in relation to others.

Self-Control: The capacity to control impulses, emotions, desires, and actions in order to resist a temptation and protect a valued goal.

Self-Efficacy: The belief in our ability to carry out actions that produce desired outcomes.

Self-Enhancement Bias: People are motivated to ignore (or at least downplay) some of their less desirable characteristics and to focus instead on their more positive attributes.

Self-Help Group: A voluntary association of people who share a common desire to overcome psychological disorder or improve their well-being.

Self-Regulation: The process through which individuals alter their perceptions, feelings, and actions in the pursuit of a goal.

Self-Report Assessment: a method of measurement associated with mixed and trait models of emotional intelligence, which evaluates the test taker's perceived emotion-related skills, distinct personality traits, and other characteristics.

Self: An archetype symbolizing the totality of the personality.

Semantic Memory: Our knowledge of facts and concepts about the world. The more or less permanent store of knowledge that people have.

Sensation: awareness resulting from the stimulation of a sense organ.

Sense of Coherence: A global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable and explicable; (2) the resources are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement.

Sensing Function: Sensory; oriented toward the body and senses; detailed, concrete, and present.

Sensitivity: the true ability of the individual to detect the presence or absence of signals.

Sensitization: occurs when the response to a stimulus increases with exposure.

Sensorimotor Stage: Refers to the direct physical interactions that babies have with the objects around them, beginning at birth until around the age of two.

Sensory Adaptation: a decreased sensitivity to a stimulus after prolonged and constant exposure.

Sensory Deprivation: the intentional reduction of stimuli affecting one or more of the senses, with the possibility of resulting changes in consciousness.

Sensory Interaction: the working together of different senses to create experience.

Sensory Memory: the brief storage of sensory information.

Sensory Neuron (or Afferent Neuron): A type of neuron that carries information from the sensory receptors.

Serial Position Curve: people are able to retrieve more words that were presented to them at the beginning and the end of the list than they are words that were presented in the middle of the list.

Set (or Attitude): Specific ways animals are predisposed to act in.

Set Point: An ideal level that the state of the system being regulated is monitored and compared.

Sex: Refers to the biological category of male or female, as defined by physical differences in genetic composition and in reproductive anatomy and function.

Sexual Harassment Unwanted treatment related to sexual behaviors or appearance.

Sexual Orientation: The direction of their emotional and erotic attraction toward members of the opposite sex, the same sex, or both sexes.

Sexual Selection: The evolution of characteristics because of the mating advantage they give organisms.

Shadow: The side of a personality that a person does not consciously display in public.

Shadowing: a task in which the individual is asked to repeat an auditory message as it is presented.

Shared Environment: Determinants that are indicated when the correlation coefficients for identical and fraternal twins are greater than zero and also very similar. These correlations indicate that both twins are having experiences in the family that make them alike.

Short-term Memory (STM): the place where small amounts of information can be temporarily kept for more than a few seconds but usually for less than one minute.

Sibling Contrast Effect: Parents often exaggerate the true magnitude of differences between their children.

Signal Detection Analysis: a technique used to determine the ability of the perceiver to separate true signals from background noise.

Silent Language: the notion that cultural rules of social time are seldomly made explicit, but rather just exist. Described by Edward Hall.

Simulation: the process of representing the other person's mental state.

Single-Blind Experiment: the research participants are blind to condition.

Situation Model: a mental representation of an event, object, or situation constructed at the time of comprehending a linguistic description.

Situational Identity: Culture can change and adapt, and people can have multiple cultural identifies, dependent on their social context.

Six Senses: seeing, hearing, smelling, touching, tasting, and monitoring the body's positions.

Skinner Box: Used to measure responses of organisms (most often rats and pigeons) and their orderly interactions with the environment.

Sleep Apnea: a sleep disorder characterized by pauses in breathing that last at least 10 seconds during sleep.

Sleep Spindles: theta waves interspersed with bursts of rapid brain activity that occurs during stage N2 sleep.

Sleep Terrors: a disruptive sleep disorder, most frequently experienced in childhood, that may involve loud screams and intense panic.

Sleeper Effect: attitude change that occurs over time when we forget the source of information.

Slow Wave Sleep: also known as stage N3. The deepest level of sleep, characterized by an increased proportion of very slow delta waves.

Social and Cultural Functions of Emotion: The role that emotions play in the maintenance of social order within a society.

