Introduction to Psychology for Human Services Foundation

Introduction to Psychology for Human Services Foundation

First Edition

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Contents

Acknowledgements ix
Author's Preface xii
Book Overview xv

Chapter 1: Introduction to Psychology

1.0 Learning Objectives 2
1.1 Defining Psychology 3
1.2 Is Psychology Just Common Sense? 7
1.3 Asking the Right Questions: Why? What? and How? 10
1.4 Contemporary Psychology 13
1.5 Careers in Psychology 27
1.6 Professional Associations in Psychology 30
1.7 Adjusting to College Life 32
1.8 Tips and Strategies for Success 37
1.9 Chapter Summary 46

Chapter 2: APA Basics

2.0 Learning Objectives 52
2.1 What is APA Style? 53
2.2 Types of Information 57
2.3 Two Types of Citation 61
2.4 Getting Familiar with Academic Journal Articles 68
2.5 The Annotated Bibliography 71
2.6 Chapter Summary 74

Chapter 3: Critical Thinking about Psychological Research

3.0 Learning Objectives 83
3.1 Why Is Research Important? 84
3.2 Approaches to Research – Descriptive Research 93
3.3 Understanding Correlation and Causation 101
3.4 Conducting Experiments 109
3.5 Conducting Ethical Research 118
3.6 Chapter Summary 122

Chapter 4: Historical and Contemporary Perspectives in Psychology

4.0 Learning Objectives 132
4.1 The History of Psychology 133
4.2 Early Psychology – Structuralism and Functionalism 136
4.3 The History of Psychology - Psychoanalytic Theory and Gestalt Psychology 142
4.4 The History of Psychology - Behaviourism and Humanism 147
4.5 The History of Psychology – The Cognitive Revolution and Beyond 154
4.6 A Note About the Present 158
4.7 Chapter Summary 160

Chapter 5: Biopsychology

5.0 Learning Objectives 167
5.1 Nature or Nurture? 168
5.2 Genetic Variation 172
5.3 Gene-Environment Interactions 179
5.4 Chapter Summary 182

Chapter 6: The Brain and Nervous System

6.0 Learning Objectives 187
6.1 Parts of the Nervous System – The Peripheral Nervous System 188
6.2 Parts of the Nervous System – Central Nervous System I 194
6.3 Parts of the Nervous System – Central Nervous System II 206
6.4 Cells of the Nervous System 215
6.5 Brain Imaging 227
6.6 Chapter Summary 233

Chapter 7: States of Consciousness

7.0 Learning Objectives 243
7.1 Consciousness Defined 244
7.2 Consciousness and Biological Rhythms 250
7.3 Other States of Consciousness 259
7.4 Chapter Summary 267

Chapter 8: Learning

8.0 Learning Objectives 275
8.1 Learning Defined 276
8.2 Classical Conditioning 280

8.3 Classical Conditioning: Effects on Behaviour 285
8.4 Operant Conditioning 288
8.5 Operant Conditioning: Types and Schedules of Reinforcement 295
8.6 Observational Learning 301
8.7 Chapter Summary 303

Chapter 9: Motivation and Emotion

9.0 Learning Objectives 319
9.1 Motivation 320
9.2 Theories of Motivation 323
9.3 Emotions Defined 332
9.4 Theories of Emotions 340
9.5 Chapter Summary 344

Chapter 10: Social Psychology

10.0 Learning Objectives 352
10.1 Social Psychology Defined 353
10.2 Self-Presentation and Situational Influences 359
10.3 Attitudes and Persuasion 362
10.4 Conformity and Obedience 370
10.5 Helping and Prosocial Behaviour 377
10.6 Chapter Summary 383

Chapter 11: Psychological Disorders

11.0 Learning Objectives 396
11.1 The Compassionate View of Psychological Disorders 397
11.2 Understanding Abnormal Behaviour 399
11.3 Perspectives on Psychological Disorders 405
11.4 The Stigma of Mental Illness 411
11.5 Chapter Summary 414

Chapter 12: Treating Psychological Disorders

12.0 Learning Objectives 420
12.1 Mental Health Treatment – Past and Present 421
12.2 Therapeutic Orientations 427
12.3 Treatment Modalities 438
12.4 Biomedical Therapies 442
12.5 Chapter Summary 444

Appendix: Sensation and Perception

A1.0 Learning Objectives 452

A1.1 Sensation and Perception 453

A1.2 Vision 456

A1.3 Hearing (Audition) 461

A1.4 Touch 463

A1.5 Smell and Taste: The Chemical Senses 466

A1.6 Appendix Summary 469

References 477

Version History 499

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- Andrew Stracuzzi, *Instructional Design and Quality Assurance*
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Author's Preface

Introduction

Human Services Foundation is a one-year certificate program that provides a broad education in understanding human behaviour. Students will learn strong interpersonal skills, theoretical models of behaviour, client service strategies, and written and verbal communication skills. Graduates of this program will be prepared to advance or supplement their education.

Psychology is the study of who we are and why we do what we do. This open resource complements PSYC-1113, which is an introduction to understanding ourselves and others. Students will learn to view the human experience from a variety of perspectives.

Why The Umbrella?

The rainbow umbrella is a metaphor for psychology as a field that brings many perspectives together to help us understand and support the human mind. Just as each coloured panel contributes to one umbrella, different areas of psychology—such as biology, learning, development, emotion, culture, and social relationships—each offer a distinct “piece” of the story of human behaviour and mental processes. The umbrella also suggests protection and support: in human services, psychological knowledge can help create safer spaces, reduce harm, and guide compassionate, evidence-informed responses when people are facing stress, trauma, or life change. Together, the colours represent the diversity of human experience and remind us that understanding the mind is richest when we consider multiple viewpoints and the whole person.

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I would like to acknowledge the many authors who generously made their work available under a Creative Commons licence. It has been a privilege to adopt, adapt, and remix your work to create a custom resource that meets my students’ needs.

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Laura Westmaas, BA, MSc
Professor, Fanshawe College

Book Overview

Introduction

In this Open Educational Resource (OER), students will explore key topics related to psychological science, including how psychologists ask questions, gather evidence, and apply theory to understand human behaviour and mental processes. The chapters emphasize clear explanations of foundational concepts (e.g., development, learning, memory, emotion, social behaviour, and biopsychology) while consistently linking ideas to the kinds of situations students may encounter in human services—such as supporting clients, communicating effectively, and understanding how biology, environment, and lived experience interact. This resource also includes learning supports such as key terms, review and reflection prompts, and opportunities to practice applying concepts through examples and activities.

Chapter Overview

Below is a high-level overview of the topics and themes discussed in this book:

Chapter 1: Introduction to Psychology

In this introductory chapter, we will define psychology and identify its goals. We will differentiate between common sense and psychological theories. In addition, we will explore areas of study within psychology and possible career paths. We will acknowledge that some of the topics within this book may be emotionally challenging for certain learners and offer some background research about the nature of trauma-informed learning. To conclude the chapter, we will discuss some tips for student success for students taking this introductory course.
Jump to Chapter 1

Chapter 2: APA Basics

In this chapter, we will learn about the American Psychological Association's (APA) style guide and how it is used to cite in academic writing. We will learn to differentiate between popular and scholarly resources and critically examine their credibility using the CRAAP framework. Finally, we will learn about the nature and benefits of creating an annotated bibliography as a part of their research process.
Jump to Chapter 2

Chapter 3: Critical Thinking about Psychological Research

In this chapter, we will explore why psychological research matters and how the scientific method helps us move beyond opinion to evidence-based conclusions. We will examine key research approaches—especially descriptive methods such as case studies, naturalistic observation, surveys, and archival research—while considering the strengths and limitations of each. The chapter also clarifies what correlations can (and cannot) tell us, including why correlation does not prove causation, and how experiments are designed to test cause-and-effect relationships. Finally, we will review essential ethical principles and safeguards that guide research with human participants and other animals.
Jump to Chapter 3

Chapter 4: Historical & Contemporary Perspectives in Psych

In this chapter, we will examine schools of thought that helped to shape psychology as it exists as a discipline today. We will acknowledge the limitations of this chapter and recognize that the contributions of women and people of colour are often excluded from the mainstream intro psych curriculum. We will trace the study of human behaviour from structuralism through the cognitive revolution and the emergence of feminist and cross-cultural psychology.
Jump to Chapter 4

Chapter 5: Biopsychology

Is human behaviour the result of genetics (nature) or environment (nurture)? In this chapter, we will learn about this classic debate within psychology. On the biological side, we will explore natural selection and how evolutionary theory can help us to understand human behaviours. We will differentiate between genetic inheritance and gene expression, and explain how researchers use twin studies to better understand the extent to which nature and nurture influence a given behaviour. Finally, we will look at a field of study called epigenetics, which examines the complex ways in which nature and nurture interact to

produce human traits and behaviours.
Jump to Chapter 5

Chapter 6: The Brain and Nervous System

In this chapter, we will learn about the body's nervous system. First, we will identify the functions of the peripheral nervous system, including the body's "fight or flight" response. Next, we will examine the functions of the brain and spinal cord. We will explore the building blocks of the nervous system – neurons – and how they communicate with one another. We will consider the ways in which psychoactive drugs alter neural activity and the impact this has on behaviour and mental processes. Finally, we will explore the methods that researchers use to study the structure and function of the brain.
Jump to Chapter 6

Chapter 7: States of Consciousness

In this chapter, we will differentiate between high and low states of consciousness. We will explore the relationship between consciousness and bias. Next, we will consider sleep and the consequences of not getting enough of it! Finally, we will explore other states of consciousness, including hypnosis, trances, and meditative states. Finally, we will discover how consciousness can be altered by the use of psychoactive drugs.
Jump to Chapter 7

Chapter 8: Learning

In this chapter, we will define learning. We will differentiate learning from reflexes and instinctual behaviours. Next, we will explore three theories of learning – learning through association (classical conditioning), learning through consequences (operant conditioning),

and learning through observing others' behaviour (observational learning) – and how each perspective can help us explain behaviour in everyday life.
Jump to Chapter 8

Chapter 9: Motivation and Emotion

In this chapter, we will explore issues relating to both motivation and emotion. We will begin with a discussion of several theories that have been proposed to explain motivation and why we engage in a given behaviour. You will learn about the physiological needs that drive some human behaviours, as well as the importance of our social experiences in influencing our actions. This chapter will close with a discussion of emotion. You will learn about several theories that have been proposed to explain how emotion occurs, the biological underpinnings of emotion, and the universality of emotions.
Jump to Chapter 9

Chapter 10: Social Psychology

In this chapter, we will explore social behaviours. We will consider the impact of situational and individual factors on our behaviour. Next, we will define attitude and discuss a state of discomfort, called cognitive dissonance, that occurs when we hold conflicting attitudes/beliefs/behaviours. We will define stereotypes, prejudice, and discrimination, and explore ways our attitudes and behaviours can be changed by others through persuasion or conformity to expectations. Finally, we will discuss prosocial behaviours and examine factors that influence when and why helping behaviour occurs.
Jump to Chapter 10

Chapter 11: Psychological Disorders

In this chapter, we will begin to differentiate between what's considered normal vs abnormal behaviour. We will learn about the DSM-5 as a tool for diagnosing psychological disorders and its diagnostic categories. We will examine historical understandings of mental illness and modern perspectives about the biological and social causes of psychological disorders. Finally, we will consider the nature of stigma and how negative attitudes and beliefs about mental illness can be a barrier to care.

Jump to Chapter 11

Chapter 12: Treating Psychological Disorders

In this chapter, we will examine the history of treating individuals who have psychological disorders. In addition, we will see that therapy approaches include both psychological and biological interventions, all aimed at alleviating distress. Because psychological challenges can originate from various sources — biology, genetics, childhood experiences, conditioning, and sociocultural influences — psychologists have developed many different therapeutic techniques and approaches. Therapy that is accessible online, via an app, is becoming increasingly popular; it allows individuals to access the care and support they need, at a time and place that is convenient to them.

Jump to Chapter 12

Appendix: Sensation and Perception

The topics of sensation and perception are among the oldest and most important in all of psychology. People are equipped with senses such as sight, hearing and taste that help us to take in the world around us. Amazingly, our senses have the ability to convert real-world information into electrical information that can be processed by the brain. The way we interpret this information– our perceptions– is what leads to our experiences of the world. In this module, you will learn about the biological processes of sensation and how these can be combined to create perceptions.

Jump to Appendix I

CHAPTER 1: INTRODUCTION TO PSYCHOLOGY

Chapter Overview

1.0 Learning Objectives
1.1 Defining Psychology
1.2 Is Psychology Just Common Sense?
1.3 Asking the Right Questions: Why? What? and How?
1.4 Contemporary Psychology
1.5 Careers in Psychology
1.6 Professional Associations in Psychology
1.7 Adjusting to College Life
1.8 Tips and Strategies for Success
1.9 Chapter Summary

1.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Define psychology.
2. Describe the difference between psychology and common sense.
3. Outline the goals of psychology – asking why, what and how.
4. Explain different fields of study within psychology.
5. Identify career paths related to training in psychology
6. List what challenges students in a psychology class might encounter.
7. Describe tips for personal and academic success in college.

Chapter Overview

In this introductory chapter, we will define psychology and identify its goals. We will differentiate between common sense and psychological theories. In addition, we will explore areas of study within psychology and possible career paths. We will acknowledge that some of the topics within this book may be emotionally challenging for certain learners and offer some background research about the nature of trauma-informed learning. To conclude the chapter, we will discuss some tips for student success for students taking this introductory course.

1.1 Defining Psychology

Psychology

The Greek word psyche means soul. The word *psychology* was coined at a time when the concepts of soul and mind were not as clearly distinguished (Green, 2001). The root ***ology*** denotes the scientific study of, and psychology refers to the scientific study of the mind. Since science studies only observable phenomena and the mind is not directly observable, we expand this definition to the scientific study of mind and behaviour.

The scientific study of any aspect of the world uses the scientific method to acquire knowledge. To apply the scientific method, a researcher with a question about how or why something happens will propose a tentative explanation, called a **hypothesis**, to explain the phenomenon. A hypothesis is not just any explanation; it should fit into the context of a **scientific theory**. A scientific theory is a broad explanation or group of explanations for some aspect of the natural world that is consistently supported by evidence over time. A theory is the best understanding that we have of that part of the natural world. Armed with the hypothesis, the researcher then makes observations or, better still, carries out an experiment to test the validity of the hypothesis. That test and its results are then published so that others can check the results or build on them. It is necessary that any explanation in science be testable, which means that the phenomenon must be perceivable and measurable.

Here's an Example

For example, that a bird sings because it is happy is not a testable hypothesis, since we have no way to measure the happiness of a bird. We must ask a different question, perhaps about the brain state of the bird, since this can be measured. In general, science deals only with matter and energy, that is, those things that can be measured, and it cannot arrive at knowledge about values and morality. This is one reason why our scientific understanding of the mind is so limited, since thoughts, at least as we experience them, are neither matter nor energy.

The scientific method is also a form of **empiricism**. An empirical method for acquiring knowledge is one based on observation, including experimentation, rather than a method based only on forms of logical argument or previous authorities.

It was not until the late 1800s that psychology became accepted as its own academic discipline. Before this

time, the workings of the mind were considered under the auspices of philosophy. Given that any behaviour is, at its roots, biological, some areas of psychology take on aspects of a natural science like biology. No biological organism exists in isolation, and our behaviour is influenced by our interactions with others. Therefore, psychology is also a social science.

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

Which of the following was mentioned as a skill to which psychology students would be exposed?

a. use of the scientific method
b. all of the above
c. critical thinking
d. critical evaluation of sources of information

2. MultiChoice Activity

Psyche is a Greek word meaning _____.

a. soul
b. behavior
c. love
d. essence

3. MultiChoice Activity

Before psychology became a recognized academic discipline, matters of the mind were undertaken by those in _____.

a. biology
b. philosophy
c. physics
d. chemistry

4. MultiChoice Activity

In the scientific method, a hypothesis is a(n) _____.

a. test
b. proposed explanation
c. observation
d. measurement

Solution:

1. b. all of the above
2. a. soul
3. b. philosophy

4. b. proposed explanation

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1.2 Is Psychology Just Common Sense?

At times, psychology seems like mostly common sense. Some people may hear the results of a psychological study and say, “Of course, everyone knows that!” Sometimes, even when they discover evidence, their common sense leads them astray, and they cannot let go of what they think they know. Maybe they find a reason to dismiss the evidence, or argue their personal experience is more valid than a scientific claim. Although personal experience has its place, the field of psychology is more often interested in trends in human behaviour. Personal experiences may not better reflect general human behaviour than results from a well-executed study.

Here’s an Example

Say you have found what works well for you as a student. Could you then claim to know that “this is the best way for everyone to learn?” When psychologists make a claim about “how humans learn,” they rely on data from diverse populations, in various situations, at different ages, and at different education levels. They are looking for trends, patterns, and generalizations. While your statement is true for you, it might not be true for everyone. However, the claim from psychological science may apply to many or even most people, depending on how the study was run. Understanding this difference is important for developing critical thinking and helps us to identify what we know based on evidence, rather than what we think we know or what we want to know. From there, we can make better decisions and be more effective in the pursuit of our respective goals.

Explaining behaviour is just the first step. Psychologists can then use that data to develop predictions. Just explaining why people are the way they are is not very useful. Predicting how they might behave in the future in different situations, or how they will learn or become motivated, gives psychologists direction and allows them to help others outside of psychology. By being able to predict behaviour and share their results, psychology researchers can make an impact beyond their research study. Then, educators, event planners, organizations, and more can craft environments such as schools, workplaces, and digital spaces to achieve desired outcomes using what psychologists have discovered.

Activity: Consider This

Consider the following statements and take a minute to answer TRUE or FALSE. How confident do you feel in your judgment of these statements? Take a moment to note your confidence for each response and what, if any, explanation you might have for your answers. Also, think about what you would say if the statements were more open-ended, rather than true or false. Some questions are not easily answered as "True" or "False". Was that the case for any of these statements? If so, make some notes about how you would explain your answer.

Quiz Text Description

1. True/False Activity

Social media is the cause of the teen mental health crisis. (True/False)

2. True/False Activity

We only use 10% of our brains. (True/False)

3. True/False Activity

Most people have a specific "learning style" (such as auditory, visual, or kinesthetic) and usually learn best using that style. (True/False)

4. True/False Activity

Adolescents (~ages 11-18) struggle more with regulating their behaviour than people who are older. (True/False)

Solution:

1. False – Explanation: While the rise in social media use coincided with the rise in teens seeking support for mental health, there are many factors to consider. For example, a decrease in social interaction among teens has also occurred and has likely contributed.
   Something as complex as mental health cannot have only one explanation or cause.
2. False – Explanation: This is a myth perpetuated by pop culture.
   Humans use our entire brains (Herculano-Houzel, 2009).
3. False – Explanation: These can feel very true for many people, but having one specific learning style is a myth and does not predict how well you will learn. In fact, believing that you learn best in only one modality might hurt learning. Most people learn best in multiple modalities (a mix of visual, auditory, and kinesthetic) (Riener & Willingham, 2010).
4. False – Explanation: Adolescents are no worse at regulating their behaviour than any other age. They might take more risks, but this is not unregulated behaviour. Rather, it is typically a regulated choice to take a risk.

It is human nature to want clear answers, preferably with simple explanations, so it might not have been difficult to choose either true or false for the above questions. Some of you may have wanted to explain more: "true for X" or "false, only if Y." The human brain is incredibly complex, and therefore, so are we. Although sometimes an explanation for something is so obvious we miss it (because we think it is complicated), more often we tend to come up with an explanation for our own or someone else's behaviour that is much too simple to truly capture the situation.

Why do we do this? One reason is that humans are not only complex, but we also tend to like certainty. A nuanced or complicated answer lacks certainty and can feel like trying to hold water in our hands (Macmillian Learning, 2022).

Let's Watch

Video: "Understanding Psychology's Integrative Themes: Theme C" by Macmillan Learning [3:14] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube.*

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

Figure 1.2.1 *Important Questions to Ask.*

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.

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 recognize injustices. Remember, every question you ask, every curiosity you pursue, adds to the field of psychology.

> **Want to Learn More?**
> If you are curious, you can watch the three videos from SciShow Psych to discover some of the quirkier questions and answers in psychology.
>
> 1. The Science Behind Our Niche Interests [1:06]
> 2. Why Do We Talk to Ourselves? [0:46]
> 3. How Does Reverse Psychology Work? [5:01]

Key Takeaway

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?” emphasizes 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.

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OpenAI. (2026). ChatGPT (5.2) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 1.2.1: “Create a simple graphic that contains the following information: Why? What? How?”

1.4 Contemporary Psychology

Figure 1.3.1 *The Subdisciplines of Psychology.*

Image Description

Infographic titled “Subdisciplines of Psychology,” with the subtitle “Psychology is the scientific study of how we think and act.” Two columns list 12 subfields in rounded panels with icons: Biopsychology (biological influences; DNA icon), Social Psychology (interacting with others; group icon), Evolutionary Psychology (how behaviours are adaptive to human survival; evolution silhouettes), I-O Psychology (behaviours at work; briefcase), Sensation & Perception (senses and construction of reality; ear/eye), Health Psychology (psychology related to health-related behaviours; heart and medical cross), Cognitive Psychology (human mind and thought processes; head with gears), Sport & Exercise Psychology (psychology related to physical activity; running shoe), Developmental Psychology (scientific study of development across a lifespan; blocks), Clinical Psychology (focuses on diagnosis and treatment; clipboard), Personality Psychology (stable patterns and traits; smiley face), and Forensic Psychology (working with criminal justice; gavel).

This section provides an overview of the major subdivisions of psychology today, in the order in which they are introduced throughout the remainder of this textbook. This is not meant to be an exhaustive listing, but it will provide insight into the major areas of research and practice of modern-day psychologists.

Biopsychology Psychology

As the name suggests, biopsychology explores how our biology influences our behaviour. While biological psychology is a broad field, many biological psychologists want to understand how the structure and function of the nervous system are related to behaviour. As such, they often combine the research strategies of both psychologists and physiologists to accomplish this goal (as discussed in Carlson, 2013).