Social and Emotional Learning (SEL): the real-world application of emotional intelligence in an educational setting and/or classroom that involves curricula that teach the process of integrating thinking, feeling, and behaving in order to become aware of the self and of others, make responsible decisions, and manage one's own behaviors and those of others.

Social Approach to Reducing Disorders: An approach that focuses on changing the social environment in which individuals live to reduce the underlying causes of disorder.

Social Attribution: When we make educated guesses about the efforts or motives of others.

Social Brain Hypothesis: the hypothesis that the human brain has evolved, so that humans can maintain larger ingroups.

Social Clock: The culturally preferred "right time" for major life events, such as moving out of the childhood house, getting married, and having children.

Social Cognition: The way we think about the social world and how we perceive others.

Social Comparison: Comparing the self to others.

Social Component: The influences on disorder due to social and cultural factors such as socioeconomic status, homelessness, abuse, and discrimination.

Social Constructivist: Assert that, despite a common evolutionary heritage, different groups of humans evolved to adapt to their distinctive environments.

Social Dominance Orientation (SDO): Describes a belief that group hierarchies are inevitable in all societies and are even a good idea to maintain order and stability.

Social Identity Theory: The tendency to favor one's own in-group over another's out-group, and as a result, outgroup disliking stems from this in-group liking.

Social Identity: The part of the self-concept that is derived from one's group memberships.

Social Influence: Refers to how outside influences might sway people to act or feel a certain way.

Social Integration: The number of social roles that a person has as well as a lack of isolation.

Social Learning Theory: The theory that people can learn new responses and behaviors by observing the behavior of others. Argues that gender roles are learned through reinforcement, punishment, and modeling.

Social Models: authorities that are the targets for observation and who model behaviors.

Social Networks: networks of social relationships among individuals through which information can travel.

Social Norms: the ways of thinking, feeling, or behaving that are shared by group members and perceived by them as appropriate.

Social Phobia: Extreme shyness around people or discomfort in social situations.

Social Psychology: A branch of psychological science mainly concerned with understanding how the presence of others affects our thoughts, feelings, and behaviors.

Social Referencing: The process whereby infants seek out information from others to clarify a situation and then use that information to act.

Social Support: Receiving support from your social network that can include emotional help, tangible help, or advice.

Social Time: cultural rules that are simply picked up in regards to being early or late, to wait or to rush, and the concept of past, present, and future.

Social-Cultural Psychology: a school of psychology that studies how social situations and culture influence thinking and behaviour.

Sociocultural Theory: Posits that cognitive development is not isolated entirely within the child but occurs at least in part through social interactions.

Socioeconomic: Differential exposure to stressful experiences can produce gender, racial-ethnic, marital status, and social class inequalities in physical and mental health.

Sociopolitical: Stressors proliferate over the life course and across generations, widening health gaps between advantaged and disadvantaged group members.

Soma: A cell body that contains the nucleus of the cell and keeps the cell alive.

Somatic Nervous System (SNS): The division of the peripheral nervous system that controls the external aspects of the body, including the skeletal muscles, skin, and sense organs. The somatic nervous system consists primarily of motor nerves responsible for sending brain signals for muscle contraction.

Somatosensory Cortex: An area just behind and parallel to the motor cortex at the back of the frontal lobe, receives information from the skin's sensory receptors and the movements of different body parts.

Somnambulism (Sleepwalking): a sleep disorder characterized by a person leaving the bed and moving around while still asleep.

Source Monitoring: the ability to accurately identify the source of a memory.

Spacing Effect: the fact that learning is better when the same amount of study is spread out over periods of time than it is when it occurs closer together or at the same time.

Specific Intelligence(s): a measure of specific skills in narrow domains.

Spinal Cord: The long, thin, tubular bundle of nerves and supporting cells that extends down from the brain. It is the central throughway of information for the body.

Spontaneous Recovery: recovery of an extinguished response that occurs with the passage of time after extinction. Can occur after extinction in either classical or instrumental conditioning.

Spreading Activation: When problem solvers disengage from the problem-solving task, they expose themselves to more information that can inform the problem-solving process.

Spurious Relationship: a relationship between two variables in which a common-causal variable produces and "explains away" the relationship.

Stage Theory of Cognitive Development: children pass through a series of cognitive stages as they grow, each of which must be mastered in succession before movement to the next cognitive stage can occur.

Standard Deviation(s): the most commonly used measure of dispersion. Distributions with larger standard deviations have more spread.

Standard Scale: Surveys that ask all participants to use the same scale to respond to questions.

Standardization: involves giving a test to a large number of people at different ages and computing the average score on the test at each age level.

Stanford-Binet Test: a measure of general intelligence made up of a wide variety of tasks including vocabulary, memory for pictures, naming of familiar objects, repeating sentences, and following commands.

State-Dependent Learning: superior retrieval of memories when the individual is in the same physiological or psychological state as during encoding.

Statistical Conclusion Validity: the extent to which we can be certain that the researcher has drawn accurate conclusions about the statistical significance of the research.

Statistical Significance: the confidence with which scientists can conclude that data are not due to chance or random error.

Stereotype Content Model: Includes four kinds of stereotypes that form from perceptions of competence and warmth.

Stereotype Threat: performance decrements that are caused by the knowledge of cultural stereotypes.

Stereotypes: Our general beliefs about a group of people and, once activated, they may guide our judgments outside of conscious awareness.

Stereotyping: A way of using information shortcuts about a group to effectively navigate social situations or make decisions.

Stigma: A disgrace or defect that indicates that person belongs to a culturally devalued social group.

Stigmatized Groups: A social or ethnic group that disapproved by the majority of society.

Stimulant: a class of drugs (psychoactives) that speed up the body's physiological and mental processes. Operates by blocking the reuptake of dopamine, norepinephrine, and serotonin in the synapses of the CNS.

Stimulus Control: when an operant behavior is controlled by a stimulus that precedes it.

Stimulus: Describes stress as a significant life event or change that demands response, adjustment, or adaptation.

Storage: the stage in the learning/memory process that bridges encoding and retrieval; the persistence of memory over time.

Story: Every person has a personal story.

Strange Situation: A measure of attachment in young children in which the child's behaviours are assessed in a situation in which the caregiver and a stranger move in and out of the environment.

Stress Coping: Determining whether a person believes he or she has the resources to respond effectively to the challenges of a stressor or change.

Stress-Related Growth: A dispositional response to stress that enables the individual to see opportunities for growth as opposed to threat or debilitation.

Stress: The physiological responses that occur when an organism fails to respond appropriately to emotional or physical threats.

Structuralism: A school of psychology whose goal was to identify the basic elements or structures of psychological experience.

Subliminal Perception: the ability to process information for meaning when the individual is not consciously aware of that information.

Subliminal Stimuli: events that occur below the absolute threshold and of which we are not conscious.

Subtle Biases: Unexamined and sometimes unconscious biases that have real consequences.

Suprachiasmatic Nucleus: a region in the brain above the thalamus that receives signals from ganglion cells in the retina and is the body's primary circadian pacemaker.

Surface Structure of the Idea: how an idea is expressed in any one language.

Surveys: a measure administered through either an interview or a written questionnaire to get a picture of the beliefs or behaviors or a sample of people of interest

Symbol: Implies something that is vague and partially unknown or hidden and never precisely defined.

Sympathetic Division or Sympathetic Nervous System: A division of the autonomic nervous system that is involved in preparing the body for behavior, particularly in response to stress, by activating the organs and the glands in the endocrine system. Controls the fight-or-flight response.

Synapses: Junction areas where the terminal buttons at the end of the axon of one neuron nearly, but do not quite, touch the dendrites of another neuron.

Synchrony: two people displaying the same behaviors or having the same internal states (typically because of mutual mimicry).

Synesthesia: an experience in which one sensation creates experiences in another.

Syntax: rules by which words are strung together to form sentences.

System 1: our intuitive decision-making system, which is typically fast, automatic, effortless, implicit, and emotional.

System 2: our more deliberative decision-making system, which is slower, conscious, effortful, explicit, and logical.

Systematic Desensitization: A behavioural treatment that combines imagining or experiencing the feared object or situation with relaxation exercises.

T

Tardive Dyskinesia: Permanent neurological damage from taking antipsychotic drugs that causes uncontrollable muscle movements, usually in the mouth area.

Taste Aversion Conditioning (Learning): the phenomenon in which a taste is paired with sickness, and this causes the organism to reject—and dislike—that taste in the future.

Taste Buds: receptors covering the tongue that are designed to sense chemicals in the mouth.

Temperament: The innate personality characteristics of an infant.