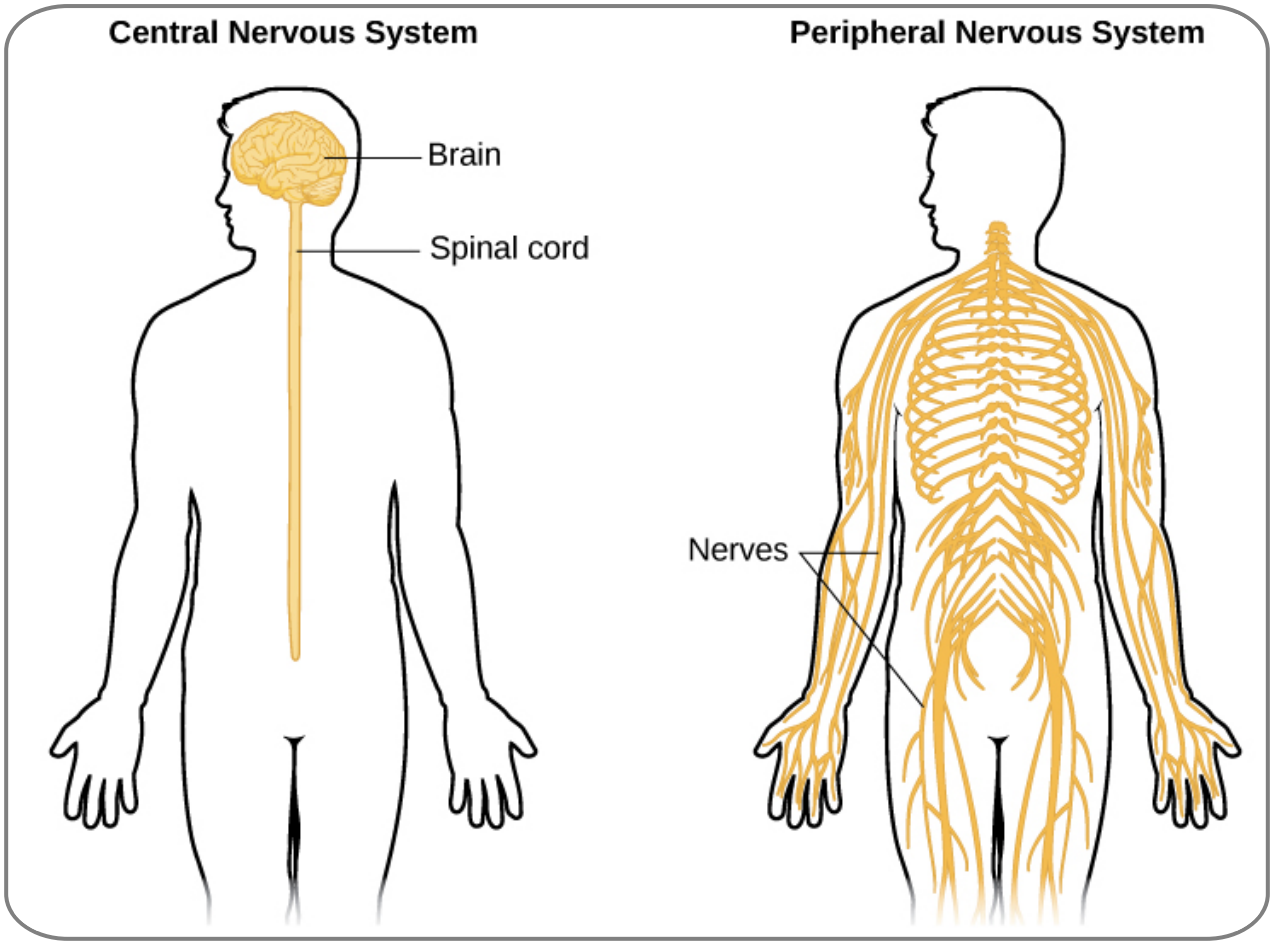

Figure 1.4.1 *Central and Peripheral Nervous Systems. Image: Psychology 2e, by OpenStax (2020), Rice University, CC BY 4.0.*

Image Description

Side-by-side diagram of two human silhouettes comparing the nervous system. The left figure, labelled "Central Nervous System," highlights the brain and spinal cord in yellow. The right figure, labelled "Peripheral Nervous System," shows a network of yellow nerves branching throughout the body, with a label pointing to "Nerves."

Biological psychologists study how the structure and function of the nervous system generate behaviour.

The research interests of biological psychologists span a number of domains, including but not limited to sensory and motor systems, sleep, drug use and abuse, ingestive behaviour, reproductive behaviour, neurodevelopment, plasticity of the nervous system, and biological correlates of psychological disorders. Given the broad areas of interest falling under the purview of biological psychology, it will probably come as no surprise that individuals from all sorts of backgrounds are involved in this research, including biologists, medical professionals, physiologists, and chemists. This interdisciplinary approach is often referred to as neuroscience, of which biological psychology is a component (Carlson, 2013).

Evolutionary Psychology

While biopsychology typically focuses on the immediate causes of behaviour based on the physiology of a human or other animal, **evolutionary psychology** seeks to study the ultimate biological causes of behaviour. To the extent that a behaviour is impacted by genetics, a behaviour, like any anatomical characteristic of a human or animal, will demonstrate adaptation to its surroundings. These surroundings include the physical environment and, since interactions between organisms can be important to survival and reproduction, the social environment.

The study of behaviour in the context of evolution has its origins with Charles Darwin, the co-discoverer of the theory of evolution by natural selection. Darwin was well aware that behaviours should be adaptive and wrote books titled *The Descent of Man* (1871) and *The Expression of the Emotions in Man and Animals* (1872), to explore this field.

One other drawback of evolutionary psychology is that the traits that we possess now evolved under environmental and social conditions far back in human history, and we have a poor understanding of what these conditions were. This makes predictions about what is adaptive for a behaviour difficult. Behavioural traits need not be adaptive under current conditions, only under the conditions of the past when they evolved, about which we can only hypothesize.

There are many areas of human behaviour for which evolution can make predictions. Examples include memory, mate choice, relationships between kin, friendship and cooperation, parenting, social organization, and status (Confer et al., 2010).

Evolutionary psychologists have had success in finding experimental correspondence between observations and expectations. In one example, in a study of mate preference differences between men and women that spanned 37 cultures, Buss (1989) found that women valued earning potential factors greater than men, and men valued potential reproductive factors (youth and attractiveness) greater than women in their prospective mates. In general, the predictions were in line with the predictions of evolution, although there were deviations in some cultures.

Sensation And Perception

Scientists interested in both physiological aspects of sensory systems as well as in the psychological experience of sensory information work within the area of **sensation and perception**. As such, sensation and perception research is also quite interdisciplinary. Imagine walking between buildings as you move from one class to another. You are inundated with sights, sounds, touch sensations, and smells. You also experience the temperature of the air around you and maintain your balance as you make your way. These are all factors of interest to someone working in the domain of sensation and perception.

Figure 1.4.2 *Duck–rabbit ambiguous figure. When you look at this image, you may see a duck or a rabbit. The sensory information remains the same, but your perception can vary dramatically. Image: Psychology 2e, by OpenStax (2020), Rice University, CC BY 4.0.*

As described in a later chapter that focuses on the results of studies in sensation and perception, our experience of our world is not as simple as the sum total of all of the sensory information (or sensations) together. Rather, our experience (or perception) is complex and is influenced by where we focus our attention, our previous experiences, and even our cultural backgrounds.

Cognitive Psychology

Cognitive psychology is the area of psychology that focuses on studying cognitions, or thoughts, and their relationship to our experiences and our actions. Like biological psychology, cognitive psychology is broad in its scope and often involves collaborations among people from a diverse range of disciplinary backgrounds. This has led some to coin the term cognitive science to describe the interdisciplinary nature of this area of research (Miller, 2003).

Cognitive psychologists have research interests that span a spectrum of topics, ranging from attention to problem solving to language to memory. The approaches used in studying these topics are equally diverse. Given such diversity, cognitive psychology is not captured in one chapter of this text per se; rather, various concepts related to cognitive psychology will be covered in relevant portions of the chapters in this text on including sensation and perception, social psychology, and therapy.

Developmental Psychology

Developmental psychology is the scientific study of development across a lifespan. Developmental

psychologists are interested in processes related to physical maturation. However, their focus is not limited to the physical changes associated with aging, as they also focus on changes in cognitive skills, moral reasoning, social behavior, and other psychological attributes.

Early developmental psychologists focused primarily on changes that occurred through reaching adulthood, providing enormous insight into the differences in physical, cognitive, and social capacities that exist between very young children and adults.

> **Note**
> Students in the HSF Program will be taking a course on Human Development in Level 2. With this in mind, developmental psychology will not be discussed at length in this text

Personality Psychology

Personality psychology focuses on patterns of thoughts and behaviours that make each individual unique. Early theorists attempted to explain how an individual's personality develops from their own given perspective.

> **Note**
> Students enrolled in the HSF program will learn about personality theories in another course. With this in mind, personality theories will not be discussed at length in this book.

Social Psychology

Social psychology focuses on how we interact with and relate to others. Social psychologists conduct research on a wide variety of topics that include differences in how we explain our own behaviour versus how we explain the behaviours of others, prejudice, attraction, and how we resolve interpersonal conflicts. Social psychologists have also sought to determine how being among other people changes our own behaviour and patterns of thinking. There are many interesting examples of social psychological research, and you will read about many of these in a later chapter of this textbook.

Industrial-Organizational Psychology

Industrial-Organizational psychology (I-O psychology) is a subfield of psychology that applies psychological theories, principles, and research findings in industrial and organizational settings. I-O psychologists are often involved in issues related to personnel management, organizational structure, and workplace environment. Businesses often seek the aid of I-O psychologists to make the best hiring decisions as well as to create an environment that results in high levels of employee productivity and efficiency. In addition to its applied nature, I-O psychology also involves conducting scientific research on behaviour within I-O settings (Riggio, 2013).

Health Psychology

Health psychology focuses on how health is affected by the interaction of biological, psychological, and sociocultural factors. This particular approach is known as the **biopsychosocial model**. Health psychologists are interested in helping individuals achieve better health through public policy, education, intervention, and research. Health psychologists might conduct research that explores the relationship between one's genetic makeup, patterns of behaviour, relationships, psychological stress, and health. They may research effective ways to motivate people to address patterns of behaviour that contribute to poorer health (MacDonald, 2013).

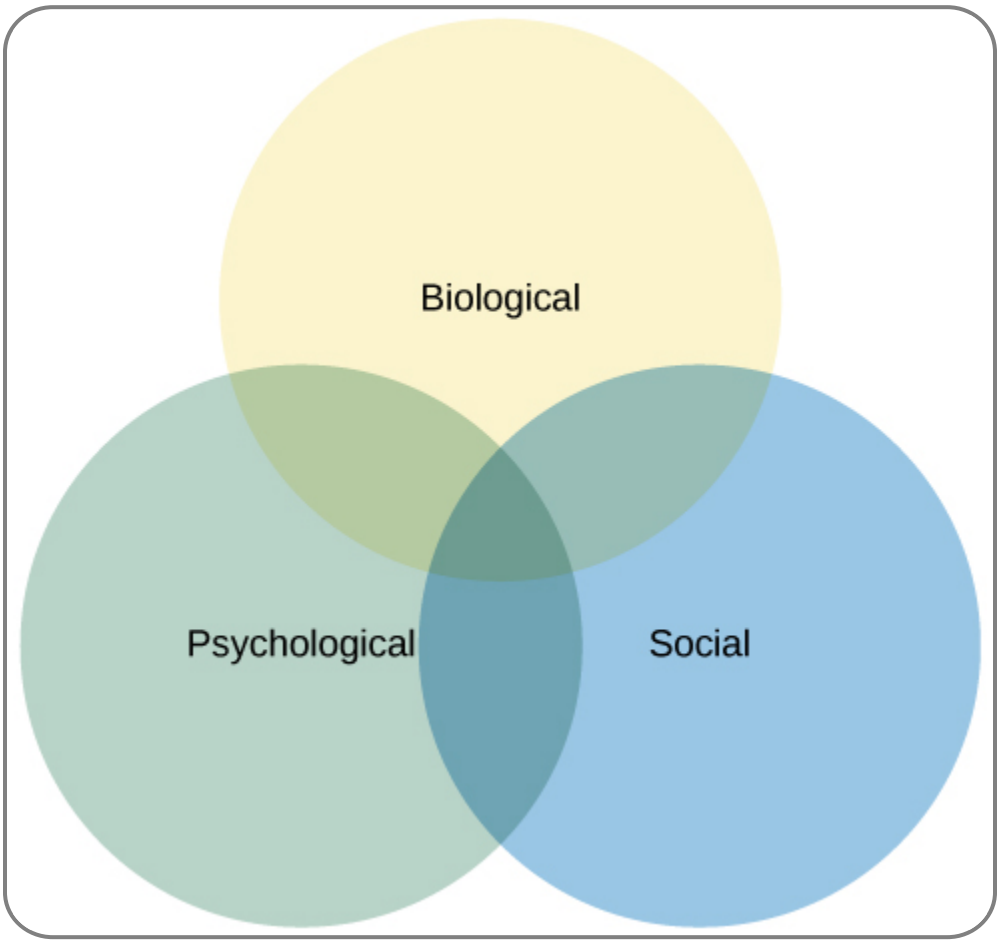

Figure 1.4.3. *The biopsychosocial model suggests that health/illness is determined by an interaction of these three factors. Image: Psychology 2e, by OpenStax (2020), Rice University, CC BY 4.0.*

Sport and Exercise Psychology

Researchers in sport and exercise psychology study the psychological aspects of sport performance, including motivation and performance anxiety, and the effects of sport on mental and emotional well-being. Research is also conducted on similar topics as they relate to physical exercise in general. The discipline also includes topics that are broader than sport and exercise but that are related to interactions between mental and physical performance under demanding conditions, such as firefighting, military operations, artistic performance, and surgery.

Clinical Psychology

Clinical psychology is the area of psychology that focuses on the diagnosis and treatment of psychological disorders and other problematic patterns of behaviour. As such, it is generally considered to be a more applied area within psychology; however, some clinicians are also actively engaged in scientific research. **Counselling psychology** is a similar discipline that focuses on emotional, social, vocational, and health-related outcomes in individuals who are considered psychologically healthy.

Sigmund Freud and Carl Rogers provided perspectives that have been influential in shaping how clinicians interact with people seeking psychotherapy. While aspects of the psychoanalytic theory are still found among some of today's therapists who are trained from a psychodynamic perspective, Rogers' ideas about client-centred therapy have been especially influential in shaping how many clinicians operate.

Furthermore, both behaviourism and the cognitive revolution (discussed in a later chapter) have shaped clinical practice in the forms of behavioural therapy, cognitive therapy, and cognitive-behavioural therapy. Issues related to the diagnosis and treatment of psychological disorders and problematic patterns of behaviour will be discussed in detail in later chapters of this textbook.

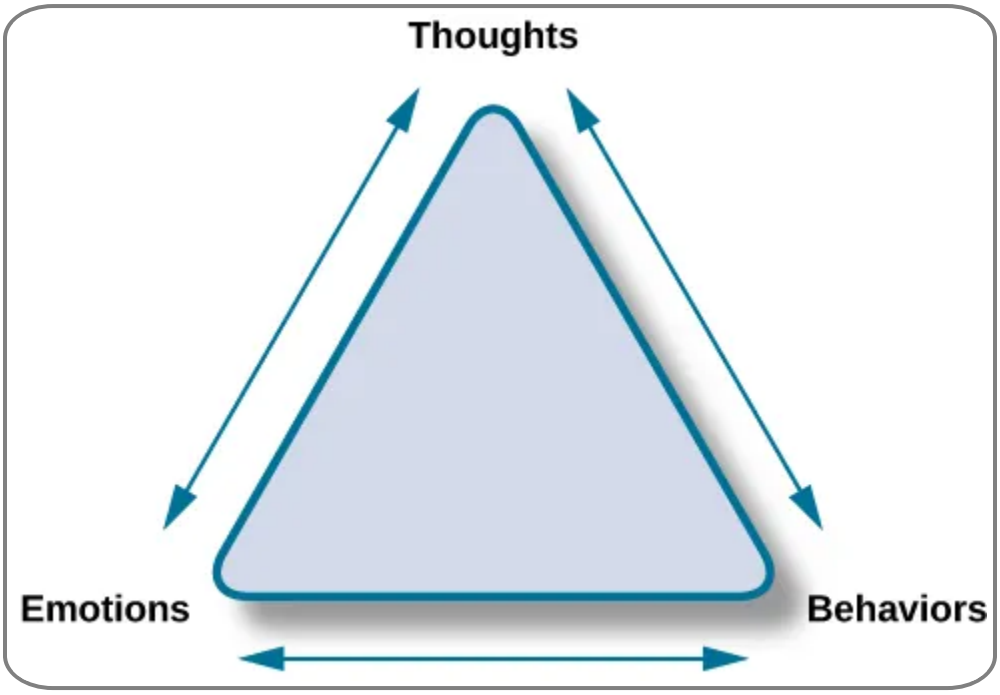

Figure 1.4.4. *Cognitive-behavioural therapists take cognitive processes and behaviours into account when providing psychotherapy. This is one of several strategies that practicing clinical psychologists may use. Image: Psychology 2e, by OpenStax (2020), Rice University, CC BY 4.0.*

By far, this is the area of psychology that receives the most attention in popular media, and many people mistakenly assume that all psychology is clinical psychology.

Forensic Psychology

Forensic psychology is a branch of psychology that deals questions of psychology as they arise in the context of the justice system. For example, forensic psychologists (and forensic psychiatrists) will assess a person's competency to stand trial, assess the state of mind of a defendant, act as consultants on child custody cases, consult on sentencing and treatment recommendations, and advise on issues such as eyewitness testimony and children's testimony (American Board of Forensic Psychology, 2014). In these capacities, they will typically act as expert witnesses, called by either side in a court case to provide their research- or experience-based opinions. As expert witnesses, forensic psychologists must have a good understanding of the law and provide information in the context of the legal system rather than just within the realm of psychology. Forensic psychologists are also used in the jury selection process and witness preparation. They may also be involved in providing psychological treatment within the criminal justice system. Criminal profilers are a relatively small proportion of psychologists who act as consultants to law enforcement.

Activities: Let's Review

Activity 1: Chapter 1 Definitions Review Quiz

Quiz Text Description

1. MultiChoice Activity

Which area of psychology focuses on the diagnosis and treatment of psychological disorders and other problematic patterns of behaviour?

a. Clinical Psychology
b. Social Psychology
c. Counselling Psychology
d. Developmental Psychology

2. MultiChoice Activity

Which area of psychology focuses on improving emotional, social, vocational, and other aspects of the lives of psychologically healthy individuals?

a. Health Psychology
b. Clinical Psychology
c. Personality Psychology
d. Counselling Psychology

3. MultiChoice Activity

Which field is the scientific study of development across a lifespan?

a. Biopsychology
b. Developmental Psychology
c. Cognitive Psychology
d. Industrial-Organizational Psychology

4. MultiChoice Activity

Psychology refers to the scientific study of what?

a. How biology influences behaviour only
b. Mental performance in sports and exercise
c. The justice system and legal issues
d. The mind and behaviour

5. MultiChoice Activity

Which area studies how biology influences behaviour?

a. Biopsychology
b. Cognitive Psychology
c. Social Psychology
d. Developmental Psychology

6. MultiChoice Activity

Which area studies the extent to which behaviour is impacted by genetics and shows adaptation to surroundings?

a. Social Psychology
b. Health Psychology
c. Evolutionary Psychology
d. Personality Psychology

7. MultiChoice Activity

Sensation and perception is the study of what?

a. Workplace behaviour and organizations
b. Patterns that make individuals unique
c. Our senses and how we construct reality
d. Thought processes like memory and language

8. MultiChoice Activity

Cognitive psychology is the study of what?

a. Health and well-being influences
b. Thought processes and how they relate to experiences/actions
c. How biology influences behaviour
d. How we interact and relate to others

9. MultiChoice Activity

Personality psychology studies what?

a. Development across a lifespan
b. Justice system issues
c. Patterns of thoughts and behaviours that make each individual unique
d. Mental and emotional factors in sports performance

10. MultiChoice Activity

Social psychology is the study of what?

a. Diagnosis and treatment of disorders

b. How we interact with and relate to others
c. How biology influences behaviour
d. Public policy, education, intervention, and research in health

11. MultiChoice Activity

Industrial-Organizational (I-O) psychology applies psychological principles in which settings?

a. Justice system and legal contexts
b. Industrial and organizational (workplace) settings
c. Lifespan growth and change
d. Sports, exercise, and physical performance contexts

12. MultiChoice Activity

Health psychology focuses on the interaction of which factors in health and well-being?

a. Biological, psychological, and sociocultural factors
b. Only genetics and adaptation
c. Only social relationships and group behaviour
d. Only thoughts, memory, and language

13. MultiChoice Activity

Sport and exercise psychology studies interactions between which factors and what outcome?

a. Mental and emotional factors and physical performance in sport/exercise
b. Diagnosis/treatment of disorders
c. Senses and constructing reality
d. Workplace motivation and productivity

14. MultiChoice Activity

Forensics (in psychology) relates to what?

a. Improving life functioning for healthy individuals
b. Issues within and related to the justice system
c. Development across the lifespan
d. Patterns that make individuals unique

Solution:

1. a. Clinical Psychology
2. d. Counselling Psychology
3. b. Developmental Psychology
4. d. The mind and behaviour
5. a. Biopsychology
6. c. Evolutionary Psychology
7. c. Our senses and how we construct reality

8. b. Thought processes and how they relate to experiences/actions
9. c. Patterns of thoughts and behaviours that make each individual unique
10. b. How we interact with and relate to others
11. b. Industrial and organizational (workplace) settings
12. a. Biological, psychological, and sociocultural factors
13. a. Mental and emotional factors and physical performance in sport/exercise
14. b. Issues within and related to the justice system

Activity 2: Chapter 1 Definitions Application Quiz

Quiz Text Description

1. MultiChoice Activity

A researcher interested in how changes in the cells of the hippocampus (a structure in the brain related to learning and memory) are related to memory formation would be most likely to identify as a(n) _____ psychologist.

a. biological
b. social
c. clinical
d. health

2. MultiChoice Activity

An individual's consistent pattern of thought and behavior is known as a(n) _____.

a. perception
b. object permanence
c. personality
d. psychosexual stage

3. MultiChoice Activity

A researcher interested in what factors make an employee best suited for a given job would most likely identify as a(n) _____ psychologist.

a. personality
b. clinical
c. social
d. I-O

Solution:

1. a. biological

2. c. personality
3. d. I-O

Key Takeaways

- Psychology is a diverse discipline that is made up of several major subdivisions with unique perspectives.
- Biological psychology involves the study of the biological bases of behaviour.
- Sensation and perception refer to the area of psychology that is focused on how information from our sensory modalities is received, and how this information is transformed into our perceptual experiences of the world around us.
- Cognitive psychology is concerned with the relationship that exists between thought and behaviour, and developmental psychologists study the physical and cognitive changes that occur throughout one's lifespan.
- Personality psychology focuses on individuals' unique patterns of behaviour, thought, and emotion.
- Industrial and organizational psychology, health psychology, sport and exercise psychology, forensic psychology, and clinical psychology are all considered applied areas of psychology.
    - Industrial and organizational psychologists apply psychological concepts to I-O settings.
    - Health psychologists look for ways to help people live healthier lives.
    - Clinical psychology involves the diagnosis and treatment of psychological disorders and other problematic behavioural patterns.
    - Sport and exercise psychologists study the interactions between thoughts, emotions, and physical performance in sports, exercise, and other activities.
    - Forensic psychologists carry out activities related to psychology in association with the justice system .

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OpenAI. (2026). ChatGPT (5.2) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 1.3.1: "Create a simple graphic that contains the provided 12 definitions of disciplines in Psychology."

1.5 Careers in Psychology

Psychologists can work in many different places doing many different things. In general, anyone wishing to continue a career in psychology at a 4-year institution of higher education will have to earn a doctoral degree in psychology for some specialties and at least a master's degree for others.

What is a PhD?

In most areas of psychology, this means earning a PhD in a relevant area of psychology. Literally, **PhD** refers to a doctor of philosophy degree, but here, philosophy does not refer to the field of philosophy per se. Rather, philosophy in this context refers to many different disciplinary perspectives that would be housed in a traditional college of liberal arts and sciences.

The requirements to earn a PhD vary from country to country and even from school to school, but usually, individuals earning this degree must complete a dissertation. A **dissertation** is essentially a long research paper or a bundle of published articles describing research that was conducted as a part of the candidate's doctoral training. In Canada, a dissertation generally has to be defended before a committee of expert reviewers before the degree is conferred.

Once someone earns a PhD, they may seek a faculty appointment at a college or university. Being on the faculty of a college or university often involves dividing time between teaching, research, and service to the institution and profession. The amount of time spent on each of these primary responsibilities varies dramatically from school to school, and it is not uncommon for faculty to move from place to place in search of the best personal fit among various academic environments.

The previous section detailed some of the major areas that are commonly represented in psychology departments around the country; thus, depending on the training received, an individual could be anything from a biological psychologist to a clinical psychologist in an academic setting.

Career Search Tools
Use this interactive tool from the American Psychological Association (APA) to explore different psychology careers by degree level and learn more. You might also wish to check out the Canadian Psychological Association (CPA) Career Hub.

Other Careers in Academic Settings

Often, schools offer more psychology courses than their full-time faculty can teach. In these cases, it is not uncommon to bring in an adjunct faculty member or instructor. Adjunct faculty members and instructors usually hold advanced degrees in psychology, but they often have primary careers outside academia and serve in this role as a secondary job. Alternatively, they may not hold the doctoral degree required by most 4-year institutions and may use these opportunities to gain teaching experience. Furthermore, many 2-year colleges and

schools (including Fanshawe College) need faculty to teach psychology courses. In general, many of the people who pursue careers at these institutions have master's degrees in psychology, though some also have PhDs.

Some people earning PhDs may enjoy research in an academic setting. However, they may not be interested in teaching. These individuals might take on faculty positions devoted exclusively to research. This type of position would be more likely an option at large, research-focused universities.

In some areas of psychology, it is common for individuals who have recently earned their PhD to seek positions in **postdoctoral training programs** before going on to serve as faculty. In most cases, young scientists will complete one or two postdoctoral programs before applying for a full-time faculty position. Postdoctoral training programs allow young scientists to further develop their research programs and broaden their research skills under the supervision of other professionals in the field.

Career Options Outside of Academic Settings

Individuals who wish to become practicing clinical psychologists have another option for earning a doctoral degree, which is known as a PsyD. A PsyD is a doctor of psychology degree that is increasingly popular among individuals interested in pursuing careers in clinical psychology. PsyD programs generally place less emphasis on research-oriented skills and focus more on the application of psychological principles in the clinical context (Norcross & Castle, 2002).

Licensing Requirements

Regardless of whether earning a PhD or PsyD, in most provinces, an individual wishing to practice as a licensed clinical or counselling psychologist may complete postdoctoral work under the supervision of a licensed psychologist.

After an individual has met these requirements, their credentials are evaluated to determine whether they can sit for the licensure exam. Only individuals who pass this exam can call themselves licensed clinical or counselling psychologists (Norcross, n.d.).

Licensed clinical or counselling psychologists can then work in a number of settings, ranging from private clinical practice to hospital settings. It should be noted that clinical psychologists and psychiatrists do different things and receive different types of education.

While both can conduct therapy and counselling, clinical psychologists hold a PhD or PsyD, whereas psychiatrists hold a doctor of medicine (MD) degree. As such, licensed clinical psychologists can administer and interpret psychological tests, while psychiatrists can prescribe medications.

Individuals earning a PhD can work in a variety of settings, depending on their areas of specialization. For example, someone trained as a biopsychologist might work in a pharmaceutical company to help test the efficacy of a new drug. Someone with a clinical background might become a forensic psychologist and work within the legal system to make recommendations during criminal trials and parole hearings or serve as an expert in a court case.

While earning a doctoral degree in psychology is a lengthy process, usually taking between 5–6 years of graduate study (DeAngelis, 2010), there are a number of careers that can be attained with a master's degree in psychology. People who wish to provide psychotherapy can become licensed to serve as various types of professional counsellors (Hoffman, 2012). Relevant master's degrees are also sufficient for individuals seeking careers as school psychologists (National Association of School Psychologists, n.d.), in some capacities related to sport psychology (American Psychological Association, 2014), or as consultants in various industrial settings (Landers, 2011). Undergraduate coursework in psychology may be applicable to other careers, such as psychiatric social work or psychiatric nursing, where assessments and therapy may be a part of the job.

An undergraduate education in psychology is associated with a knowledge base and skill set that many employers find quite attractive. It should come as no surprise, then, that individuals earning bachelor's degrees in psychology find themselves in a number of different careers. Examples of a few such careers can involve serving as case managers, working in sales, working in human resource departments, and teaching in high schools. The rapidly growing realm of healthcare professions is another field in which an education in psychology is helpful and sometimes required. For example, the Medical College Admission Test (MCAT) exam that people must take to be admitted to medical school now includes a section on the psychological foundations of behaviour (Association of American Medical Colleges, 2026).

HSF Pathways at Fanshawe College

This course can help you to decide if further study in psychology is a good fit for you. Even if you never take another psychology course, this class can help you to develop study, research and critical thinking skills that will help you to be successful in other educational programs. Many HSF graduates go on to pursue programs of interest in human behaviour and take other programs that include psychology courses through the School of Community Studies. I encourage you to check out the programs listed below to see if any might be of interest to you:

- Child and Youth Care
- Early Childhood Education
- Social Service Worker
- Developmental Service Worker
- Recreation and Leisure Services
- Addictions and Mental Health

For a full list, see Fanshawe College their list of Programs.

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1.6 Professional Associations in Psychology

This overview provides a brief look into the organizations that shape and define the field of psychology in Canada, highlighting their roles, missions, and contributions to the discipline. Each organization plays a pivotal role in the development and application of psychological knowledge and practice, both within Canada and on a global stage.

The **Canadian Psychological Association (CPA)** was established as the premier organization for psychologists in Canada, mirroring the role of the American Psychological Association (APA) in the United States, with a distinct focus on the Canadian context.

CPA Mission
The CPA's primary mission is to foster the advancement of psychology as a science, as a profession, and as a means of promoting health and human welfare (Canadian Psychological Association, 2020).

The CPA comprises various sections, paralleling the divisions within the APA, each dedicated to a specific area of psychological study and practice. The CPA's membership is diverse, encompassing individuals at various stages of their psychology careers, from students to doctoral-level professionals. These members contribute to a range of sectors such as education, healthcare, government, and private practice, highlighting the wide-reaching impact of psychology in society (Canadian Psychological Association, 2020).

The American Psychological Association (APA)

The American Psychological Association (APA), established in 1892, is a leading professional organization for psychologists in the United States and has significant influence in Canada and other countries. It plays a crucial role in setting ethical standards, advocating for the profession, and disseminating psychological knowledge through its comprehensive publishing program, including the Publication Manual of the American Psychological Association. This manual outlines the APA citation style, a cornerstone of scholarly writing in psychology and many related disciplines. The APA's efforts extend beyond publication, encompassing the development of educational standards, public outreach, and policy advocacy to advance the field and promote mental health and well-being globally.

A parallel organization, the Association for Psychological Science (APS), founded in 1988, aims to promote a scientific approach to psychology. Emerging from a divergence in focus within the APA, the APS emphasizes research and education in psychology, publishing five notable research journals and actively engaging in advocacy (Association for Psychological Science, 2020). While its membership is predominantly based in the United States, it has a significant international presence.

Additionally, various organizations, including the National Latina/o Psychological Association (NLPA), the Asian American Psychological Association (AAPA), the Association of Black Psychologists (ABPsi), and the Society of Indian Psychologists (SIP), provide valuable networking and collaboration opportunities for psychologists from diverse ethnic and racial backgrounds. These groups are instrumental in addressing psychological and social issues that may be overlooked in mainstream discussion of psychology (NLPA, 2020; AAPA, 2020; ABPsi, 2020; SIP, 2020).

The Registered Psychological Association (RPA) serves a critical function in the field of psychology, primar-

ily focusing on the regulation and standardization of professional practice. Its core purpose is to maintain high standards of competence and ethical behaviour among practicing psychologists. The RPA achieves this by setting rigorous criteria for registration and licensure, ensuring that only qualified individuals are permitted to practice psychology. This registration process typically involves verifying educational credentials, assessing professional training, and sometimes requiring the passing of a licensing examination. Furthermore, the RPA provides ongoing professional development opportunities and resources to its members, fostering a commitment to lifelong learning and advancement in the field. By upholding these standards, the RPA plays a vital role in protecting the public by ensuring that psychological services are provided by competent and ethical professionals (Registered Psychological Association, 2020).

In summary, the field of psychology in Canada is shaped and supervised by various organizations, each contributing uniquely to the discipline. These organizations collectively ensure the growth, integrity, and application of psychological knowledge. Their efforts not only enhance the field of psychology but also ensure that the services provided to the public are of the highest standard, reflecting the evolving needs and diversity of Canadian society.

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1.7 Adjusting to College Life

Adjusting to College Life

Not surprisingly, better academic adjustment predicts degree completion and academic achievement (Brady-Amoon & Fuentes, 2011; Gerdes & Mallinckrodt, 1994). That said, if you are in your first year (or even upper years), there are a number of challenges that you may be navigating that can impact your adjustment. These include, but are not limited to, the following (*click on the interactive image for more details about each challenge*):

Image Description
Infographic titled "Adjusting to College Life". In the center, a student holding books stands in front of a college building. Six rounded speech-bubble boxes surround the student, each with a heading and an icon but no additional text: Loneliness (sad face), Financial stress (coins), Class format (classroom/online icons on two separate boxes), Freedom (bird), and Social opportunities (group of people). On the lower right, three students stand together (including at least one woman), smiling and holding books/backpacks. The interactive text reveals the following:

- Loneliness. This state of mind may be attributed to separation from family, high school and/or hometown friends, and other important people in your life.
- Financial stress. College is expensive and you may be faced with debt, the need to reduce expenses, and/or needing to increase income (e.g., through a part-time job).
- Class format. Many college class sizes are larger than a typical high school classroom. Your class session might also be a longer block of time (often 3 hours in length). This format creates many challenges, including opportunities for distraction.
- Freedom. Most students have much more independence in college. With freedom and flexibility comes the need to regulate key aspects of your life, including sleep, diet, study schedule, and exercise.
- Social opportunities. Attending college involves meeting new people with experiences, beliefs, and passions that may substantially diverge from your own. This opportunity is exciting and leads to forming new peer groups and relationships. At the same time, there is a need to choose whether to engage in certain recreation activities, and more broadly, how to balance your social life with other obligations.
- Personal and emotional problems. From a developmental perspective, the years during which many attend post-secondary programs – between late adolescence and late 20s – are critical for developing personal values, beliefs, and goals, as well as intimate, trusting relationships (e.g., Erikson, 1963). Questioning one's purpose, self-worth, relationships, etc. is normal. That said, doing so can also contribute to emotional turmoil and personal crises (more on personal and emotional challenges below).

Loneliness

This state of mind may be attributed to separation from family, high school and/or hometown friends, and other important people in your life.

Financial Stress

College is expensive and you may be faced with debt, the need to reduce expenses, and/or needing to increase income (e.g., through a part-time job).

Class Format

Many college class sizes are larger than a typical high school classroom. Your class session might also be a longer block of time (often 3 hours in length). This format creates many challenges, including opportunities for distraction.

Freedom

Most students have much more independence in college. With freedom and flexibility comes the need to regulate key aspects of your life, including sleep, diet, study schedule, and exercise.

Social Opportunities

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Personal and Emotional Problems

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In sum, the challenges of this Introductory Psychology course, or any course you might take, do not occur in a vacuum, but instead exist in the context of the many other demands that college life presents. This point is

important to remember. We are not suggesting that our psychology courses are the only challenge in your life (we are sure that is far from true), and we do not believe that the strategies we suggest for navigating the course are "one size fits all". We hope to shed light on some of the more common barriers and to provide a useful starting point for building a set of individualized skills and strategies.

Academic Challenges

Psychology is a Science

Perhaps the most common source of academic difficulties in Principles of Psychology stems from a fundamental misunderstanding of what psychology is. Many students are surprised to learn that we study topics such as neuroanatomy, genetics, statistics, and research methods (to name a few!). There is a misconception that knowledge of these topics is only relevant to "hard sciences" like biology, chemistry, physics, mathematics, etc. While understandable, this view is an unhelpful, false dichotomy that we strive to debunk in this course.

The study of psychology is firmly grounded in empiricism and the scientific method. In order to understand and interpret research in psychology, it is critical to have a firm grasp of research design, hypothesis testing, and statistics. Further, one of the most exciting things about Psychology is that it is multidisciplinary. Our thoughts and behaviours are complex, and to understand them, scientists must draw on theory and methods from diverse disciplines.

Research Domain Criteria (RDoC) Project

One example of drawing on information from diverse fields is the National Institute of Mental Health's influential Research Domain Criteria (RDoC) project. Launched in 2008, the RDoC framework has shaped how scientists study the causes and symptoms of mental illnesses. A core RDoC tenant is that mental illness must be classified and studied at multiple "units of analysis" (e.g., molecules, cells, brain circuits, behaviours). Guided by this comprehensive understanding of mental illness, scientists and clinicians have made breakthroughs in treatment and prevention.

What does all of this mean? The bottom line is that some of the content in Psychology for HSF will overlap (and even extend) material that you may see in courses in biology, chemistry, statistics, mathematics, and others. For instance, you will learn about the anatomy and physiology of structures involved in sensation and perception, and about the statistical properties of a normal curve. Learning content that overlaps with a range of other disciplines is undoubtedly a tall order for students to tackle, but the variability and multi-disciplinary nature of psychological science is what makes it a fascinating and rewarding area of study.

Psychology is Very Broad

Related to the point above, Psychology for HSF covers considerable ground in the 14 weeks allotted. Topics touch on many of the major disciplines in psychology, including neuroscience, sensation and perception, learning/behavioural psychology, social psychology, and clinical psychology. These areas of psychology are in

and of themselves very broad (indeed, psychology departments devote several upper-year courses to each) and include multiple sub-disciplines. The course also touches on the history of psychology, research methods, and statistics. So, a lot to accomplish in a short period of time!

One challenging aspect is learning and mastering a lot of information. The diversity of topics covered makes this learning tricky, as you might feel as though you are "shifting gears" frequently, rather than cruising seamlessly from one content area to the next. This challenge makes students more flexible, efficient, and altogether better learners, and this is one of the benefits of studying psychology. The potential added layer of difficulty in the short term is worthwhile in the long term! Our lectures, readings, assignments, and quizzes will emphasize common threads or connections among course topics. We have made an effort to have content build on itself wherever possible, and to demonstrate how very diverse areas of psychology share common basic principles and themes.

Multiple Methods of Learning

The material is presented and learned in several formats. However, active engagement with course material (e.g., preparing for and participating in class activities; completing quizzes; preparing for a lecture by reviewing and annotating textbook readings) takes time. It is also harder than passively absorbing content by simply "showing up" for weekly lectures. Making full use of the different ways of learning offered in Psychology for HSF may mean prioritizing them regularly from week to week.

Fully benefiting from the richness of HSF for Psychology demands organization, scheduling, and planning ahead. College life is busy, and our class is only one of the courses in which you are enrolled! Thus, in many ways, this course (and most others) asks you to reflect on what's important to you and purposefully adjust your behavior so that it is in line with your priorities and goals. This reflection takes self-knowledge and maturity; it's disarmingly difficult at times to act in a value-consistent manner. In fact, some psychotherapies aim to reduce symptoms of depression and anxiety in part by helping patients identify values and change behaviour in accordance with them (e.g., Acceptance and Commitment Therapy; Hayes et al., 2011). Structuring your time (see "Strategies to Overcome Academic Challenges" below) is a great place to start.

Emotional Challenges

Psychology for HSF may be more emotionally taxing than many or all of your other courses. Generally, this response is because much of (but not all) of the content tackles *human processes* – how we perceive, think, feel, and behave. In short, the course content can be highly relatable, and you may make connections with what you've learned about yourself, your loved ones, and/or other important people in your life. In our experience, this relatability interacts with what students bring into the course. We can all probably think about significant hardships we've endured and moments in our lives that have tested us to our limits; we all bring our unique emotional histories.

There are two take-home points from this discussion. First, mental health problems are common. If you are coping with them, you certainly aren't alone. Research suggests that mental illness reduces student academic success and adjustment in college overall, but very few people receive the treatment that might help. Accessing personal support systems and professional help will increase your ability to navigate college life (see strategies below as well). Second, your lived experiences with symptoms related to mental illness will provide a unique lens through which to view the material; it may also leave you open to strong and/or unexpected reactions to aspects of the course content. It's impossible to predict what may be most jarring; nonetheless, below we turn to some notable parts of the course content that may be most emotionally challenging.

Course Content

As much of the content of Psychology of HSF concerns the study of us – what we think and feel, how we act, and what we experience – parts of the material may resonate with you deeply. Indeed, we hope this is the case! The potential downside is that you may come across content that you find challenging or activating.
Given the prevalence of mental illness and suicide in the general population, an obvious area in which you may face some tough course content is the clinical psychology section. This section will: give a broad overview of the history of mental illness; cover the symptoms, course, and causes of several psychiatric conditions; and discuss available treatments. Hearing about the specific symptoms of mental illnesses and the impacts these can have on people's lives can remind us of our own personal experiences and/or what our loved ones have been through. In general, hearing about precursors to psychiatric symptoms – for example, child abuse, major traumatic events (e.g., being the victim of violence), and substance use – can be upsetting. Hearing about the hardships people face and the fundamental inequalities that can bring on and perpetuate mental illness can be moving. A challenge of this course, and this section in particular, is noticing how these things impact us, taking care of ourselves as needed, and using our experiences as fuel for our scholarship. These challenges are tricky to accomplish, and we provide some strategies that could prove helpful in the next section.

The emotional challenges of the course content do not necessarily end with the clinical psychology section. For example, a major topic in social psychology concerns how people create "in-groups" (others with whom one feels they have a lot in common) and "out-groups" (others who share few of one's broad characteristics and/or beliefs). Creating these dichotomies has an important evolutionary and interpersonal function. Nonetheless, our tendency to think in terms of "in groups" and "out groups" can contribute to stereotypes, bigotry, and hatred. Many of us, and particularly those with lived experience of discrimination, may find this difficult to discuss and learn about.

Key Takeaway

The key takeaway is that, unlike many other courses, the content in our course may trigger strong feelings and reactions. We think that the strong emotions psychology may generate are a strength of psychology and something that can make it intrinsically fascinating. We also think the potential for content to be provocative is something to keep in the back of your mind and watch with a very purposeful eye (see more in the next section).

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1.8 Tips and Strategies for Success

Strategies to Overcome Academic Challenges

The change from a high school to a college course load can feel dramatic. Suddenly, there are extensive readings to complete each week, assignments to stay on top of, and examinations to prepare for, across multiple courses. It can be easy to become overwhelmed with the amount of academic material to manage.

The following are some strategies to help manage your academic demands and facilitate your ability to manage your time effectively:

Scheduling Your Time

It is very helpful to get into the habit of creating a weekly schedule. This scheduling not only helps you to sort out what work you plan to focus on each week, and when, but also ensures you are scheduling balanced activities into your life outside of your academics. Having a schedule can lead you to be more productive with your time and manage feelings of being overwhelmed by all of the things you need to do each week.

Keeping Focused

Do you get easily distracted? Perhaps when you sit down to do some work, your mind wanders to all the other things you need to do, such as “will I remember to text my friend later to hang out?” or “I have to remember to do that online quiz before tomorrow night”. Using a distraction pad to write down wandering thoughts and to-do items while you are working can help you to make sure you are not forgetting anything important, by writing them down for later. This practice also keeps you from getting distracted by going to do the task that has popped into your mind while working on something else.

Getting distracting thoughts out of your head by writing them down on paper can help you focus on the task at hand. You can then set a specific time each evening to review your distraction pad, at which time you can decide which items are insignificant and can be forgotten, and which items are important. You can then turn the important items into specific actions, and plan for when you will tackle them by slotting them into your weekly schedule.

Not only can your thoughts distract you from attending to your work, but electronic devices also can be very distracting. It is important that each time you sit down to complete a session of work, you decide if you need your digital device in order to do it. If you do not need it, consider leaving your phone or computer in another room, or at home if you plan to work somewhere outside of your home. If you do need your device, consider blocking unnecessary sites with digital applications or scheduling short breaks (e.g., 5-10 minutes) approximately every hour to check for notifications on social media.

Of course, everyone's attention span is different, so it is important that you find the limits of your attention for a particular task. Once you have figured out how long you can focus on the particular activity or subject, you can break down your tasks into goals or chunks of work that you anticipate will take that long to complete.

Effective Studying

Finding a place to work. Where do you study most often? When you are sitting down to do your school work, consider your environment. Are you someone who needs a quiet space, or do you prefer to be around people and music? How distracted do you get by your phone and computer? Reflect on what the ideal work environment is for you, and plan to find a space that is most conducive to your own ability to focus when planning to do your coursework. You may not know what works best for you yet, and that is okay! Try out a few spaces (e.g., residence room, coffee shop, library cubicle, study rooms on campus) before making your decision.

Strategies to Overcome Emotional Challenges

Forewarned is Forearmed

Among the emotional challenges of Psychology for HSF is encountering material that could be upsetting to you. Upsetting content could be something you read in your textbook, read or watch online, or hear in a lecture. Oftentimes, course content that is most likely to affect us connects with some important experiences we have had, or that have happened to people we love, or both.

A deceptively simple strategy for addressing the emotional challenges of this course is looking well ahead in your syllabus. Doing so might allow you to identify, well in advance, topics that you might find difficult to learn and/or read about because of personal experiences. This approach would give you time to find out more about the content by asking your professor. Knowing what's coming might allow you to prepare for certain topics. For instance, you might decide to review and practice some recommended coping skills (described below) and/or recruit a friend, partner, or other source of support to attend a lecture with you. Further, you might schedule activities that you find fun or distracting on days you know you will be encountering content you are likely to find distressing.