Temporal Lobe: A portion of the brain, also known as the auditory cortex, Located in front of the occipital lobe between the ears. It is involved in the interpretation of the sounds and language we hear.

Temporal Perspective: the perspective an individual takes about time. For example, some individuals may focus on the past, while others focus on the future.

Temporally Graded Retrograde Amnesia: inability to retrieve memories from just prior to the onset of amnesia with intact memory for more remote events.

Tend-and-Befriend Response: A behavioral reaction to stress that involves activities designed to create social networks that provide protection from threats.

Teratogens: Substances that can harm the fetus.

Tertiary Prevention: Treatment, such as psychotherapy or biomedical therapy, that focuses on people who are already diagnosed with disorder.

Testes: Male sex glands that secrete a number of hormones, the most important of which is testosterone.

Testosterone: Male sex hormone secreted by the testes. Regulates body changes associated with sexual development, including enlargement of the penis, deepening of the voice, growth of facial and pubic hair, and the increase in muscle growth and strength.

Thalamus: An egg-shaped structure above the brain stem that applies more filtering to the sensory information that is coming up from the spinal cord and through the reticular formation, and relays some of these remaining signals to the higher brain levels.

The Big Five (Five-Factor Model): The most widely accepted system that describes five major personality traits.

Theory of Intelligence (Three Part or Triarchic): proposes that people may display more or less analytical intelligence, creative intelligence, and practical intelligence. Proposed by Robert Sternberg.

Theory of Mind: The human capacity to understand minds, a capacity that is made up of a collection of concepts (e.g., agent, intentionality) and processes (e.g., goal detection, imitation, empathy, perspective taking). The ability to take another person's viewpoint.

Theory of Natural Selection: an idea coined by Charles Darwin that proposed that the physical characteristics of animals and humans evolved because they were useful or functional.

Theory: an integrated set of principles that explains and predicts many, but not all, observed relationships within a given domain of inquiry.

Therapeutic Alliance: A relationship between the client and the therapist that is facilitated when the therapist is genuine, when the therapist treats the client with unconditional positive regard, and when the therapist develops empathy with the client.

Thinking Function: Logical; sees cause and effect relations; cool, distant, frank, and questioning.

Third Force: Humanistic psychology.

Threat-Simulation Theory: Dreams are seen as an ancient biological defense mechanism since they simulate potentially threatening events.

Three Stages of Moral Thinking: Three stages that children pass through as they develop intellectually.

Thriving: Growth and strength that arise in the face of adversity.

Thyroid Gland: The area responsible for determining how quickly the body uses energy and hormones (in conjunction with the parathyroid gland), and affects metabolism, among other things.

Tinnitus: a ringing or a buzzing sensation that typically occurs after being exposed to loud sounds that likely damaged the cilia within the cochlea.

Tip-of-the-Tongue Phenomenon: we are certain that we know something that we are trying to recall but cannot quite come up with it.

Tolerance: an increase in the dose of a drug that is required to produce the same effect.

Toxic Inhalants: a substance that is easily accessible as the vapours of glue, gasoline, propane, hairspray, and spray paint, and are inhaled to create a change in consciousness. Often frequently abused as depressants.

Traits of Good Theories: 1) **General:** they summarize many different outcomes. 2) **Parsimonious:** they provide the simplest possible account of outcomes. 3) **Falsifiable:** the variables of interest can be adequately measured and the relationships between the variables that are predicted by the theory can be shown, through research, to be incorrect.

Trance States: a state of consciousness characterized by the experience of "out-of-body possession," or an acute dissociation between one's self and the current, physical environment surrounding them.

Transactional Theory of Stress and Coping (TTSC): Describes stress as a product of a transaction between a person and his or her complex environment.

Transcranial Magnetic Stimulation (TMS): A procedure in which magnetic pulses are applied to the brain of a living person with the goal of temporarily and safely deactivating a small brain region. TMS is used to temporarily and safely deactivate a small brain region, with the goal of testing the causal effects of the deactivation on behavior.

Transduction: the conversion of stimuli detected by receptor cells to electrical impulses that are then transported to the brain.

Transfer-Appropriate Processing: a principle that states that memory performance is superior when a test taps the same cognitive processes as the original encoding activity.

Transference: The unconscious redirection of the feelings experienced in an important personal relationship toward the therapist.

Trichromatic Colour Theory: the belief that the colour we see depends on the mix of the signals from the three types of cones.