What are Trigger Warnings?
Trigger warnings are advanced notifications at the start of a video, piece of writing, or, in educational contexts, a lecture or topic that contains potentially distressing material. Trigger warnings involve a description of the potentially distressing content with the goal of providing the opportunity to prepare for or avoid this content. On the surface, if trigger warnings help people cope with challenging information, this might reduce negative reactions and ultimately protect mental health.

Although you may come across them in other courses, Psychology for HSF does not give ***trigger warnings*** for

any course content. The reasons are both scientific and pedagogical. From a scientific standpoint, studies that have investigated the effects of trigger warnings are mixed, but the bottom line is that they either have no impact or a slightly negative impact on overall student well-being. On the pedagogical side, the use of trigger warnings may lead to the avoidance of course material, which impedes learning this material. Beyond course material, a more important learning opportunity may also be missed. Since trigger warnings may encourage avoidance of things that are upsetting, there are no opportunities to experience potential "triggers" and learn that you can cope, that the threat is not as bad as you thought, or that the intense emotional reaction you have does not last forever. Indeed, this principle of ***exposure*** to things that may be triggering or upsetting is a cornerstone of psychological treatments for post-traumatic stress disorder (PTSD) and anxiety disorders (e.g., Abramowitz et al., 2019; Foa et al., 2007). Further, avoidance is a key mechanism that drives the persistence and worsening of many mental health symptoms (e.g., Ottenbreit et al., 2014). For the interested reader, the box presents more information about trigger warnings and further rationale for why these are not used in our course.

The Problems with Trigger Warnings

Our primary reason for not using trigger warnings is the lack of scientific evidence that they do what they are supposed to. If trigger warnings protected students from discomfort or distress, using them might have benefits that outweigh their psychological costs (see below). For instance, in a series of carefully designed experiments, Bridgland and colleagues (2019) gave some participants trigger warnings about a graphic photo and measured their levels of negative affect (e.g., adjectives like "distressed") and anxiety before and after viewing the photo. Another group of participants did not receive any warning. In five separate studies, the groups (warned and unwarned) did not differ in their emotional reactions to graphic, upsetting content. This general effect – that trigger warnings do not impact emotional reactions to potentially upsetting content – has been replicated in studies using a graphic written passage (Bellet et al., 2018) and videos (Sanson et al., 2019). Sanson and colleagues (2019) summarize their series of six well-designed studies as follows: "people who saw trigger warnings, compared to people who did not, judged material to be similarly negative, experienced similarly frequent intrusive thoughts and avoidance, and comprehended subsequent material similarly well." Ultimately, trigger warnings are not helping to reduce or offset the things that they are supposed to (e.g., distress, intrusive memories), which raises questions about their appropriateness for educational contexts.

You may be thinking that, even if they are not overtly helpful, trigger warnings can't hurt, so why not use them? Although "hurt" may be an exaggeration, there is emerging evidence that trigger warnings may have unintended negative consequences. The initial impetus for trigger warnings came out of clinical research on post-traumatic stress disorder (PTSD). Briefly, some people with PTSD experience intense recollections (e.g., flashbacks; sensory experiences) of a traumatic event that are triggered by reminders of the trauma. Thus, it was thought that warnings of these types of triggers might be helpful. However, critics of trigger warnings have long maintained that trigger warnings encourage avoidance (which fuels the persistence of symptoms and impedes learning coping strategies necessary for treatment) and increase the salience of trauma to an individual's identity. The result is that PTSD symptoms worsen over time and people do not recover (McNally, 2014, 2016; Rosenthal et al., 2005). In line with these criticisms, studies have uncovered some of the negative side effects of trigger warnings. First, compared to the unwarned, those who receive trigger warnings report greater negative affect and anxiety before viewing the potentially distressing content (Bellet et al., 2018; Bridgland et al., 2019; Gainsburg & Earl, 2018). Second, people who receive trigger warnings avoid the content more (Bridgland et al., 2019; Gainsburg & Earl, 2018); in the context of a college course, this translates to missed learning opportunities in the absence of documented benefits.

Finally, trigger warnings may affect people's beliefs about their own resilience versus vulnerability. In one study, compared to unwarned participants, people who viewed trigger warnings rated themselves, and people in general, as more emotionally vulnerable following traumatic events (Bellet et al., 2018). In balance, we think trigger warnings likely do very little to make tough content easier to consume. Further, we are concerned about the potential unintended side effects of such warnings. For those reasons, trigger warnings are not used in Psychology for HSF.

If not Trigger Warnings, then what?

There are ways to cope with potentially upsetting content that do not involve trigger warnings. If you know you will encounter information that may be distressing, some strategies for engaging with that content include:

- Looking ahead at the syllabus
- Reading keywords at the end of each chapter to see if the content may be difficult
- Connecting with a member of the instructional team if there is a specific area you are concerned about
- Bringing a friend or family member to a lecture on a day when the content may be difficult
- Planning light and fun activities following what may be a difficult lecture
- Using coping and relaxation techniques, described below

Coping and Mental Hygiene

Coping means dedicating time and conscious effort to the management of your stress levels and problems that you are faced with. Stress can surface as a result of many factors, including homework, exams, work, volunteer positions, extracurricular activities, and problems in family and peer relations. When we are coping, we are utilizing techniques and engaging in activities that will help us minimize the effects of these stressors on our well-being.

A significant part of coping is recognizing the importance of mental hygiene. You are likely familiar with the term *hygiene*, which refers to practices we engage in that are important for maintaining our health and preventing diseases, such as showering and brushing our teeth. Mental hygiene follows the same general principle, referring to practices we engage in that are important for maintaining our mental health and preventing psychological conditions such as burnout and mental illness. In this module, we will discuss some coping skills that you can use to facilitate mental hygiene and manage your own wellness.

Self-care

You have likely heard of the term self-care. What does it mean to you?

> True self-care is not salt baths and chocolate cake, it is making the choice to build a life you don't need to regularly escape from – Brianna Wiest

Self-care tends to get a reputation in society and the media as simply being the act of taking a bubble bath or eating chocolate to reward oneself. However, self-care is actually multi-faceted, consisting of all of the activities needed to promote and maintain your health across multiple domains. It is about developing for yourself a life that you feel you can manage, enjoy, and not need to escape from. Self-care activities are not just physical activities, but also mental, emotional, and spiritual. These activities include nutrition, sleep, hygiene, exercise, time with family and friends, as well as time alone and leisure. To engage in self-care is to deliberately choose activities that are nourishing, restorative, and that strengthen your connections with others.

One of the things that makes self-care tricky is that there are many different areas. If you're spending all your time and energy on your physical health and school, you may find you're not getting enough social time! Similarly, if you are staying up really late every night of the week to spend time with friends, the exhaustion is going

to catch up with you. An important part of engaging in self-care is finding what activities are restorative for you and being sure to schedule them into your week so that your schedule is well-balanced.

Our culture tends to reward people who deal with their stress by working harder and faster to produce more in a shorter time. You might feel compelled to do this, by engaging in cramming sessions to pump out work, and cutting out healthy habits in favour of freeing up more time to focus on studies. However, this behaviour can have a negative effect on your physical and mental health, which can result in burnout, which is a state of physical, mental and emotional collapse caused by overwork or stress.

Our bodies are equipped with something called the fight or flight system, which is activated when we are under stress. This response consists of a series of biochemical changes that prepare our bodies to deal with threat or danger. Primitive people needed rapid bursts in energy to fight or flee from predators such as sabre-toothed tigers. This response can help us in threatening situations today, such as having to respond quickly to a car that cuts you off on the highway. However, not only can this system become activated when we are faced with serious dangers in our environment, but it can also activate when we are under a great deal of stress and feeling overwhelmed. Luckily, our bodies are also equipped with a relaxation response, which can counter the activation of our fight/flight response.

Take a moment to consider how you relax. Some people enjoy downtime, for example, reading an enjoyable book. Others might prefer scheduling time with friends, perhaps going out to dinner or seeing a movie. Some people relax through exercise or yoga. We are all different and what helps one person to relax won't necessarily be what best helps another. It is important to find out what relaxing activities help you to unwind, and to be sure to make time for these activities throughout the week to help maintain mental wellness.

Techniques for Managing Stress

The following are some techniques you can try out, which can help you to manage your stress levels and overcome emotional challenges. These techniques are drawn from evidence-based therapy protocols (e.g., Cognitive Behavioural Therapy, Beck, 1979, Beck, 2011; Dialectical Behaviour Therapy, Linehan, 2015; Acceptance and Commitment Therapy, Hayes et al., 2011). These psychological therapies have been extensively researched and are used to improve individuals' well-being across multiple mental and physical health problems.

1. Deep Breathing

Breathing is a fundamental necessity of life that we can often take for granted. Certain breathing patterns can contribute to feelings of anxiety, panic attacks, low mood, muscle tension and fatigue. When we're anxious or stressed out, our breathing tends to become rapid and shallow. In contrast, when we are relaxed, our breathing is much deeper and slower. A technique that can help manage your stress levels, is to engage in deep breathing. This form of breathing has been found to be effective in reducing symptoms of anxiety and improving feelings of relaxation. When you recognize that you are breathing in a quick and shallow way, consciously make the choice to engage in slower breathing for a few minutes. For each breath, focus on inhaling air deep into the lungs through your nose as the abdomen expands. After holding this breath for a few moments, exhale the air out of your mouth, noticing your abdomen contracting. The process of deep breathing signals to your body that it is safe to relax and activates your relaxation response.

2. Progressive Muscle Relaxation

Maybe you have noticed when you are in a stressful situation or feeling overwhelmed that there is a tightening in your body. Perhaps you feel it in your shoulders, or back, or maybe you get headaches. When we are stressed, we hold tightness in our muscles, and this sends signals to our brain that we are stressed out. Not only can this negatively affect how our bodies feel, but it can also influence our mood and our thoughts we have. A good way to relax our mind is to deliberately relax our body, taking purposeful steps to relax our muscles. Using the technique of progressive muscle relaxation, you go through each muscle group in your body, one by one, tensing the muscle group and holding that tension for several seconds, followed by releasing the tension in the muscle group. This relaxation of our tension sends feedback to our brain that we are feeling calm and relaxed.

3. Visualization

Have you ever heard people say "go to your happy place"? This saying may be a reference to a technique called visualization. Research (e.g., Rossman, 2000) shows that focusing the imagination in a positive way can result in a state of ease, mood regulation, and can have a relaxing effect (e.g., imagining a place where you feel calm and safe). Some people do this on their own by really imagining what this place looks like, feels like, and smells like. Some people prefer to be guided to a calm place with an audio track.

4. Grounding

Grounding is a set of simple strategies to help detach from emotional pain, such as sadness, anger, or anxiety. When you are feeling overwhelmed with emotion, it can be helpful to find a way to detach so that you can gain control of your feelings and cope. Grounding focuses on distraction strategies that help you cope with intense emotions and anchor you to the present moment. There are several ways that you can ground yourself, and it can be done any time, any place, and anywhere. When engaging in grounding, you want to focus on the present moment, rather than ruminating about the past or worrying about the future.

Mental Grounding

- Describe your environment in detail using all of your senses. Describe what you see in the room, hear, taste, and smell. What is the temperature? What objects do you see, and what textures do you feel? For example: I am in the lecture hall. I see three brown walls, one in front and two to either side. I see a professor and she is pacing back and forth. The temperature is cool. I feel the armrests

on my chair, and the pen in my hand.
- Play a categories game with yourself. Try to think of as many "types of animals", "cars", "TV shows", "sports" as you can.
- Describe an everyday activity in great detail. For example, describing a meal that you cook (e.g., first I boil the water, then I put salt in it, then I pour the pasta noodles in, and while that is cooking I sauté vegetables and add them to the tomato sauce)
- Use humour. Think of something funny, like a joke or a funny clip from a TV show that you enjoyed.
- Say a coping statement, such as I can handle this, I will be okay, I will get through this.

Physical Grounding

- Grab the armrests of your chair
- Touch objects around you for the tactile sensation, such as writing utensils, your clothing, or items in your pocket.
- Walk slowly, noticing each footstep that you take and how your foot curves as you bring it down to meet contact with the ground.
- Eat something and describe the flavour

5. Planned Exercise

Physical activity, in addition to having significant health benefits, is often recommended for emotional wellbeing as a technique for managing stress levels. Indeed, research has found that college students who exercised at least 3 days per week were less likely to report poor mental health and perceived stress than students who did not (Vankim & Nelson, 2013). Multiple studies indicate that physical activity improves mood and reduces symptoms of anxiety and depression (Rethorst et al., 2009; Rimer et al., 2012; Trivedi et al., 2011; Ross & Hayes, 1988; Stephens, 1988).

6. Cultural, Diversity and Faith-based Resources

Culture influences our experience in many ways and can have a significant impact on our mental health, playing a role in how we relate to others, manage our emotions, and experience and express psychological distress (Roberts & Burleson, 2013).

7. Healthy Eatings

Maintaining a healthy, balanced diet is not only important for physical health, but also for emotional and mental health. Negative affect (e.g., anxiety, frustration, sadness, boredom, depression, fatigue, stress) has been related to food consumption in order to distract oneself from, or cope with, it. The foods consumed are often the "comfort foods" with high sugar and fats, that can provide immediate satisfaction and may even manage mood in the short term; however, leading to greater preference for indulgent foods over healthy foods (Gardner et al., 2014). Research also shows that unhealthy dietary patterns are related to poorer mental health in youth (O'Neil et al., 2014). Better overall diet quality and lower intake of simple carbohydrates and processed foods are related to lower depressive symptoms (Jacka et al., 2011; Mikolajczyk et al., 2009; Christensen & Somers, 1996; Quehl et al., 2017).

8. Using Resources

If you find something in this or any course to be very distressing (e.g., a discussion of mental health symptoms that you recognize in yourself), seeking help and support is also a very useful part of coping and mental hygiene. Your professors and program coordinator can be good points of contact, especially for connecting you with college-based supports and accommodations (where relevant).

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1.9 Chapter Summary

Questions for Further Discussion

Critical Thinking Questions

1. Why do you think psychology courses like this one are often a requirement of so many different programs of study?
   Hint
   Psychology courses deal with a number of issues that are helpful in a variety of settings. The text made mention of the types of skills as well as the knowledge base with which students of psychology become familiar. As mentioned in the link to learning, psychology is often helpful/valued in fields in which interacting with others is a major part of the job.
2. Why do you think many people might be skeptical about psychology being a science?
   Hint
   One goal of psychology is the study of the mind. Science cannot directly study the mind, because it is not a form of matter or energy. This might create some skepticism about the scientific nature of psychology.
3. Given the incredible diversity among the various areas of psychology that were described in this section, how do they all fit together?
   Hint
   Although the different perspectives all operate on different levels of analysis, have different foci of interests, and different methodological approaches, all of these areas share a focus on understanding and/or correcting patterns of thought and/or behaviour.

Personal Application Question

1. Why are you taking this course? What do you hope to learn about during this course?
2. Now that you've been briefly introduced to some of the major areas within psychology, which are you most interested in learning more about? Why?

Key Terms

- **Biopsychology:** the study of how biology influences behaviour.
- **Clinical Psychology:** an area of psychology that focuses on the diagnosis and treatment of psychological disorders and other problematic patterns of behaviour.
- **Cognitive Psychology:** the study of thought processes (e.g., attention, problem solving, language, memory) and their relationship to our experiences and our actions.
- **Counselling Psychology:** the area of psychology that focuses on improving emotional, social, vocational, and other aspects of the lives of psychologically healthy individuals.
- **Developmental Psychology:** the scientific study of development across the lifespan.
- **Evolutionary Psychology:** the study of the extent to which a behaviour is impacted by genetics, will demonstrate adaptation to its surroundings.
- **Forensic Psychology:** the science and practice of psychology to issues within and related to the justice system.
- **Health Psychology:** the study of the interaction of biological, psychological, and sociocultural factors in health and well-being. Health psychologists are interested in helping individuals achieve better health through public policy, education, intervention, and research.
- **Industrial-Organizational Psychology (I-O Psychology):** an area within psychology which applies psychological theories, principles, and research findings in industrial and organizational settings.
- **Object Permanence:** refers to the understanding that physical objects continue to exist even when hidden from view.
- **Personality Psychology:** the study of patterns of thoughts and behaviours that make each individual unique.
- **Personality Traits:** relatively consistent patterns of thought and behaviour.
- **Psychology:** refers to the scientific study of the mind and behaviour.
- **Sensation and Perception:** the study of our senses (sensation) and factors that impact how we construct our reality (perception).
- **Social Psychology:** the study of how we interact with and relate to others.
- **Sport and Exercise Psychology:** the study of the interactions between mental and emotional factors and physical performance in sports, exercise, and other activities.

Activities: Let's Review

Activity 1: Chapter 1 Review Quiz

Quiz Text Description

1. MultiChoice Activity

Which of the following was mentioned as a skill to which psychology students would be exposed?

a. critical evaluation of sources of information
b. critical thinking
c. use of the scientific method
d. all of the above

2. MultiChoice Activity

Before psychology became a recognized academic discipline, matters of the mind were undertaken by those in _____.

a. Philosophy
b. Biology
c. Chemistry
d. Physics

3. MultiChoice Activity

In the scientific method, a hypothesis is a(n) _____.

a. test
b. proposed explanation
c. observation
d. measurement

4. MultiChoice Activity

A researcher interested in how changes in the cells of the hippocampus (a structure in the brain related to learning and memory) are related to memory formation would be most likely to identify as a(n) _____ psychologist.

a. social
b. health
c. clinical
d. biological

5. MultiChoice Activity

An individual's consistent pattern of thought and behavior is known as a(n) _____.

a. personality
b. perception
c. psychosexual stage
d. object permanence

6. MultiChoice Activity

A researcher interested in what factors make an employee best suited for a given job would most likely identify as a(n) _____ psychologist.

a. developmental
b. I-O
c. clinical
d. social

7. MultiChoice Activity

If someone wanted to become a psychology professor at a 4-year university, they would probably need a _____ degree in psychology.

a. bachelor of art
b. PhD
c. bachelor of science
d. master's

Solution:

1. d. all of the above
2. a. Philosophy
3. b. proposed explanation
4. d. biological
5. a. personality
6. b. I-O
7. b. PhD

Activity 2: Chapter 1 Definitions – Matching

Drag the correct subdivision of the contemporary psychology term and match it with the correct definition.

Quiz Text Description (Answers)

1. **Term:** Biopsychology

Answer: Study of how biology influences behaviour.

2. **Term:** Clinical Psychology
   Answer: Focuses on the diagnosis and treatment of psychological disorders and other problematic patterns of behaviour.
3. **Term:** Cognitive Psychology
   Answer: Study of thought processes and their relationship to our experiences and our actions.
4. **Term:** Counselling Psychology
   Answer: Focuses on improving emotional, social, and vocational, lives of psychologically healthy individuals.
5. **Term:** Developmental Psychology
   Answer: Scientific study of development across a lifespan.
6. **Term:** Evolutionary Psychology
   Answer: Study of the extent to which a behaviour is impacted by genetics and will demonstrate adaptation to its surroundings.
7. **Term:** Forensics
   Answer: Science and practice of psychology related to issues within and related to the justice system.
8. **Term:** Health Psychology
   Answer: Study of the interaction of biological, psychological, and sociocultural factors in health and well-being.
9. **Term:** Industrial-Organizational psychology (I-O psychology)
   Answer: Applies psychological theories, principles, and research findings in industrial and organizational settings.
10. **Term:** Psychology
    Answer: Refers to the scientific study of the mind and behaviour.
11. **Term:** Personality Psychology
    Answer: Study of patterns of thoughts and behaviors that make each individual unique.
12. **Term:** Sensation and perception
    Answer: Study of how we interact with and relate to others
13. **Term:** Sport and Exercise Psychology
    Answer: Study of the interactions between mental and emotional factors and physical performance.

Reflection questions adapted from Psychology 2e, by OpenStax (2020), Rice University, which is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted.

CHAPTER 2: APA BASICS

Chapter Overview

2.0 Learning Objectives
2.1 What is APA Style?
2.2 Types of Information
2.3 Two Types of Citation
2.4 Getting Familiar with Academic Journal Articles
2.5 The Annotated Bibliography
2.6 Chapter Summary

2.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Identify the purpose of the APA's style guide.
2. Differentiate between various sources of information.
3. Use the CRAAP framework to assess the quality of a research source.
4. Describe how to find, review and use academic journals.
5. Identify how to cite journal articles and other sources using APA formatting.
6. Explain the purpose of an annotated bibliography.

Chapter Overview

In this chapter, students will learn about the American Psychological Association's (APA) style guide and how it is used to cite in academic writing. Students will learn to differentiate between popular and scholarly resources and critically examine their credibility using the CRAAP framework. Finally, students will learn about the nature and benefits of creating an annotated bibliography as a part of their research process.

2.1 What is APA Style?

APA Style is a set of guidelines covering many different aspects of scholarly writing, including:

- formatting (title page setup, margins, line spacing, font, headings, etc.)
- mechanics of style (spelling, punctuation, capitalization, italics, etc.)
- grammar
- use of bias-free language
- references/citations

The APA Style Manual is published by the **American Psychological Association (APA**) and is used in psychology, nursing, business, communications, criminology, engineering, and related fields.

APA Style Website
Check out the APA Style website for more info!

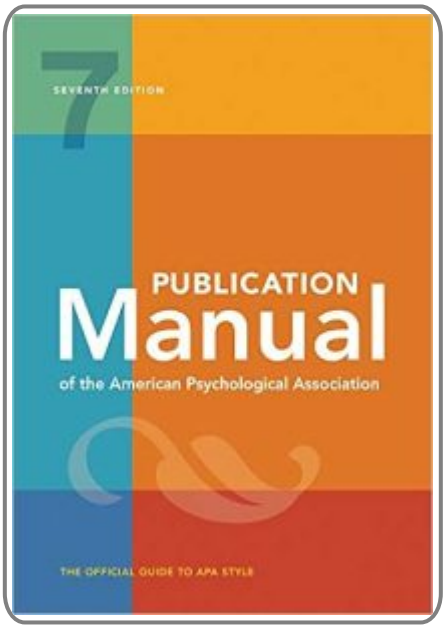

Image: "Cover of APA Style manual," American Psychological Association, Wikipedia, Fair Use.

Why is Citing Important?

Figure 2.1 *The Importance of Citing*

For Scholarly Communication

Academics engage in conversations to advance their knowledge and understanding of a subject. This happens mostly in written form through the publication of scholarly materials. In these academic conversations, it is necessary and expected that all prior thought is acknowledged and that all contributors to the conversation are credited. This is mostly done through citations.

Citing sources will situate a work in the current literature and will allow the reader to distinguish prior contributions from new original thought. Readers will be able to locate and read the cited sources to learn more about them, and they can check that thoughts and ideas are being passed on accurately.

By reading, analyzing, and including scholarly sources in your assignments, you are contributing to and participating in this scholarly communication. You are therefore expected to acknowledge all the sources from which you drew information.

To Give Credit and Show Professionalism

In academic writing, it is considered ethically wrong to take credit for someone else's intellectual output. Citing your sources is a means of giving credit to the other person's efforts and to their findings. It shows respect for the intellectual output of others and demonstrates professionalism in your writing. To support your research and to add credibility to your arguments, you will mainly use scholarly and professional sources as evidence.

To Avoid Plagiarism

To avoid plagiarism, you always need to give credit to the person whose work or idea you are using, whether you quote, paraphrase, summarize, or otherwise use the ideas of others. Written and spoken words, music and videos, movies, performances, artwork, photographs, graphs, tables, figures, diagrams, data, computer code, and any other intellectual or creative product must be cited. This applies even if the original author agrees that you can use their intellectual output or if you paid to use it. It also applies to reusing your own work without citing it and to work generated using prompts in artificial intelligence tools.

> **It might help to think:**
> Is this my own idea, or did I read or hear about it in one of my sources? If it came from somewhere else, cite it. If you want to learn more about Academic Integrity at Fanshawe College, consider reviewing this Academic Integrity Guide from Fanshawe's Library Learning Commons.

Key Takeaways

The American Psychological Association's (APA) Publication Manual provides students and researchers with a style guide for writing and research. The main reasons why we cite are to participate in scholarly communication, give credit to our sources, and avoid plagiarism.

"What is APA?" was adopted from "3. What is APA Style?" in APA Style Citations . Copyright © 2021 by Ulrike Kestler, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted.

"Why is Citing Important" was adopted from "Why Do We Cite?" in APA Style Citations. Copyright © 2021 by Ulrike Kestler, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted. *Modifications: removed images and added additional links, images and key takeaway text.*

Microsoft. (2026). *M365 Copilot (GPT-5)* [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 2.1: “Create a similar image with three boxes that contain the following text.”

2.2 Types of Information

General “Popular” Sources

“Scholarly” and “popular” are terms used to describe a source’s content, purpose, audience and more. **Popular sources** are intended for a more general audience, and they can range from entertainment magazines to well-researched investigative articles from the New York Times. With most scholarly sources, we can rely on the **peer review process** to evaluate the authority and credibility of the research presented to us. With popular sources, it is up to you to determine whether the source is appropriate for your own research.

So, What are Popular Sources?

The following are some common examples:

- magazines,
- newspapers (from your local daily news to the New York Times),
- books (online and in print),
- websites, social media, blogs and wikis, etc., and
- media (including podcasts, movies and award-winning documentaries).

When to Use Popular Sources

This depends on your assignment, but if you are permitted to use popular sources, there are excellent sources like newspapers, personal interviews and government reports that will help you advance your own argument. Sources, such as magazines and newspapers, are very useful for current commentary on a topic or issue. Governments and organizations, such as large non-profit charities, release reports and data regularly. The Canadian Census is one great example of the type of information you can access for free from government websites. Investigative journalists’ reports and organizations, such as the YMCA, often publish in-depth pieces on current issues, such as poverty levels in large cities, and provide data and analysis. All of these document types can be excellent sources of up-to-date statistics and analysis. However, you must also be aware that some newspapers, blogs and non-government organizations, such as policy think-tanks, have specific political viewpoints that you will have to be aware of. It is up to you to evaluate whether or not to use a popular source in your assignment.

Scholarly Peer-Reviewed Sources

The standard source in post-secondary level research is scholarly, peer-reviewed articles. Peer-reviewed articles are the agreed-upon method of disseminating original research conducted by professors, scientists and other experts. In fact, when writing your own papers in your subject area, you should model their style and prose.

The Peer Review Process

A journal is a scholarly publication containing articles, letters to the editors and book reviews written by researchers, professors and other experts. Journals focus on a specific discipline or field of study and are published on a regular basis (monthly, quarterly, etc.). The intended reading audience is other experts and not the general public. The authors are considered experts because they have PhDs and have specialized in-depth knowledge of current and past theories and years of training in research and analysis.

When a professor writes a research article, she will submit it to a peer-reviewed journal to be published. However, before the journal will accept the article, it will be *reviewed by experts in the same area of study, hence, her peers*. If her peers deem her research lacking validity, she will be asked to make changes, or her article might be outright rejected. This is why assignments ask you to use articles published in peer-reviewed journals, as they contain rigorous research and use a critical lens when picking what gets published.

It is also important to keep in mind that there are many theories or schools of thought within a discipline, and professors choose to conduct their research through one particular theory. A psychology professor, for example, could write her article through cognitive neuroscience or a psychodynamic lens. You need to develop an awareness of the different theories in your subject area as this will help you *identify what lens the author is using to conduct their research*. This is also important if an assignment requires sources from different theories or if you must support your thesis with sources from one particular theory.

Experts like professors often publish their evidence-based research in non-peer-reviewed sources, such as *books and newspapers*. These sources are still considered authoritative and contain expert research and are often reviewed by editors for accuracy, but *they do not count as peer-reviewed sources*. It is important to know the difference if your professor specifically requests that you use articles from peer-reviewed journals. Not to worry, library databases are designed to help you locate peer-reviewed articles.

The Need to Remain Critical

The peer review process is the agreed-upon method for checking credibility in the academic world, but it is not without its flaws. Articles with inaccurate research methods and, therefore, flawed conclusions have been published. However, thanks to the work of journalists and other diligent experts, these papers have been *retracted* and the research removed from the journal. The work of researchers can also be funded by outside corporations, and many journals insist that authors state their *conflict of interest* within their papers. If you come across an admission of conflict when reading an article, it will be up to you to evaluate whether or not you feel the research was influenced by the corporation's own agenda.

You also need to be vigilant when using Google to find peer-reviewed journals, as there are non-credible journals parading themselves as peer-reviewed. *Your library provides you with access to databases that contain authorized peer-reviewed journals and filters out the non-credible ones.* Overall, even though the peer review process works to evaluate research, you, as the reader, need to remain critical and conduct your own evaluation of what you are reading.

Finding Credible Information

For your academic assignments, you will be asked to consult credible sources like academic books and peer-reviewed journal articles. Different writing assignments can also require other sources of information, like government statistics or personal interviews.

As a researcher, you want to use sources that are credible. Credible sources provide *information that is factual and can be verified***.** You also need to be aware of bias in your sources. Bias refers to a source's intent or purpose. It is possible for credible sources to have some bias as they might learn towards one particular research methodology or viewpoint, but they will still use sources to support their argument. What to watch out for is sources that have extreme bias. These sources are overtly one-sided, lack factual information or provide little to no evidence to back up their arguments.

Evaluate What You Find With the "CRAAP Test"

Evaluating your sources is critical to the process of academic research. The CRAAP test allows you analyze your sources and determine if they are appropriate for your research or just plain crap! The CRAAP test uses a series of questions that address specific evaluation criteria like the authority and purpose of the source. This test should be used for all your sources, and it is not intended to make you exclude your sources, but to help you to analyze how you intend to use them to support your own arguments.

C = Currency:

The timeliness of the information.

- When was the information published or posted?
- Has the information been revised or updated?
- Does your topic require current information, or will older sources work as well?

R = Relevance:

The importance of the information for your needs

- Does the information relate to your topic or answer your question?
- Who is the intended audience?
- Is the information at an appropriate level (i.e. not too elementary or advanced for your needs)?
- Have you looked at a variety of sources before determining this is one you will use?
- Would you be comfortable citing this source in your research paper?

A = Authority:

The source of the information.

- What are the author's credentials or organizational affiliations?
- Is the author qualified to write on the topic? Do you trust the author?
- Is there contact information, such as a publisher or email address?

- Does the URL reveal anything about the author or source? examples: .com .edu .gov .org .net

A = Accuracy:

The reliability, truthfulness and correctness of the content.

- Where does the information come from?
- Is the information supported by evidence?
- Has the information been reviewed or refereed?
- Can you verify any of the information in another source or from personal knowledge?
- Does the language or tone seem unbiased and free of emotion?
- Are there spelling, grammar or typographical errors?

P = Purpose:

The reason the information exists.

- What is the purpose of the information? Is it to inform, teach, sell, entertain or persuade?
- Do the authors/sponsors make their intentions or purpose clear?
- Is the information fact, opinion or propaganda?
- Does the point of view appear objective and impartial?
- Are there political, ideological, cultural, religious, institutional or personal biases?

Adapted from “General “Popular” Sources“, “When to Use Popular Sources“, “Finding Credible Information“, “Scholarly Peer-Reviewed Sources“, and “Evaluate What You Find With the “CRAAP Test” in Write Here, Right Now: An Interactive Introduction to Academic Writing and Research Copyright © 2018 by Ryerson University, which is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted. *Modifications: “Scholarly Peer-Reviewed Sources” – removed certain phrasing and added Canadian examples, and “Evaluate What You Find With the CRAAP Test” – omitted Video 8.2 and associated weblinks.*

2.3 Two Types of Citation

In APA Style, there are **two** parts to every citation: an in-text citation and a reference list citation.

> **In-text citations**
> Use only a few details of the source, enough to locate its matching reference citation in the reference list.
>
> **Reference list citations**
> Provide more information about the source, so that the reader can find it if they wish.

We will discuss both of these separately first and then together later. First, we will discuss reference list citations.

What is a Reference List?

A reference list is an alphabetized list located on a separate page at the end of your paper that lists all the reference citations for the sources used in your paper to support your research.

Each reference citation includes key elements referred to as the **Four W's**:

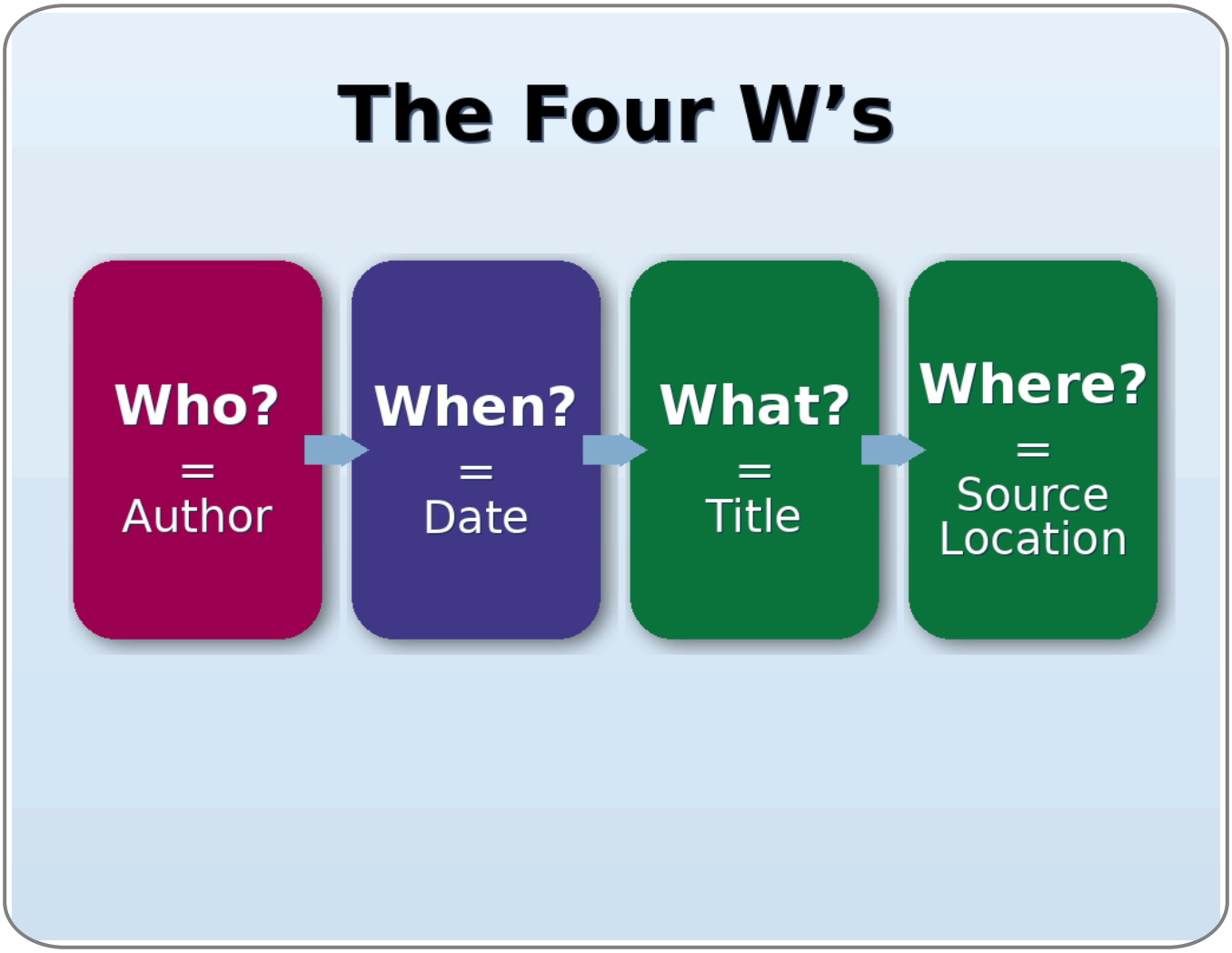

Figure 2.3.1 *The Four W's.*

Asking these 4 questions helps identify the key elements needed for a reference list citation.

Using APA resources to help create a reference citation is like using a recipe. The ingredients are the key pieces of information about a source (4Ws). If you're missing an ingredient, leave it out or substitute it.

Following a recipe's directions is like following a citation example. If you follow the directions and add the ingredients at the right point, then your recipe (i.e. your citation) will turn out!

You are not expected to memorize APA guidelines. Instead, use available resources (APA Quickguide and this tutorial) to help guide you. Over time you will become more comfortable with creating citations yourself.

Image: "Pancake recipe with ingredients" by pikisuperstar, Freepik, CC BY 4.0.

What is an In-Text Citation?

If you want to include information from a source you consulted in your paper, you need to create an **in-text citation**. As mentioned before, in-text citations use only a few details of the source, enough to locate its matching reference citation in the reference list.

APA Elements

In APA style, you need to include the following elements for all in-text citations, whether you are citing a book, a journal or trade article, a website or any other item:

- the author's family name(s) or the group name
- the year
- and if you are quoting word for word, also the page number or other locator*

Some instructors may prefer location information for all in-text citations, so check with your instructor.

Where Do I Place Citations in My Writing?

Because in-text citations tell your reader which ideas belong to you and which ideas belong to someone else, it is crucial that you place them correctly.

There are two different ways that you can include in-text citations into your assignments:

- as a *parenthetical citation* at the end of your sentence, ex. (Smith, 2026).
- as a *narrative citation* as part of the sentence, ex. Smith (2026) discusses how...

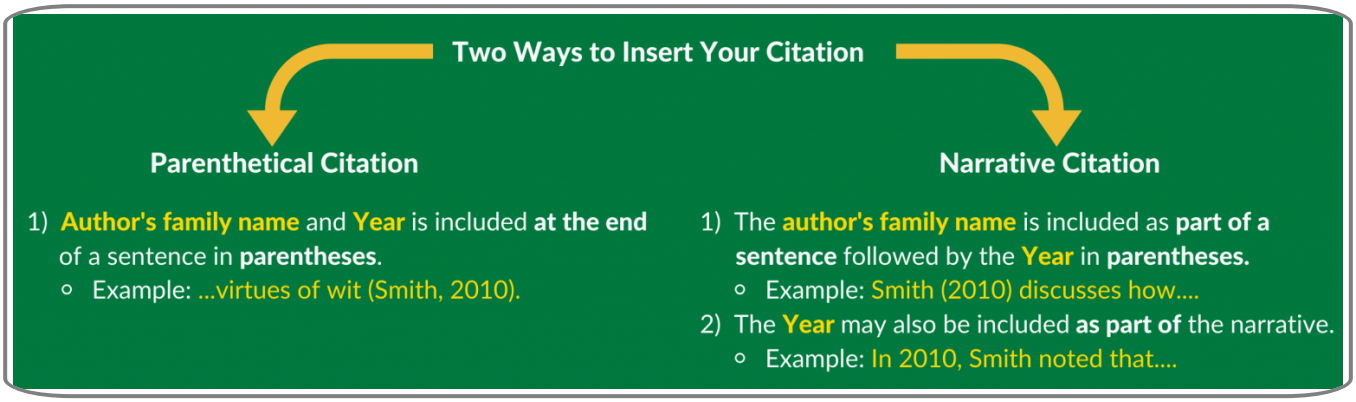

Figure 2.3.2 *"Two Ways To Insert Your Citation", APA Style Citation Tutorial, by University of Alberta Library, CC BY-NC-SA 4.0.*

Examples

In-text citation example for a paraphrase

Click on the symbol to learn about the parenthetical and narrative citation used in these paraphrases.

Hotspot Description

This hotspot activity displays a screenshot of a paragraph demonstrating how to cite a short direct quotation in APA style. Two parts of the example are visually emphasized (underlined) to indicate clickable hotspots:

1. Hotspot: "In-text citation" (on the author and year in the sentence).
Pop-up text: When using direct quotes, include an in-text citation containing the author and year of publication.

2. Hotspot: "Page number" (on the parenthetical page reference after the quotation).
Pop-up text: When citing a direct quote, include the page number of where you found the quote in the source.

In-text citation examples for a short quote

Click on the symbol to learn about how to add in-text citations for short quotes (less than 40 words).

Narrative Citation

Hotspot Description

Interactive hotspot activity titled "In-text citation: Short quotation example." An excerpt of text shows a short, direct quotation with an in-text citation. Two hotspots appear over "Tronick (2007)" and "(p. 6)"; selecting each hotspot opens a pop-up explaining the author/year format and the need to include a page number for direct quotes.:

What to do: Select each hotspot icon to read a brief explanation of the highlighted part of the citation.

On-screen example text (excerpt):
"While acknowledging the importance of culture, Tronick (2007), a developmental child psychologist, satirically notes that, 'Culture is often referred to, even deferred to, but only superficially and rarely well' (p. 6). If we take Tronick's ..."

Hotspot 1 (over "Tronick (2007)"): "Authors can be included in the narrative; then the year is included in parentheses."

Hotspot 2 (over "(p. 6)"): "When quoting a source directly, include the page number at the end of the quote. The page number is preceded by 'p.' (for one page) or 'pp.' (for multiple pages)."

Parenthetical Citation

Hotspot Description

A screenshot of a textbook paragraph includes a short quotation followed by a parenthetical in-text citation: (Landreth, 1991, p. 14). Select the info hotspot on/near the citation to read an explanation that a parenthetical citation for a short quote includes the author's last name, year, and page number, with the sentence punctuation placed after the citation."

In-text citation examples for a long quote

Click on the symbol to learn about how to add in-text citations for long quotes (more than 40 words).

Narrative Citation

Hotspot Description

An interactive image hotspot showing an APA-style narrative block quote example. The quote is introduced with the signal phrase 'Clark (1955) noted:' and the quoted paragraph is indented about 1/2 inch from the left margin. A label notes that the page number citation comes after the ending punctuation. Select the hotspot to read an explanation that block quotes are used for quotations of 40 words or more and to review the key formatting features."

Parenthetical Citation

Hotspot Description

Interactive image hotspot showing an APA-style block quote with a parenthetical in-text citation placed at the very end of the quote after the ending punctuation on the same line. The citation includes the author and year plus a page range (e.g., 'pp. 343–344'), indicating the quotation spans two consecutive pages. Select the hotspot near the citation to read the formatting note."

What if There Aren't Any Page Numbers?

Some sources don't have page numbers, in which case you should try to include some other pinpoint, so your reader can find the quote more easily. This could be a section heading, a chapter number, a paragraph, and so on.

What if There Is No Author? What if There Are Multiple Authors? What if There Is No Date?

Whatever the situation, you still need to cite your source. Check out the Fanshawe APA Citation guide for answers to these and other questions, and if you need help, please refer to Fanshawe's Library Learning Commons Help website.

Tip:
It is easiest to create the reference citation first and then its matching in-text citation(s).

Adapted from "Two Types of Citations", "12 What is a Reference List Citation?", and "19. What is an In-Text Citation"in APA Style Citations Copyright © 2021 by Ulrike Kestler, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted. *Modifications: Removed and replaced some images and tables, and replaced some weblinks*.

Microsoft. (2026). *M365 Copilot (GPT-5)* [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 2.3.1: "Create a similar image with four boxes that contain the following text."

2.4 Getting Familiar with Academic Journal Articles

Getting Familiar with Academic Journal Articles

Most of the sources you'll encounter in your post-secondary career are academic articles, also called scholarly articles, scholarly papers, journal articles, academic papers, or peer-reviewed articles. They all mean the same thing: a paper published in an academic periodical after being scrutinized anonymously and judged to be sound by other experts in the subfield. Their origin explains both their basic structure and the high esteem they have in the eyes of your professors.

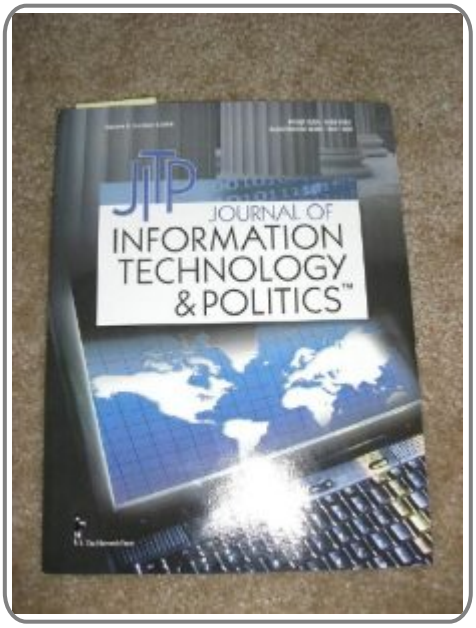

Image by justgrimes on Flickr, licensed CC BY-SA 2.0.

Many journals are sponsored by academic associations. Most of your professors belong to some big, general one (such as the Modern Language Association, the American Psychological Association)and one or more smaller ones organized around particular areas of interest and expertise (such as the Association for the Study of Food and Society or the Slavic and East European Folklore Association). There are also generalist organizations organized by region of the country or state, such as the Eastern Sociological Society or the Southern Management Association. Each of these associations exists to promote the exchange of research findings and collaboration in its discipline. Towards this end, they organize conferences, sponsor working groups, and publish one or more academic journals. These journals are meant to both publicize and archive the most interesting and important findings of the field.

What are Academic Papers?