Tricyclic Antidepressants: The original antidepressants that work by increasing the amount of serotonin, norepinephrine, and dopamine at the synapses.

Twin Studies: A behavior genetic research method that involves comparison of the similarity of identical (monozygotic; MZ) and fraternal (dizygotic; DZ) twins.

Two-Factor Theory of Emotion: Asserts that the experience of emotion is determined by the intensity of the arousal we are experiencing, but that the cognitive appraisal of the situation determines what the emotion will be.

Tympanic Membrane (or Eardrum): a tightly stretched, highly sensitive membrane at the end of the auditory canal.

Type A Behavior: A pattern of behavior that includes being competitive, impatient, hostile, and time urgent, and is associated with a greater risk of heart disease.

Type B Behavior: A pattern of behavior that includes being easygoing, patient, and relaxed, and is associated with a lower risk of heart disease.

Types of Memory: there are two types of memory – explicit memory and implicit memory.

Typicality: the difference in "goodness" of category members, ranging from the most typical (the prototype) to borderline members.

U

Umbilical Cord: Links the embryo directly to the placenta and transfers all material to the fetus.

Unconditioned Response (UR): in classical conditioning, an innate response that is elicited by a stimulus before (or in the absence of) conditioning.

Unconditioned Stimulus (US): in classical conditioning, the stimulus that elicits the response before conditioning occurs.

Unconscious: Not conscious; the part of the mind that affects behavior though it is inaccessible to the conscious mind. Those things that are outside of conscious awareness, including many memories, thoughts, and urges of which we are not aware.

Universalist: Assert that emotions evolved as a response to the environments of our primordial ancestors, so they are the same across all cultures.

V

Valid: the conclusions drawn by the researcher are legitimate.

Validity: Evidence related to the interpretation and use of test scores.

Value-Free Research: When social psychologists research culture, they try to avoid making value judgments in order to approach scientific objectivity.

Variables: any attribute that can assume different values among different people or across different times or places.

Vestibular System: a set of liquid-filled areas in the inner ear that monitors the head's position and movement, maintaining the body's balance.

Vicarious Reinforcement: learning that occurs by observing the reinforcement or punishment of another person.

Virtual Reality CBT: The therapist uses computer-generated, three-dimensional, lifelike images of the feared stimulus in a systematic desensitization program.

Visible Spectrum: the range of energy the eyes can detect on the electromagnetic spectrum. For humans, this range is only 400 to 700 billionths of a meter.

Visual Accommodation: the process of changing the curvature of the lens to keep the light entering the eye focused on the retina.

Visual Attention: The brain's ability to selectively filter unattended or unwanted information from reaching awareness.

Visual Cliff: a mechanism that gives the perception of a dangerous drop-off, in which infants can be safely tested for their perception of depth.

Visual Cortex: The area located in the occipital lobe (at the very back of the brain) that processes visual information.

Visual Perspective Taking: can refer to visual perspective taking (perceiving something from another person's spatial vantage point) or more generally to effortful mental state inference (trying to infer the other person's thoughts, desires, emotions).

W

Wavelength: the distance between one wave peak and the next wave peak.

Weber's Law: the just noticeable difference of a stimulus is a constant proportion of the original intensity of the stimulus.

Wechsler Adult intelligence Scale (WAIS): the most widely used intelligence test for adults.

Wernicke's Area: an area of the brain next to the auditory cortex responsible for language comprehension.

Wish Fulfilment: the idea that dreaming allows us to act out the desires that we must repress during the day.

Withdrawal: negative experiences that accompany reducing or stopping drug use, including physical pain and other symptoms.

Word Association Test: A research technique used to study the personal unconscious that involves reading 100 words to someone and having the person respond quickly with a word of his or her own.

Working Memory: the form of memory we use to hold onto information temporarily, usually for the purposes of manipulation.

Working Memory: the processes that we use to make sense of, modify, interpret, and store information in STM.

X

Y

Z

Zygote: A fertilized ovum.

Versioning

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This page provides a record of edits and changes made to this book since its initial publication. If the change is minor, the version number increases by 0.1. If the edits involve substantial updates, the version number increases to the next full number. Due to the nature of the guide being continuously updated, the addition or removal of a resource is not recorded on this page.

Version	Date	Change	Affected Web Page
1.0	August 29, 2025	Book published based on editorial team's contributions and adaptation of source chapters. Consult Source Chapter Attributions for chapter-level full authorship details.	