Academic papers are essentially reports that scholars write to their peers—present and future—about what they've done in their research, what they've found, and why they think it's important. Thus, in a lot of fields they often have a structure reminiscent of the lab reports you've written for science classes:

1. **Abstract:** A one-paragraph summary of the article: its purpose, methods, findings, and significance.
2. **Introduction:** An overview of the key question or problem that the paper addresses, why it is important, and the key conclusion(s) (i.e., thesis or theses) of the paper.
3. **Literature review:** A synthesis of all the relevant prior research (the so-called "academic literature" on the subject) that explains why the paper makes an original and important contribution to the body of knowledge.
4. **Data and methods:** An explanation of what data or information the author(s) used and what they did with it.
5. **Results:** A full explanation of the key findings of the study.
6. **Conclusion/discussion:** Puts the key findings or insights from the paper into their broader context; explains why they matter.

Not all papers are so "sciencey." For example, a historical or literary analysis doesn't necessarily have a "data and methods" section, but they do explain and justify the research question, describe how the authors' own points relate to those made in other relevant articles and books, develop the key insights yielded by the analysis, and conclude by explaining their significance. Some academic papers are review articles, in which the "data" are published papers and the "findings" are key insights, enduring lines of debate, and/or remaining unanswered questions.

Scholarly journals use a peer-review process to decide which articles merit publication. First, hopeful authors send their article manuscript to the journal editor, a role filled by a prominent scholar in the field. The editor reviews the manuscript and decides whether it warrants peer review. If it's outside the interests of the journal or is clearly inadequate, the editor will reject it outright. If it looks appropriate and sufficiently high quality, the editor will recruit a few other experts in the field to act as anonymous peer reviewers. The editor will send the manuscript (scrubbed of identifying information) to the reviewers, who will read it closely and provide a thorough critique. Is the research question driving the paper timely and important? Does the paper sufficiently and accurately review all of the relevant prior research? Are the information sources believable and the research methods rigorous? Are the stated results fully justified by the findings? Is the significance of the research clear? Is it well written? Overall, does the paper add new, trustworthy, and important knowledge to the field? Reviewers send their comments to the editor who then decides whether to (1) reject the manuscript, (2) ask the author(s) to revise and resubmit the manuscript, or (3) accept it for publication. Editors send the reviewers' comments (again, with no identifying information) to authors along with their decisions. A manuscript that has been revised and resubmitted usually goes out for peer review again; editors often try to get reviews from one or two first-round reviewers as well as a new reviewer. The whole process, from start to finish, can easily take a year, and it is often another year before the paper appears in print.

Finding, Reading and Reviewing Sources

Understanding the academic publication process and the structure of scholarly articles tells you a lot about how to find, read and use these sources:

1. **Find them quickly.** Instead of paging through mountains of dubious web content, go right to the relevant scholarly article databases in order to quickly find the highest quality sources.
2. **Use the abstracts.** Abstracts tell you immediately whether or not the article you're holding is relevant or useful to the paper you're assigned to write. You shouldn't ever have the experience of reading the whole paper just to discover it's not useful.
3. **Read strategically.** Knowing the anatomy of a scholarly article tells you what you should be reading for in each section. For example, you don't necessarily need to understand every nuance of the literature review. You can just focus on why the authors claim that their own study is distinct from the ones that came before.
4. **Don't sweat the technical stuff.** Not every social scientist understands the intricacies of log-linear modeling of quantitative survey data; however, the reviewers definitely do, and they found the analysis to be well constructed. Thus, you can accept the findings as legitimate and just focus on the passages that explain the findings and their significance in plainer language.
5. **Use one article to find others.** If you have one really good article that's a few years old, you can use article databases to find newer articles that cited it in their own literature reviews. That immediately tells you which ones are on the same topic and offer newer findings. On the other hand, if your first source is very recent, the literature review section will describe the other papers in the same line of research. You can look them up directly.

Students sometimes grumble when they're ordered to use scholarly articles in their research. It seems a lot easier to just Google some terms and find stuff that way. However, academic articles are the most efficient resource out there. They are vetted by experts and structured specifically to help readers zero in on the most important passages.

Let's Review: Effectively Reading Journal Articles

This short tutorial will focus on how to effectively read journal articles and integrate citations into your lab report.

- By the end of the tutorial, you will address the following questions:
- What are the different sections within a journal article?
- What type of notes should I take when reading a journal article?
- How do I read strategically so that I target the most crucial pieces of information needed for my lab report?

Reading Journal Articles © 2024 is by Sarah Guay, Sarah Shujah and Jasmine Wemigwans and is licensed under CC BY-NC-SA 4.0.

Let's Practice

Enter a topic into a general subscription database that has both scholarly and non-scholarly sources (you can use the Fanshawe Library Learning Commons database); browse the first few hits and classify each one as scholarly or non-scholarly. Look at the structure of the piece to make your determination.

Adapted from "16 Getting Familiar with Academic Journal Articles" in Upping Your Argument and Research Game Copyright © 2022 by Liona Burnham is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted.

2.5 The Annotated Bibliography

What is an Annotated Bibliography?

An **annotated bibliography** is not part of your research paper – there is no such section in your paper by that name. However, it is a critically important part of the research process. It is a pre-writing task where you gather all of the sources you can find related to your research question and then evaluate them in terms of their credibility and relevance.

Why Is an Annotated Bibliography Worth Devoting Time to if It Is Not Part of the Paper?

Writing an annotated bibliography is useful as a pre-writing strategy because the results will describe "the lay of the land" in your domain of research. If you began writing your Literature Review without compiling an Annotated Bibliography, you might be surprised to find that there is scarce information about your field of study or that the existing resources are hardly reliable.

The Benefits of Developing an Annotated Bibliography

Understanding Relevance:

It provides a brief summary and evaluation of each source, helping you determine its relevance to your research topic. It enables you to grasp the main ideas, arguments, and methodologies used in the sources, allowing you to identify their significance and potential contribution to your own work.

Efficient Literature Review:

It serves as a foundation for a comprehensive literature review. By summarizing and critically evaluating each source it saves you time by providing a condensed overview of the key findings, methodologies, and debates in your field of study. It helps you identify gaps in existing research, potential contradictions, and areas where further investigation is needed.

Evaluating Source Quality:

It serves as a separate workspace for you to assess the credibility, reliability, and academic rigor of each source. By providing a critical analysis, you can evaluate the author's credentials, the source's publication venue, the research methods employed, and the overall validity of the information presented. This helps you determine the trustworthiness and authority of the sources you're considering for your own research.

Organizing and Managing Sources:

Creating an annotated bibliography helps you organize and manage your sources so that you can iden-

tify areas where your sources for subject matter are strong or weak. By providing concise summaries and evaluations, it allows you to keep track of a large number of sources, making it easier to refer back to specific information or quotations when needed. This systematic approach ensures that you have a well-structured collection of relevant sources for your research.

Enhancing Critical Thinking Skills:

Writing annotations requires you to think critically about the sources you're reviewing. You must analyze the strengths and weaknesses of each work, identify biases or limitations, and consider how they contribute to the broader academic discourse. This process fosters a deeper understanding of the subject matter.

Avoiding Plagiarism:

It can serve as a tool for avoiding unintentional plagiarism. By summarizing each source and attributing the ideas to their respective authors, you create a clear distinction between your own work and the existing literature. This practice helps you properly credit the original authors and prevent accidental plagiarism.

Creating a Record of Research:

As you network within your field, you may find that other professionals share your interests. An annotated bibliography provides an overview, or snapshot, of the research you have conducted on a particular topic, which can be shared with colleagues who may want to study the same topic. You may be more comfortable sharing an annotated bibliography–which does not include an argument or position–than you would an actual paper or project.

Above all, a strong annotated bibliography is a tool. If done well, you will find that it saves you time and precious intellectual energy once you begin assembling your Capstone project.

Writing annotations may not be intuitive for most students, but with a little practice, you will be able to make strategic choices about which information belongs in an annotation and what does not.

A strong annotation should never be longer than 1-2 paragraphs. Your task is to annotate the source, not rewrite it.

A Basic Entry

The components of a basic entry

- An overview of the thesis or position of the article.
- An indication of how it is relevant to the researcher's question or thesis. Is there an indication that it supports or opposes a particular proposition or thesis?
- An assessment of the article's credibility, reliability, rigor, or historical/cultural bias.

Additional Resources:

If you have not compiled an Annotated Bibliography before, the following links from the Purdue Online Writing Lab will help you get started:

- Annotated Bibliography
- Annotated Bibliography Samples
- Annotated Bibliography Breakdown

Adapted from "The Annotated Bibliography" in Handbook for Capstone Projects in Communications Copyright © by Steve Covello, which is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted. *Modifications: removed language around the Capstone project and omitted videos.*

2.6 Chapter Summary

Let's Reflect

In this chapter, we introduced APA Style as a standardized system used in psychology and related fields to support clear, ethical, and professional academic writing. We emphasized that citing sources is essential for participating in scholarly communication, giving credit to original authors, and avoiding plagiarism, and that citation applies to many forms of intellectual work, including paraphrased ideas, visuals, data, and AI-generated content. We also compared popular and scholarly sources, noting that while popular sources can provide timely context, scholarly peer-reviewed sources are the foundation of academic research because they undergo rigorous review. Students were encouraged to remain critical of all sources by considering factors such as bias, funding, and possible retractions.

In addition, students learned to evaluate sources using the CRAAP framework (Currency, Relevance, Authority, Accuracy, Purpose) and explored the two parts of APA citation: in-text citations and reference list citations. By applying the "Four W's" (Who, When, What, Where), students practiced identifying the key elements needed to create accurate citations that help readers locate original sources. The chapter concluded by introducing annotated bibliographies as a research-planning tool that supports source evaluation, organization, and critical thinking. By summarizing and assessing sources early in the research process, students can prepare more effectively for literature reviews, reduce the risk of unintentional plagiarism, and build a strong foundation for academic work.

Key Terms

- **APA – American Psychological Association:** A professional association for psychologists in the United States. They help to set the standard for writing, research and ethics in the field.
  Popular sources – sources are intended for a more general audience
- **Peer-review:** the process by which experts in the field review research for validity prior to publication
- **In-text citations:** a signal used in written text to identify a few details of the research source, enough to locate its matching reference citation in the reference list. In APA style, this includes the author and year of publication.
- **Reference List Citations**: provide more information about the source, so that the reader can find it if they wish. In APA style, this includes information about who, when, what and where.
- **Annotated Bibliography:** It is a pre-writing task where you gather all of the sources you can find related to your research question and then evaluate them in terms of their credibility and relevance.

Let's Review: Matching Reference and In-Text Citations Activity

For the four questions in this activity, match the reference citation to their corresponding in-text citation by choosing the correct in-text citation from a selection of choices.

Question 1

Godin, K. M., Patte, K. A., & Leatherdale, S. T. (2018, February). Examining predictors of breakfast skipping and breakfast program use among secondary school students in the COMPASS study. *Journal of School Health*, *88*(2), 150-158. https://doi.org/10.1111/josh.12590

Image Description
Screenshot of an APA 7th edition journal article reference. Authors listed as Godin, K. M., Patte, K. A., and Leatherdale, S. T. (2018, February). The article title discusses predictors of breakfast skipping and breakfast program use among secondary school students in the COMPASS study. The journal title Journal of School Health appears in italics, followed by volume 88, issue 2, pages 150–158, and a DOI link displayed below.

Quiz Text Description
Select the correct **in-text citation** that matches the **reference citation** above for a **journal article with a DOI**.

a. (Godin et al., 2018)
b. (Godin, Patte, & Leatherdale, 2018)
c. (Journal of School Health, 2018)
d. (Examining predictors of breakfast skipping and breakfast program use among secondary school students in the COMPASS study, 2018)

Solution:

Correct answer(s): a. (Godin et al., 2018)

Question 2

Centre for the Study of Historical Consciousness. (n.d.). *Historical thinking concepts*. Historical Thinking Project. http://historicalthinking.ca/historical-thinking-concepts

Image Description
Screenshot of an APA-style web reference. The organization 'Centre for the Study of Historical Consciousness' is listed as the author, with no date provided. The title Historical thinking concepts appears, followed by 'Historical Thinking Project,' and a URL linking to historicalthinking.ca/historical-thinking-concepts."

Quiz Text Description
Select the correct **in-text citation** that matches the **reference citation** above for a **webpage with no date**.

a. (Center for the Study of Historical Consciousness, n.d.)
b. (Historical Thinking Project, n.d.)
c. (Centre for the Study of Historical Consciousness)
d. (Historical thinking concepts, n.d.)

Solution:

Correct answer(s): a. (Center for the Study of Historical Consciousness, n.d.)

Question 3

McRae, P. (2020, Winter). Ambiguous but gaining momentum. *ATA Magazine*, *100*(2), 30-32. https://www.teachers.ab.ca/SiteCollectionDocuments/ATA/ATA%20Magazine/Vol%20100/Vol100-No2-Winter_2020.pdf

Image Description
"Screenshot of an APA-style trade publication reference. The citation lists McRae, P. (2020, Winter) as the author, with the article title 'Ambiguous but gaining momentum.' The source is ATA Magazine, volume 100, issue 2, pages 30–32. A URL link to a PDF of the article on the teachers.ab.ca website appears below the reference."

Quiz Text Description
Select the correct **in-text citation** that matches the **reference citation** above for a **trade publication from a webpage**.

a. (Ambiguous but gaining momentum, 2020)
b. (ATA Magazine, 2020)
c. (McRae, 2020)
d. (McRae, 2020, Winter)

Solution:

Correct answer(s): c. (McRae, 2020)

Question 4

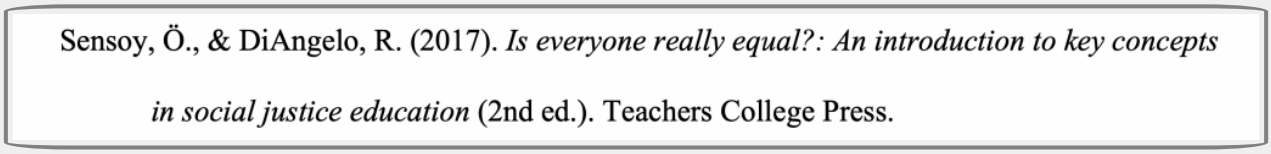

Image Description
"Screenshot of an APA-style trade publication reference. The citation lists McRae, P. (2020, Winter) as the author, with the article title 'Ambiguous but gaining momentum.' The source is ATA Magazine, volume 100, issue 2, pages 30–32. A URL link to a PDF of the article on the teachers.ab.ca website appears below the reference."

Text Description
Select the correct **in-text citation** that matches the **reference citation** above for an **eBook with an edition** and **no DOI**.

a. (Teachers College Press, 2017)
b. (Sensoy & DiAngelo, 2017)
c. (Is everyone really equal?: An introduction to key concepts in social justice education, 2017)
d. (Sensoy et al., 2017)

Solution:

Correct answer(s): b. (Sensoy & DiAngelo, 2017)

Media Attributions: "[Citation for Godin et al]", "[Citation for the Centre for the Study of Historical Consciousness]", "[Citation for McRae]", "[Citation for Sensoy]" from the University of Alberta Library's APA Style Citation Tutorial are licensed under CC BY-NC-SA 4.0 International.

Let's Review: Creating Reference List Citations for Journal Articles Activity

Step 1

Find the 4 Ws for the journal article (there are four slides)

Text Description
Slide 1 (WHO): Screenshot of a journal article's first page with the authors' names highlighted in yellow; an arrow labelled "WHO" points to the author line.

Slide 2 (WHEN): Screenshot of a journal article header with the publication year (2018) highlighted; an arrow labelled "WHEN" points to the date information.

Slide 3 (WHAT): Screenshot of a journal article's first page with the article title highlighted in yellow; an arrow labelled "WHAT" points to the title.

Slide 4 (WHERE): Screenshot of a journal article header with the source details highlighted (journal title, volume/issue, page range, and DOI); an arrow labeled "WHERE" points to the publication information.

Step 2

Arrange the 4 Ws in the correct order and with the correct formatting.

The citation for the journal article (click image to see it bigger)

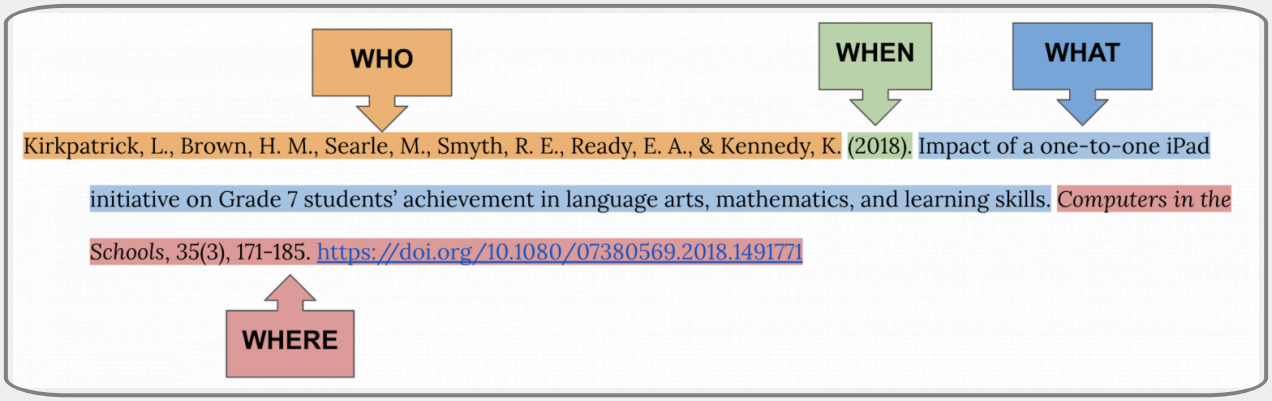

Image: "[Colour-coded and labelled image for a journal citation]" by University of Alberta Library, APA Style Citation Tutorial, CC BY-NC-SA 4.0.

- **Author**: is the Family name, Initials. for each author, with a comma in between, and an ampersand (the and sign &) before the last author.
    - Authors are always ordered as they appear on the work.

- **Date**: is the publication date (Year) of the article.
- **Title**: is in sentence-case, as are all titles of works cited in APA Style.
- **Source location**: is the *Scholarly Journal Title* (in Title-Case and italics), *Volume number* (in italics) and Issue number (in parentheses), the article's page range, and hyperlinked DOI.
    - **Note:** The article is part of a larger source (the scholarly journal), so the source is *italicized* and **not** the article.

Now try it yourself!

The Fanshawe Library Learning Commons APA Online Guide is a great resource to have on hand for creating reference citations.

Exercise 1: Find the elements needed for a reference list citation for this journal article

Text Description
Screenshot of the first page of an academic journal article with several highlighted areas indicating key citation elements. Highlighted sections include the authors' names at the top of the page, the publication year, the article title, and the journal and DOI information. Learners are expected to select the correct areas using hotspots.

Exercise 2: How do you write each citation element in APA Style for the same journal article?

Quiz Description
Slide 1 – Author information (multiple choice set)
Interactive slide introducing "APA citation elements" and asking how to write the author information in an APA reference citation.

Slide 2 – Date information (true/false)
Interactive true/false question about how to write date information in an APA reference list entry.

Slide 3 – Article title information (multiple choice set)
Interactive question asking how to format the article title in an APA reference citation.

Slide 4 – Journal title information (multiple choice set)
Interactive question asking how to write the journal title in an APA reference list citation.

Slide 5 – Volume information (multiple choice set)
Interactive question asking how to write the volume number in an APA reference list citation.

Slide 6 – Issue information (true/false)
An interactive true/false question explaining that if there is no issue number, it is not included in the reference citation.

Slide 7 – Page information (multiple choice set)
Interactive question asking how to format page range information in an APA reference list citation.

Slide 8 – DOI (multiple choice set)
Interactive question asking how to write DOI information in an APA reference list citation.

Slide 9 – Putting it all together (drag and drop)
Drag-and-drop activity with labelled drop zones for APA reference elements (Author, Year, Article Title, Journal Title, Volume, Pages, DOI). Learners drag text pieces—such as the author name, year, article title, journal title, volume, page range, and DOI—into the correct labeled positions to build a complete reference citation.

Activities adapted from "23 Matching Reference and In-Text Citations Activity" and "15 Creating Reference List Citations: Journal Articles" in APA Style Citations Copyright © 2021 by Ulrike Kestler, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted.

CHAPTER 3: CRITICAL THINKING ABOUT PSYCHOLOGICAL RESEARCH

Chapter Overview

3.0 Learning Objectives
3.1 Why Is Research Important?
3.2 Approaches to Research – Descriptive Research
3.3 Understanding Correlation and Causation
3.4 Conducting Experiments
3.5 Conducting Ethical Research
3.6 Chapter Summary

3.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Explain how scientific research addresses questions about behaviour.
2. Discuss the strengths and weaknesses of case studies, naturalistic observation, surveys, and archival research.
3. Identify what a correlation coefficient tells us about the relationship between variables.
4. Describe why correlation does not indicate a cause-and-effect relationship between variables.
5. Explain the process of creating an experiment to demonstrate cause and effect.
6. List the ethical considerations for research involving humans and other animals.

Chapter Overview

In this chapter, you will explore why psychological research matters and how the scientific method helps us move beyond opinion to evidence-based conclusions. You will examine key research approaches—especially descriptive methods such as case studies, naturalistic observation, surveys, and archival research—while considering the strengths and limitations of each. The chapter also clarifies what correlations can (and cannot) tell us, including why correlation does not prove causation, and how experiments are designed to test cause-and-effect relationships. Finally, you will review essential ethical principles and safeguards that guide research with human participants and other animals.

This chapter is adapted from “Psychological Research” in Psychology – H5P Edition Copyright © 2021 by Rose M. Spielman; Kathryn Dumper; William Jenkins; Arlene Lacombe; Marilyn Lovett; and Marion Perlmutter is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted. *Modifications: Condensed sections, graphics, H5P activities and omitted “9. Ethics”; added graphics, corrected phrasing and updated references.*

3.1 Why Is Research Important?

Consider This

Have you ever wondered whether the violence you see on television affects your behaviour? Are you more likely to behave aggressively in real life after watching people behave violently in dramatic situations on the screen? Or, could seeing fictional violence actually get aggression out of your system, causing you to be more peaceful? How are children influenced by the media they are exposed to? A psychologist interested in the relationship between behaviour and exposure to violent images might ask these very questions.

How does television content impact children's behaviour? Image: "Antisocialtor", by Tory Brown, CC BY 2.0. Modifications by original authors

The topic of violence in the media today is contentious. Since ancient times, humans have been concerned about the effects of new technologies on our behaviours and thinking processes. The Greek philosopher Socrates, for example, worried that writing—a new technology at that time—would diminish people's ability to remember because they could rely on written records rather than committing information to memory. In our world of quickly changing technologies, questions about the effects of media continue to emerge. Many of us find ourselves with a strong opinion on these issues, only to find the person next to us bristling with the opposite view.

How can we go about finding answers that are supported not by mere opinion, but by evidence that we can all agree on? The findings of psychological research can help us navigate issues like this.

Scientific Research

This chapter explores how scientific knowledge is generated and how important that knowledge is in forming decisions in our personal lives and in the public domain.

Let's Watch

Watch this news report to learn more about some of the controversial issues surrounding the D.A.R.E. program.

Video: "Science Scene: Does D.A.R.E. Work?" by The Daily Texan [0:59] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube.*

Ultimately, it is not just politicians who can benefit from using research in guiding their decisions. We all might look to research from time to time when making decisions in our lives. Imagine you just found out that a close friend has breast cancer or that one of your young relatives has recently been diagnosed with autism. In either case, you want to know which treatment options are most successful with the fewest side effects. How would you find that out? You would probably talk with your doctor and personally review the research that has been done on various treatment options—always with a critical eye to ensure that you are as informed as possible.

In the end, research is what makes the difference between **facts** and opinions. Facts are observable realities, and **opinions** are personal judgments, conclusions, or attitudes that may or may not be accurate. In the scientific community, facts can be established only using evidence collected through empirical research.

The Process of Scientific Research

Scientific knowledge is advanced through a process known as the scientific method. Basically, ideas (in the form of theories and hypotheses) are tested against the real world (in the form of empirical observations), and 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. The types of reasoning within the circle are called deductive and inductive. In **deductive reasoning**, ideas are tested against the empirical world; in **inductive reasoning**, empirical observations lead to new ideas. These processes are inseparable, like inhaling and exhaling, but different research approaches place different emphasis on the deductive and inductive aspects.

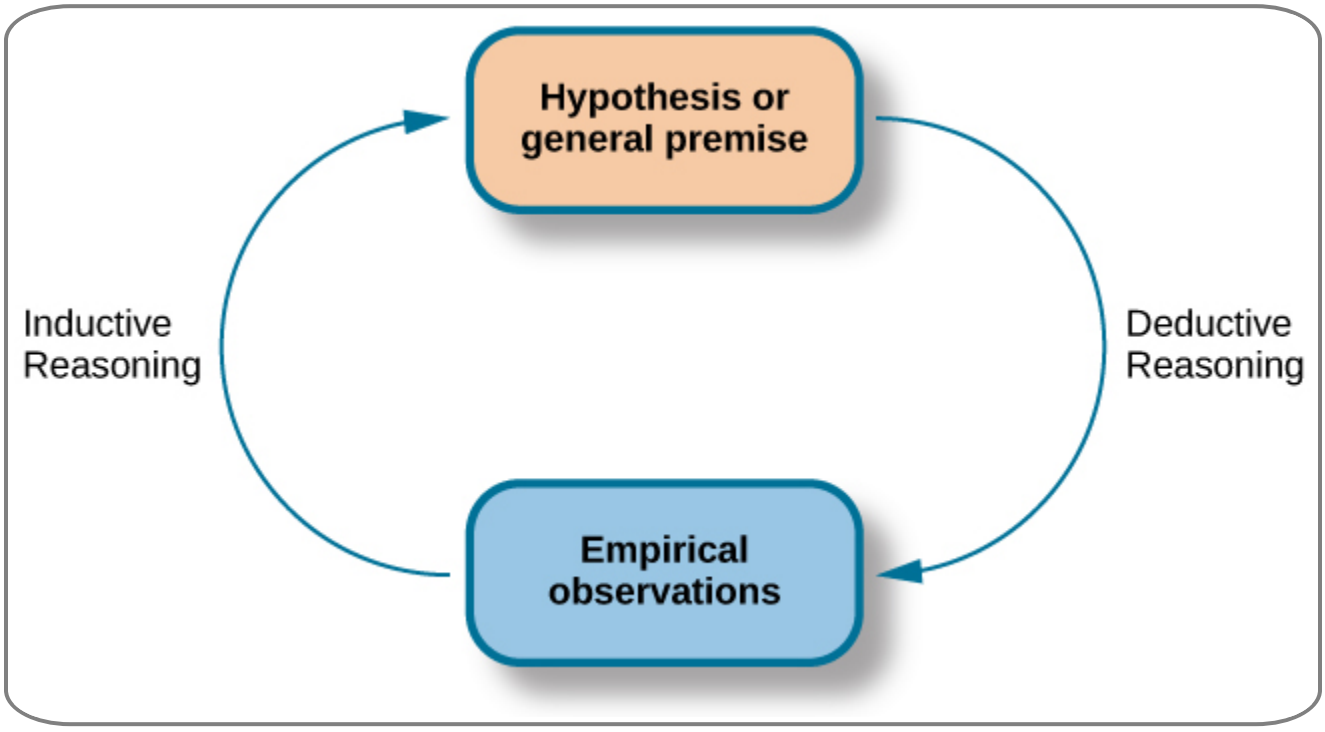

Figure 3.1 *Psychological research relies on both inductive (hypothesis or general premise) and deductive reasoning (empirical observations).*

In the scientific context, deductive reasoning begins with a generalization—one hypothesis—that is then used to reach logical conclusions about the real world. If the hypothesis is correct, then the logical conclusions reached through deductive reasoning should also be correct.

Here's an Example

A deductive reasoning argument might go something like this: All living things require energy to survive (this would be your hypothesis). Ducks are living things. Therefore, ducks require energy to survive (logical conclusion). In this example, the hypothesis is correct; therefore, the conclusion is correct as well. Sometimes, however, an incorrect hypothesis may lead to a logical but incorrect conclusion. Consider this argument: all ducks are born with the ability to see. Quackers is a duck. Therefore, Quackers was born with the ability to see. Scientists use deductive reasoning to empirically test their hypotheses. Returning to the example of the ducks, researchers might design a study to test the hypothesis that if all living things require energy to survive, then ducks will be found to require energy to survive.

Deductive reasoning starts with a generalization that is tested against real-world observations; however, inductive reasoning moves in the opposite direction. Inductive reasoning uses empirical observations to con-

struct broad generalizations. Unlike deductive reasoning, conclusions drawn from inductive reasoning may or may not be correct, regardless of the observations on which they are based.

Here's an Example

You may notice that your favourite fruits—apples, bananas, and oranges—all grow on trees; therefore, you assume that all fruit must grow on trees. This would be an example of inductive reasoning, and, clearly, the existence of strawberries, blueberries, and kiwi demonstrates that this generalization is not correct, despite it being based on a number of direct observations. Scientists use inductive reasoning to formulate theories, which in turn generate hypotheses that are tested with deductive reasoning. In the end, science involves both deductive and inductive processes.

Case studies, for example, which you will read about in the next section, are heavily weighted on the side of empirical observations. Thus, case studies are closely associated with inductive processes as researchers gather massive amounts of observations and seek interesting patterns (new ideas) in the data. Experimental research, on the other hand, puts great emphasis on deductive reasoning.

We've stated that theories and hypotheses are ideas, but what sort of ideas are they, exactly? 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 if our idea is correct, and it is often worded as an if-then statement (e.g., if I study all night, I will get a passing grade on the test). The hypothesis is extremely important because it bridges the gap between the realm of ideas and the real world. As specific hypotheses are tested, theories are modified and refined to reflect and incorporate the results of these tests.

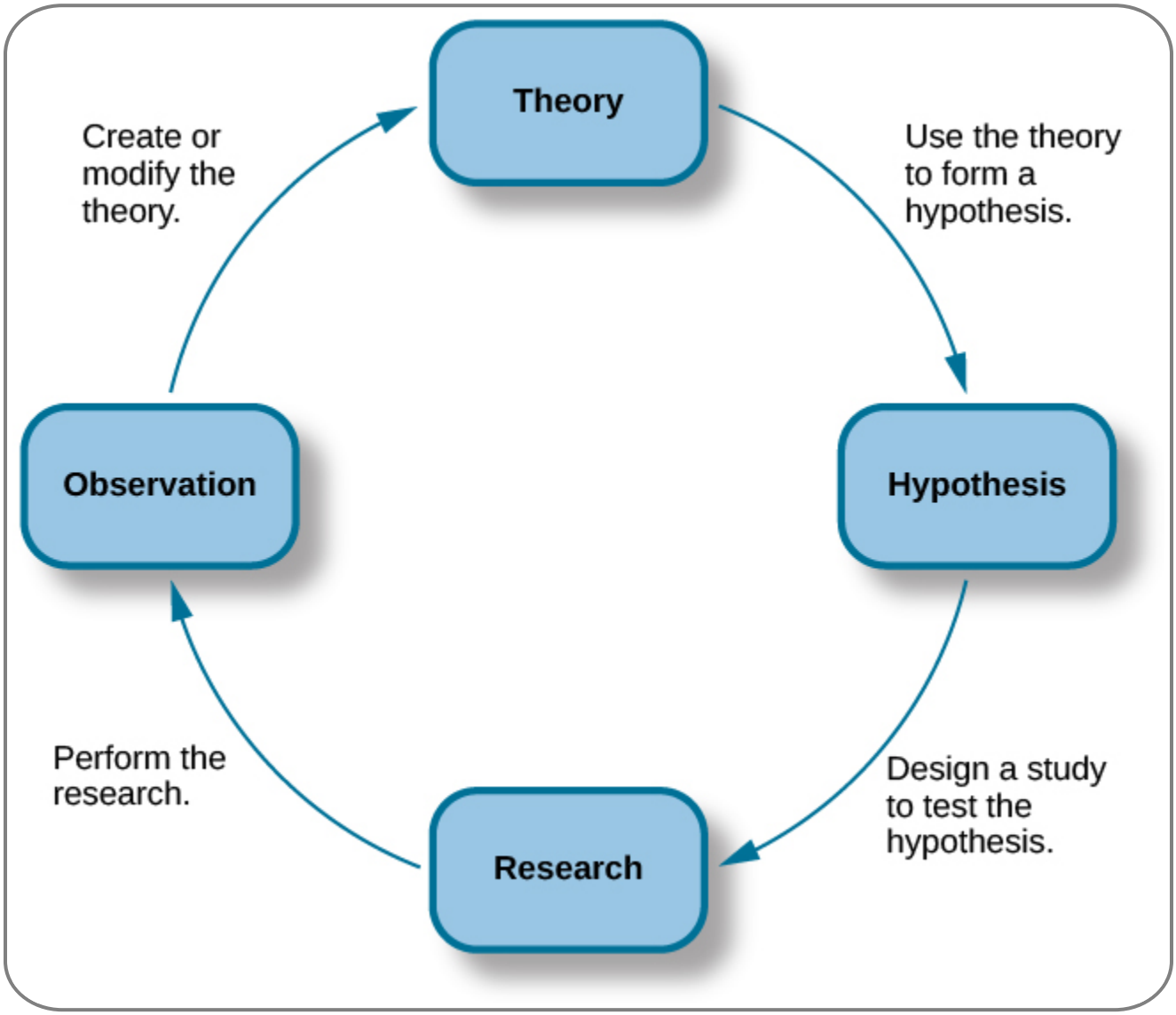

Figure 3.2 *The scientific method of research includes proposing hypotheses, conducting research, and developing or refining theories based on the results.*

Image Description

Circular flowchart of the scientific method with four boxes connected by arrows: Theory (top) → Hypothesis (right) → Research (bottom) → Observation (left) → back to Theory. Captions around the circle read: "Use the theory to form a hypothesis," "Design a study to test the hypothesis," "Perform the research," and "Create or modify the theory."

Here's an Example

To see how this process works, let's consider a specific theory and a hypothesis that might be generated from that theory. As you'll learn in a later chapter, the James-Lange theory of emotion asserts that emotional experience relies on the physiological arousal associated with the emotional state. If you walked out of your home and discovered a very aggressive snake waiting on your doorstep, your heart would begin to race and your stomach would churn. According to the James-Lange theory, these physiological changes would result in your feeling of fear. A hypothesis that could be derived from this theory might be that a person who is unaware of the physiological arousal that the sight of the snake elicits will not feel fear.

A scientific hypothesis is also **falsifiable**, or capable of being shown to be incorrect. Sigmund Freud had lots of interesting ideas to explain various human behaviours. However, a major criticism of Freud's theories is that many of his ideas are not falsifiable; for example, it is impossible to imagine empirical observations that would disprove the existence of the id, the ego, and the superego—the three elements of personality described in Freud's theories. Despite this, Freud's theories are widely taught in introductory psychology texts because of their historical significance for personality psychology and psychotherapy, and these remain the root of all modern forms of therapy.

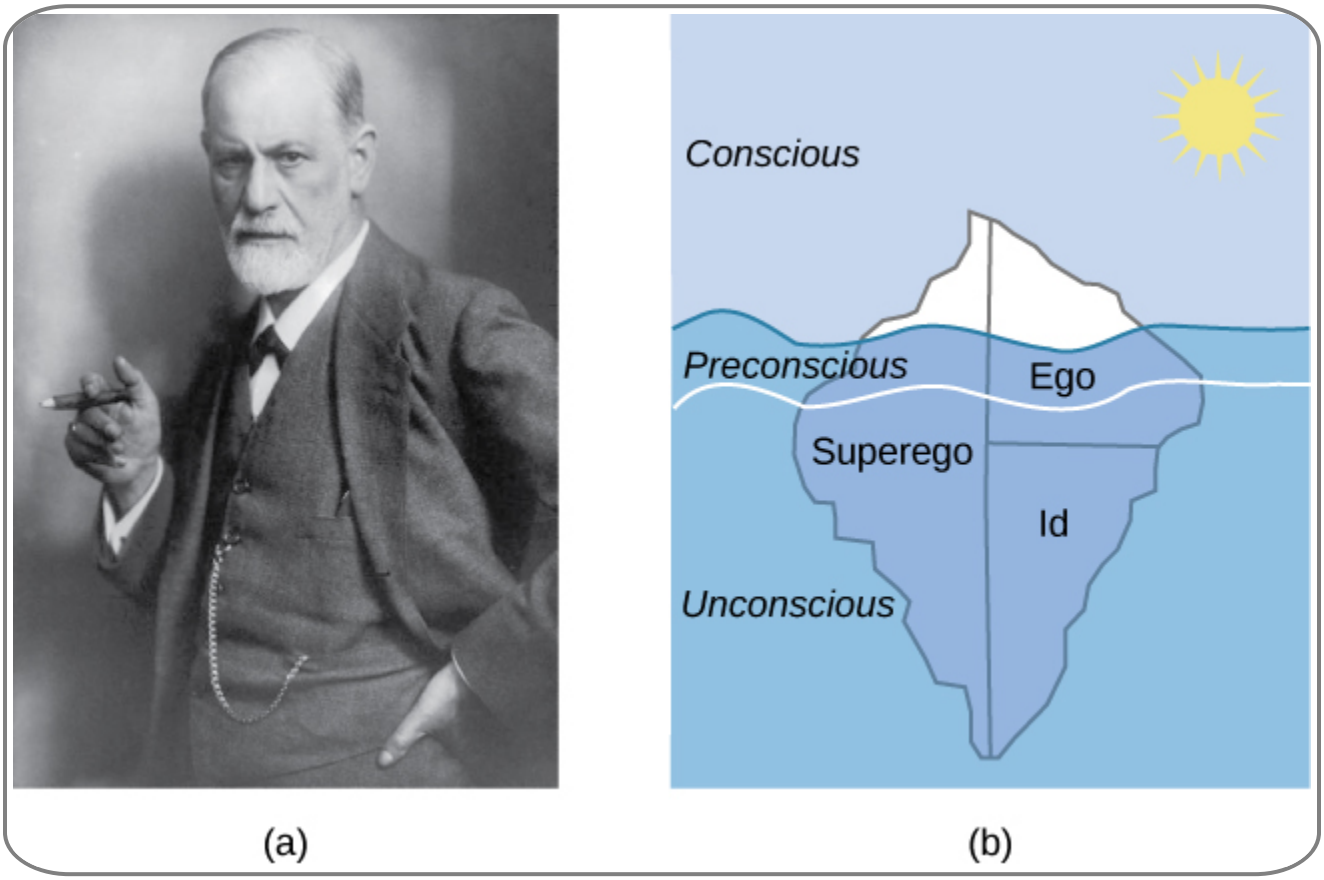

Figure 3.3 *Many of the specifics of (a) Freud's theories, such as (b) his division of the mind into id, ego, and superego, have fallen out of favour in recent decades because they are not falsifiable. In broad strokes, his views set the stage for much of psychological thinking today, such as the unconscious nature of most psychological processes. Images: Sigmund Freud, by Max Halberstadt and Diagram of Sigmund Freud's Theory by Jordan Gordanier, Wikipedia, Public Domain.*

Image Description

Two-panel figure. (a) Black-and-white portrait of Sigmund Freud standing in a suit, holding a cigar. (b) Iceberg diagram of Freud's model of the mind: the small tip above water is labelled Conscious, the area at the waterline is Preconscious, and the large submerged portion is Unconscious. Inside the iceberg, Ego sits near the surface spanning above and below the waterline, Superego is mostly below the surface on the left, and Id is the largest section deep underwater. A sun appears in the sky above the iceberg..

In contrast, the James-Lange theory does generate falsifiable hypotheses, such as the one described above. Some individuals who suffer significant injuries to their spinal columns are unable to feel the bodily changes that often accompany emotional experiences. Therefore, we could test the hypothesis by determining how emotional experiences differ between individuals who have the ability to detect these changes in their physiological arousal and those who do not. In fact, this research has been conducted, and while the emotional experiences of people deprived of an awareness of their physiological arousal may be less intense, they still experience emotion (Chwalisz et al., 1988).

Scientific research's dependence on falsifiability allows for great confidence in the information that it produces. Typically, by the time information is accepted by the scientific community, it has been tested repeatedly.

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

observable

a. testable
b. original
c. provable

2. MultiChoice Activity

_____ are defined as observable realities.

a. opinions
b. theories
c. facts
d. behaviors

3. MultiChoice Activity

Scientific knowledge is _____.

a. permanent
b. subjective
c. empirical
d. intuitive

4. MultiChoice Activity

A major criticism of Freud's early theories involves the fact that his theories _____.

a. were too outrageous
b. were too broad
c. were too limited in scope
d. were not testable

Solution:

1. a. testable
2. c. facts
3. c. empirical
4. d. were not testable

Key Takeaway

Scientists are engaged in explaining and understanding how the world around them works, and they are able to do so by coming up with theories that generate hypotheses that are testable and falsifiable. Theories that stand up to their tests are retained and refined, while those that do not are discarded or modified. In this way, research enables scientists to separate fact from simple opinion. Having good information generated from research aids in making wise decisions both in public policy and in our personal lives.

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3.2 Approaches to Research – Descriptive Research

There are many research methods available to psychologists in their efforts to understand, describe, and explain behaviour and the cognitive and biological processes that underlie it. Some methods rely on observational techniques. Other approaches involve interactions between the researcher and the individuals who are being studied, ranging from a series of simple questions to extensive, in-depth interviews to well-controlled experiments.

Each of these research methods has unique strengths and weaknesses, and each method may only be appropriate for certain types of research questions. For example, studies that rely primarily on observation produce incredible amounts of information, but the ability to apply this information to the larger **population** is somewhat limited because of small **sample sizes**. Survey research, on the other hand, allows researchers to easily collect data from relatively large samples. While this allows for results to be generalized to the larger population more easily, the information that can be collected on any given survey is somewhat limited and subject to problems associated with any type of self-reported data. Some researchers conduct archival research by using existing records. While this can be a fairly inexpensive way to collect data that can provide insight into a number of research questions, researchers using this approach have no control over how or what kind of data was collected. All of the methods described thus far are correlational in nature. This means that researchers can speak to important relationships that might exist between two or more variables of interest. However, correlational data cannot be used to make claims about cause-and-effect relationships.

Correlational research can find a relationship between two variables, but the only way a researcher can claim that the relationship between the variables is cause and effect is to perform an experiment. In experimental research, which will be discussed later in this chapter, there is a tremendous amount of control over variables of interest. While this is a powerful approach, experiments are often conducted in very artificial settings. This calls into question the validity of experimental findings with regard to how they would apply in real-world settings. In addition, many of the questions that psychologists would like to answer cannot be pursued through experimental research because of ethical concerns.

There are a number of methods that researchers use to collect information about human thoughts, feelings and behaviours. These common descriptive methods include clinical or case studies, naturalistic observation, structured (laboratory research), surveys, and archival research. Additionally, we can consider how information is collected using cross-sectional or longitudinal designs. To learn more about the nature of each of these research methods, along with their relative advantages and disadvantages, review the following sections:

Clinical or Case Studies

In observational research, scientists are conducting a **clinical or case study** when they focus on one person or just a few individuals. Indeed, some scientists spend their entire careers studying just 10–20 individuals. Why would they do this? Obviously, when they focus their attention on a very small number of people, they can gain a tremendous amount of insight into those cases. The richness of information

that is collected in clinical or case studies is unmatched by any other single research method. This allows the researcher to have a very deep understanding of the individuals and the particular phenomenon being studied.

If clinical or case studies provide so much information, why are they not more frequent among researchers? As it turns out, the major benefit of this particular approach is also a weakness. As mentioned earlier, this approach is often used when studying individuals who are interesting to researchers because they have a rare characteristic. 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 generalize any observations to the larger population as a whole. **Generalizing** 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.

Naturalistic Observation

If you want to understand how behaviour occurs, one of the best ways to gain information is to simply 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? As an example, imagine that your professor asks everyone in your class to raise their hand if they always wash their hands after using the restroom. Chances are that almost everyone in the classroom will raise their hand, but do you think hand washing after every trip to the restroom is really that universal?

Naturalistic observation is the observation of behaviour in its natural setting. For example, to better understand peer exclusion, Suzanne Fanger collaborated with colleagues at the University of Texas to observe the behaviour of preschool children on a playground. How did the observers remain inconspicuous 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 (Fanger et al., 2012).

It should be pointed out that naturalistic observation is not limited to research involving humans. Indeed, some of the best-known examples of naturalistic observation involve researchers going into the field to observe various kinds of animals in their own environments. As with human studies, the researchers maintain their distance and avoid interfering with the animal subjects so as not to influence their natural behaviours. 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 organize socially and communicate with one another. The anthropologist Jane Goodall, for example, spent nearly five decades observing the behaviour of chimpanzees in Africa. As an illustration of the types of concerns that a researcher might

encounter in naturalistic observation, some scientists criticized Goodall for giving the chimps names instead of referring to them by numbers—using names was thought to undermine the emotional detachment required for the objectivity of the study (McKie, 2010).

(a) Jane Goodall made a career of conducting naturalistic observations of (b) chimpanzee behaviour. Image: "Jane Goodall": modification of work by Erik Hersman, Flickr; "Chimpanzee": modification of work by Afrika Force, Flickr.

The greatest benefit of naturalistic observation is the validity, or accuracy, of information collected unobtrusively in a natural setting. Having individuals behave as they normally would in a given situation means that we have a higher degree of ecological validity, or realism, than we might achieve with other research approaches. Therefore, our ability to generalize the findings of the research to real-world situations is enhanced. If done correctly, we need not worry about people or animals modifying their behaviour simply because they are being observed. Sometimes, people may assume that reality programs give us a glimpse into authentic human behaviour. However, the principle of inconspicuous observation is violated as reality stars are followed by camera crews and are interviewed on camera for personal confessionals. Given that environment, we must doubt how natural and realistic their behaviours are.

The major downside of naturalistic observation is that it is often difficult to set up and control. 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? The benefit of realistic data comes at a cost. As a researcher, you have no control over when (or if) you have behaviour to observe. In addition, this type of observational research often requires significant investments of time, money, and a good dose of luck.

Laboratory (Structured) Observation

Sometimes studies involve **structured observation**. In these cases, people are observed while engaging in set, specific tasks. An excellent example of structured observation comes from the *Strange Situation* by Mary Ainsworth. The *Strange Situation* is a procedure used to evaluate 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 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 characterizing the infant's attachment style with the caregiver.

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 expectations. To protect against this type of bias, researchers should have clear criteria established for the types of behaviours 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.

Surveys

Often, psychologists develop **surveys** as a means of gathering data. 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. Generally, the survey itself can be completed in a short time, and the ease of administering a survey makes it easy to collect data from a large number of people.

Surveys allow researchers to gather data from larger samples than may be afforded by other research methods. A sample is a subset of individuals selected from a population, which is the overall group of individuals that the researchers are interested in. Researchers study the sample and seek to generalize their findings to the population.

There are both strengths and weaknesses of the survey in comparison to case studies. By using surveys, we can collect information from a larger sample of people. A larger sample is better able to reflect the actual diversity of the population, thus allowing better generalizability. Therefore, if our sample is sufficiently large and diverse, we can assume that the data we collect from the survey can be generalized to the larger population with more certainty than the information collected through a case study. However, given the greater number of people involved, we are not able to collect the same depth of information on each person that would be collected in a case study.

Another potential weakness of surveys is something we touched on earlier in this chapter: People don't always give accurate responses. They may lie, misremember, or answer questions in a way that they think makes them look good. For example, many Canadians may report drinking less alcohol than they actually do (c.f., Stockwell & Zhao, 2023).

Archival Research

Some researchers gain access to large amounts of data without interacting with a single research participant. Instead, they use existing records to answer various research questions. This type of research approach is known as archival research. **Archival research** relies on looking at past records or data sets to look for interesting patterns or relationships.

For example, a researcher might access the academic records of all individuals who enrolled in college within the past ten years and calculate how long it took them to complete their degrees, as well as course loads, grades, and extracurricular involvement. Archival research could provide important information about who is most likely to complete their education, and it could help identify important risk factors for struggling students.

A researcher doing archival research examines records, whether archived as a (a) hardcopy or (b) electronically. Images: "Paper Files": modification of work by Newtown graffiti, Flickr; "Computer": modification of work by INPIVIC Family, Flickr.

In comparing archival research to other research methods, there are several important distinctions. For one, the researcher employing archival research never directly interacts with research participants. Therefore, the investment of time and money to collect data is considerably less with archival research. Additionally, researchers have no control over what information was originally collected. Therefore, research questions have to be tailored so they can be answered within the structure of the existing data sets. There is also no guarantee of consistency between the re

Activity: Test Your Understanding

Quiz Text Description

1. MultiChoice Activity

Sigmund Freud developed his theory of human personality by conducting in-depth interviews over an extended period of time with a few clients. This type of research approach is known as a(n): _____.

a. survey
b. case study
c. archival research
d. naturalistic observation

2. MultiChoice Activity

_____ involves observing behavior in individuals in their natural environments.

a. survey
b. case study
c. naturalistic observation
d. archival research

3. MultiChoice Activity

The major limitation of case studies is _____.

a. the superficial nature of the information collected in this approach
b. the inability to generalize the findings from this approach to the larger population
c. the absence of inter-rater reliability
d. the lack of control that the researcher has in this approach

4. MultiChoice Activity

The benefit of naturalistic observation studies is _____.

a. the ability to determine cause and effect in this particular approach
b. the honesty of the data that is collected in a realistic setting
c. how quick and easy these studies are to perform
d. the researcher's capacity to make sure that data is collected as efficiently as possible

5. MultiChoice Activity

Using existing records to try to answer a research question is known as _____.

a. longitudinal research
b. archival research

c. naturalistic observation
d. survey research

6. MultiChoice Activity

A(n) _____ is a list of questions developed by a researcher that can be administered in paper form.

a. case Study
b. naturalistic observation
c. survey
d. archive

Solution:

1. b. case study
2. c. naturalistic observation
3. b. the inability to generalize the findings from this approach to the larger population
4. b. the honesty of the data that is collected in a realistic setting
5. b. archival research
6. c. survey

Critical Thinking Questions

1. Presumably, reality television programs aim to provide a realistic portrayal of the behaviour displayed by the characters featured in such programs. This section pointed out why this is not really the case. What changes could be made in the way that these programs are produced that would result in more honest portrayals of realistic behaviour?
   Hint
   The behaviour displayed on these programs would be more realistic if the cameras were mounted in hidden locations, or if the people who appear on these programs did not know when they were being recorded.
2. Which of the research methods discussed in this section would be best suited to research the effectiveness of the D.A.R.E. program in preventing the use of alcohol and other drugs? Why?
   Hint
   Longitudinal research would be an excellent approach in studying the effectiveness of this program because it would follow students as they aged to determine if their choices regarding alcohol and drugs were affected by their participation in the program.

Key Takeaways

- The clinical or case study involves studying just a few individuals for an extended period of time. While this approach provides an incredible depth of information, the ability to generalize these observations to the larger population is problematic.
- Naturalistic observation involves observing behaviour in a natural setting and allows for the collection of valid, true-to-life information from realistic situations. However, naturalistic observation does not allow for much control and often requires quite a bit of time and money to perform. Researchers strive to ensure that their tools for collecting data are both reliable (consistent and replicable) and valid (accurate).
- Surveys can be administered in a number of ways and make it possible to collect large amounts of data quickly. However, the depth of information that can be collected through surveys is somewhat limited compared to a clinical or case study.
- Archival research involves studying existing data sets to answer research questions.

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3.3 Understanding Correlation and Causation

Consider This

Did you know that as ice cream sales increase, so does the overall crime rate? Is it possible that indulging in your favourite flavour of ice cream could send you on a crime spree? Or, after committing a crime, do you think you might decide to treat yourself to a cone?

There is no question that a relationship exists between ice cream and crime (e.g., Harper, 2013), but it would be pretty foolish to decide that one thing actually caused the other to occur. It is much more likely that both ice cream sales and crime rates are related to the temperature outside. When the temperature is warm, there are lots of people out of their houses, interacting with each other, getting annoyed with one another, and sometimes committing crimes. Also, when it is warm outside, we are more likely to seek a cool treat like ice cream. How do we determine if there is indeed a relationship between two things? And when there is a relationship, how can we discern whether it is attributable to coincidence or causation?

Correlational Research

Let's Watch

Video: "Correlation" by Steven Barnes [4:41] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube*.

Correlation means that there is a relationship between two or more variables (such as ice cream consumption and crime), 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 represented by the letter r.

The number portion of the correlation coefficient indicates the strength of the relationship. The closer the number is to 1 (be it negative or positive), 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 become. For instance, a correlation coefficient of 0.9 indicates a far stronger relationship than a correlation coefficient of 0.3. If the variables are not related to one another at all, the correlation coefficient is 0.

> The example above about ice cream and crime shows two variables that we might expect to have no relationship with each other.

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.

> **Positive Correlation**
> The example of ice cream and crime rates is a positive correlation because both variables increase when temperatures are warmer. Other examples of positive correlations are the relationship between an individual's height and weight or the relationship between a person's age and the number of wrinkles. One might expect a negative correlation to exist between someone's tiredness during the day and the number of hours they slept the previous night: the amount of sleep decreases as the feelings of tiredness increase. In a real-world example of negative correlation, student researchers at the University of Minnesota found a weak negative correlation ($r = -0.29$) between the average number of days per week that students got fewer than 5 hours of sleep and their GPA (Lowry et al., 2010). Keep in mind that a negative correlation is not the same as no correlation. For example, we would probably find no correlation between hours of sleep and shoe size.

As mentioned earlier, correlations have predictive value. Imagine that you are on the admissions committee of a major university. You are faced with a huge number of applications, but you are able to accommodate only a small percentage of the applicant pool. How might you decide who should be admitted? You might try to correlate your current students' college GPA with their scores on standardized tests like the SAT or ACT. By observing which correlations were strongest for your current students, you could use this information to predict the relative success of those students who have applied for admission into the university.

Activity: Test Your Understanding

Branching Activity Description
"Correlation Practice" is an interactive H5P branching activity that quizzes learners on correlation direction. It includes three multiple-choice questions—(1) weight and height, (2) hours of sleep and tiredness, and (3) hours of sleep and shoe size—followed by short explanations and visual examples (graphs/scatterplots and illustrative photos). The activity ends with a brief summary explaining how scatterplots show the direction and strength of correlations.

Accessible Text Alternative (H5P Transcript)
Activity Title: Correlation Practice

Intro Screen

On-screen text: Having just learned about correlations, let's put your newfound knowledge to the test! In the following pages, you will either be given a description of two variables or be shown a picture. Your task will be to identify the possible relationship (positive, negative, or none).

Image alt text: An image of paper with some graphs on it

Question 1 Prompt: How would you describe the most likely correlation between weight and height

Answer choices: Positive, Negative, No correlation.

If learner selects: **Positive** *(Correct)*

Feedback text: Correct! This image graphically represents the relationship between weight and height. Taller people tend to weigh more than shorter people. So as height increases, so does weight. Similarly, as height decreases, so does weight.

Image alt text: A graph demonstrating the positive correlation between weight and height.

If learner selects: **Negative** or **No correlation** *(Incorrect → Guided review → returns to Question 1)*

Slide 1 text: Unfortunately, this is incorrect. Let's think through this together. To work through this example, click on the little right-facing arrow at the bottom of this screen to move to the next slide
Slide 2 text: Imagine there are two brothers. These brothers live in the same house and eat the same food. They also exercise a similar amount. One brother is 7ft tall. The other brother is 5ft tall.
Slide 2 image alt text: A family picture of the two brothers
Slide 3: *(No text. No image alt text provided in the file.)*
Slide 4 text: Given that these brothers have the same diet and environmental influences, the taller brother will have more muscle mass than the shorter brother (assuming they do the same amount of physical activity). Thus, the 7ft brother should weigh more than the 5ft brother. Now, imagine that they both had an older brother who was 8 feet tall; he would weigh more than both the 7-foot and 5-foot brothers. If this family had a fourth brother who was 4 feet tall, he would weigh the least.
So, here we see: as height goes up, so does weight and as height goes down, so does weight. This describes a positive correlation.

Slide 4 image alt text: Four brothers standing next to each other, and their respective heights ranging from 4 feet to 7 feet tall

Question 2 Prompt: What direction do you think the correlation between hours of sleep and tiredness is?

Answer choices: Positive, Negative, No correlation

If learner selects: **Negative** *(Correct)*

Feedback text: Correct! The more hours of sleep one gets, the less tired they feel. So as hours of sleep go up, levels of tiredness go down. This describes a negative correlation.

Image alt text: An image graphically representing the negative relationship between hours of sleep (y-axis) and tiredness (x-axis).

If learner selects: **Positive** or **No correlation** *(Incorrect → Guided review → returns to Question 2)*

Slide 1 text: Oh dear – your answer was unfortunately incorrect. Not to worry, we'll work through it together! To do so, click on the little right-facing arrow at the bottom of the slides
Slide 2 text: In Chapter 10 on Emotion and Motivation, you'll learn about homeostasis and homeostatic processes. Sleep is one such process. We need sleep to survive. So, if we do not get enough sleep, our body lets us know this by feeling tired, much like the good boy pictured on the right. Sometimes, the wording of negative correlations can be tricky. If we think through this example, as the number of hours you are asleep increases, then you should feel less tired. If you do not sleep for long, then you feel more tired. So, as the time asleep increases, how tired we feel will decrease. Similarly, as the time asleep decreases, how tired we feel will increase. This is an example of a negative correlation.
Slide 2 image alt text: A picture of a sleeping puppy in a person's hand (image by StockSnap)
Slide 3 text: Other examples of negative correlations include:

- Anxiety and sleep quality: as anxiety goes up, sleep quality goes down
- Number of days wearing a t-shirt and cleanliness of the t-shirt: the more you wear a t-shirt, the less clean it becomes.
- Breathing: the longer you hold your breath, the more carbon dioxide builds up in your lungs.
- Drying clothes: the longer clothes are in the tumble drier, the drier they get (up until a point at least…)
- Examples and confusion: the more examples of negative correlations you read, the less confused you become.

Question 3 Prompt: Sticking with hours of sleep, what direction do you think is the correlation between hours of sleep and shoe size?

Answer choices: Positive, Negative, No correlation

If learner selects: **No correlation** *(Correct)*

Feedback text: Correct! There is no reason why the size of a person's shoe should influence for how long they sleep. Sleep also does not necessarily cause your feet to grow. Imagine if the longer you slept, the bigger your feet got…As such, the best way to describe the relationship between shoes size and hours of sleep is that there is no correlation between them.

Image alt text: A scatterplot depicting what two uncorrelated variables would look like.

If learner selects: **Positive** or **Negative** *(Incorrect → returns to Question 3)*

Feedback text: Imagine this. You go to sleep, and when you wake up, your shoes dont fit! If there were a positive correlation between time asleep and shoe size, this is what would happen!

Image alt text: An image of two feet poking out the end of a bed

End Screen (Summary)

On-screen text: Scatterplots are a graphical view 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.

Scatterplot Practice
Manipulate this interactive scatterplot to practice your understanding of positive and negative correlation: Interpreting Correlations.

Correlation Does Not Indicate Causation

Correlational research is useful because it allows us to discover the strength and direction of relationships that exist between two variables. However, correlation is limited because establishing the existence of a relationship tells us little about cause and effect. While variables are sometimes correlated because one does cause the other, it could also be that some other factor, a confounding variable, is actually causing the systematic movement in our variables of interest. In the ice cream/crime rate example mentioned earlier, temperature is a confounding variable that could account for the relationship between the two variables.

Even when we cannot point to clear confounding variables, we should not assume that a correlation between two variables implies that one variable causes changes in another. This can be frustrating when a cause-and-effect relationship seems clear and intuitive. It seems reasonable to assume that smoking causes cancer, but if we were limited to correlational research, we would be overstepping our bounds by making this assumption.

Unfortunately, people mistakenly make claims of causation as a function of correlations all the time. Such claims are especially common in advertisements and news stories.

Here's an Example

Recent research found that people who eat cereal on a regular basis achieve healthier weights than those who rarely eat cereal (Frantzen, Treviño, Echon, Garcia-Dominic, & DiMarco, 2013; Barton et al., 2005). 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 is obese or someone who avoids meals in an attempt to diet?

Does eating cereal really cause someone to be a healthy weight? Image: "Cookie Crisp cereal from the side," by Tim Skillern, Wikimedia Commons, CC BY 3.0.

While correlational research is invaluable in identifying relationships among variables, a major limitation is the inability to establish causality. Psychologists want to make statements about cause and effect, but the only way to do that is to conduct an experiment to answer a research question.

The next section describes how scientific experiments incorporate methods that eliminate, or control for, alternative explanations, which allow researchers to explore how changes in one variable cause changes in another variable.

Illusory Correlations

The temptation to make erroneous cause-and-effect statements based on correlational research is not the only way we tend to misinterpret data. We also tend to make the mistake of illusory correlations, especially with unsystematic observations. Illusory correlations, or false correlations, occur when people believe that relationships exist between two things when no such relationship exists.

Here's an Example

One well-known illusory correlation is the supposed effect that the moon's phases have on human behaviour. Many people passionately assert that human behaviour is affected by the phase of the moon, and specifically, that people act strangely when the moon is full.

There is no denying that the moon exerts a powerful influence on our planet. The ebb and flow of the ocean's tides are tightly tied to the gravitational forces of the moon. Many people believe, therefore, that it is logical that we are affected by the moon as well. After all, our bodies are largely made up of water. A meta-analysis of nearly 40 studies consistently demonstrated, however, that the relationship between the moon and our behaviour does not exist (Rotton & Kelly, 1985).

While we may pay more attention to odd behaviour during the full phase of the moon, the rates of odd behaviour remain constant throughout the lunar cycle.

Many people believe that a full moon makes people behave oddly. Image: "Waxing Gibbous Moon", Wkentaur, Wikipedia, CC BY-SA 3.0.

Why are we so apt to believe in illusory correlations like this? Often we read or hear about them and simply accept the information as valid. Or, we have a hunch about how something works and then look for evidence to support that hunch, ignoring evidence that would tell us our hunch is false; this is known as **confirmation bias**. Other times, we find illusory correlations based on the information that comes most easily to mind, even if that information is severely limited. And while we may feel confident that we can use these relationships to better understand and predict the world around us, illusory correlations can have significant drawbacks. For example, research suggests that illusory correlations—in which certain behaviours are inaccurately attributed to certain groups—are involved in the formation of prejudicial attitudes that can ultimately lead to discriminatory behaviour (Fiedler, 2004).

Causality: Conducting Experiments and Using the Data

As you've learned, the only way to establish that there is a cause-and-effect relationship between two variables is to conduct a scientific experiment. Experiment has a different meaning in the scientific context than in everyday life. In everyday conversation, we often use it to describe trying something for the first time, such as experimenting with a new hairstyle or a new food. However, in the scientific context, an experiment has precise requirements for design and implementation.

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3.4 Conducting Experiments

The Experimental Hypothesis

In order to conduct an experiment, a researcher must have a specific hypothesis to be tested. As you've learned, hypotheses can be formulated either through direct observation of the real world or after careful review of previous research.

Here's an Example

If you think that children should not be allowed to watch violent programming on television because doing so would cause them to behave more violently, then you have basically formulated a hypothesis—namely, that watching violent television programs causes children to behave more violently. How might you have arrived at this particular hypothesis? You may have younger relatives who watch cartoons featuring characters using martial arts to save the world from evildoers, with an impressive array of punching, kicking, and defensive postures. You notice that after watching these programs for a while, your young relatives mimic the fighting behaviour of the characters portrayed in the cartoon.

These sorts of personal observations are what often lead us to formulate a specific hypothesis, but we cannot use limited personal observations and anecdotal evidence to rigorously test our hypothesis. Instead, to find out if real-world data supports our hypothesis, we have to conduct an experiment.

Designing an Experiment

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 experimental manipulation—that is, the treatment or variable being tested (in this case, violent TV images)—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 chance.

Seeing behaviour like this right after a child watches violent television programming might lead you to hypothesize that viewing violent television programming leads to an increase in the display of violent behaviours. Image by 达 李, Pixabay license.

Violent Television and Behaviour

In our example of how violent television programming might affect violent behaviour in children, we have the experimental group view violent television programming for a specified time and then measure their violent behaviour. We measure the violent behaviour in our control group after they watch nonviolent television programming for the same amount of time. It is important for the control group to be treated similarly to the experimental group, with the exception that the control group does not receive the experimental manipulation. Therefore, we have the control group watch non-violent television programming for the same amount of time as the experimental group.

We also need to precisely define, or operationalize, what is considered violent and nonviolent. An **operational definition** is a description of how we will measure our variables, and it is important in allowing others to understand exactly how and what a researcher measures in a particular experiment.

Operationalizing Violent Behaviour

In operationalizing violent behaviour, we might choose to count only physical acts like kicking or punching as instances of this behaviour, or we may also choose to include angry verbal exchanges. Whatever we determine, it is important that we operationalize violent behaviour in such a way that anyone who hears about our study for the first time knows exactly what we mean by violence. This aids people's ability to interpret our data as well as their capacity to repeat our experiment should they choose to do so.

Once we have operationalized what is considered violent television programming and what is considered violent behaviour from our experiment participants, we need to establish how we will run our experiment. In this case, we might have participants watch a 30-minute television program (either violent or nonviolent, depending on their group membership) before sending them out to a playground for an hour, where their behaviour is observed and the number and type of violent acts is recorded..

Ideally, the people who observe and record the children's behaviour are unaware of who was assigned to the experimental or control group, in order to control for **experimenter bias**. Experimenter bias refers to the possibility that a researcher's expectations might skew the results of the study. Remember, conducting an experiment requires a lot of planning, and the people involved in the research project have a vested interest in supporting their hypotheses. If the observers knew which child was in which group, it might influence how

much attention they paid to each child's behaviour as well as how they interpreted that behaviour. By being blind to which child is in which group, we protect against those biases. This situation is a single-blind study, meaning that one of the groups (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.

In a **double-blind study**, both the researchers and the participants are blind to group assignments. Why would a researcher want to run a study where no one knows who is in which group? Because by doing so, we can control for both experimenter and participant expectations. If you are familiar with the phrase placebo effect, you already have some idea as to why this is an important consideration. The **placebo effect** occurs when people's expectations or beliefs influence or determine their experience in a given situation. In other words, simply expecting something to happen can actually make it happen.

Providing the control group with a placebo reduces bias caused by expectancy. Image: "Prescription placebos," US Federal Government, Wikipedia, Public Domain.

The placebo effect is commonly described in terms of testing the effectiveness of a new medication. Imagine that you work in a pharmaceutical company, and you think you have a new drug that is effective in treating depression. To demonstrate that your medication is effective, you run an experiment with two groups: The experimental group receives the medication, and the control group does not. But you don't want participants to know whether they received the drug or not.

Why is that? Imagine that you are a participant in this study, and you have just taken a pill that you think will improve your mood. Because you expect the pill to have an effect, you might feel better simply because you took the pill and not because of any drug actually contained in the pill—this is the placebo effect.

To make sure that any effects on mood are due to the drug and not due to expectations, the control group receives a placebo (in this case, a sugar pill). Now everyone gets a pill, and once again neither the researcher

nor the experimental participants know who got the drug and who got the sugar pill. Any differences in mood between the experimental and control groups can now be attributed to the drug itself rather than to experimenter bias or participant expectations.

Independent and Dependent Variables

In a research experiment, we strive to study whether changes in one thing cause changes in another. To achieve this, we must pay attention to two important variables, or things that can be changed, in any experimental study: the independent variable and the dependent variable. An **independent variable** is manipulated or controlled by the experimenter. In a well-designed experimental study, the independent variable is the only important difference between the experimental and control groups. In our example of how violent television programs affect children's display of violent behaviour, the independent variable is the type of program—violent or nonviolent—viewed by participants in the study. A dependent variable is what the researcher measures to see how much effect the independent variable had. In our example, the dependent variable is the number of violent acts displayed by the experimental participants.

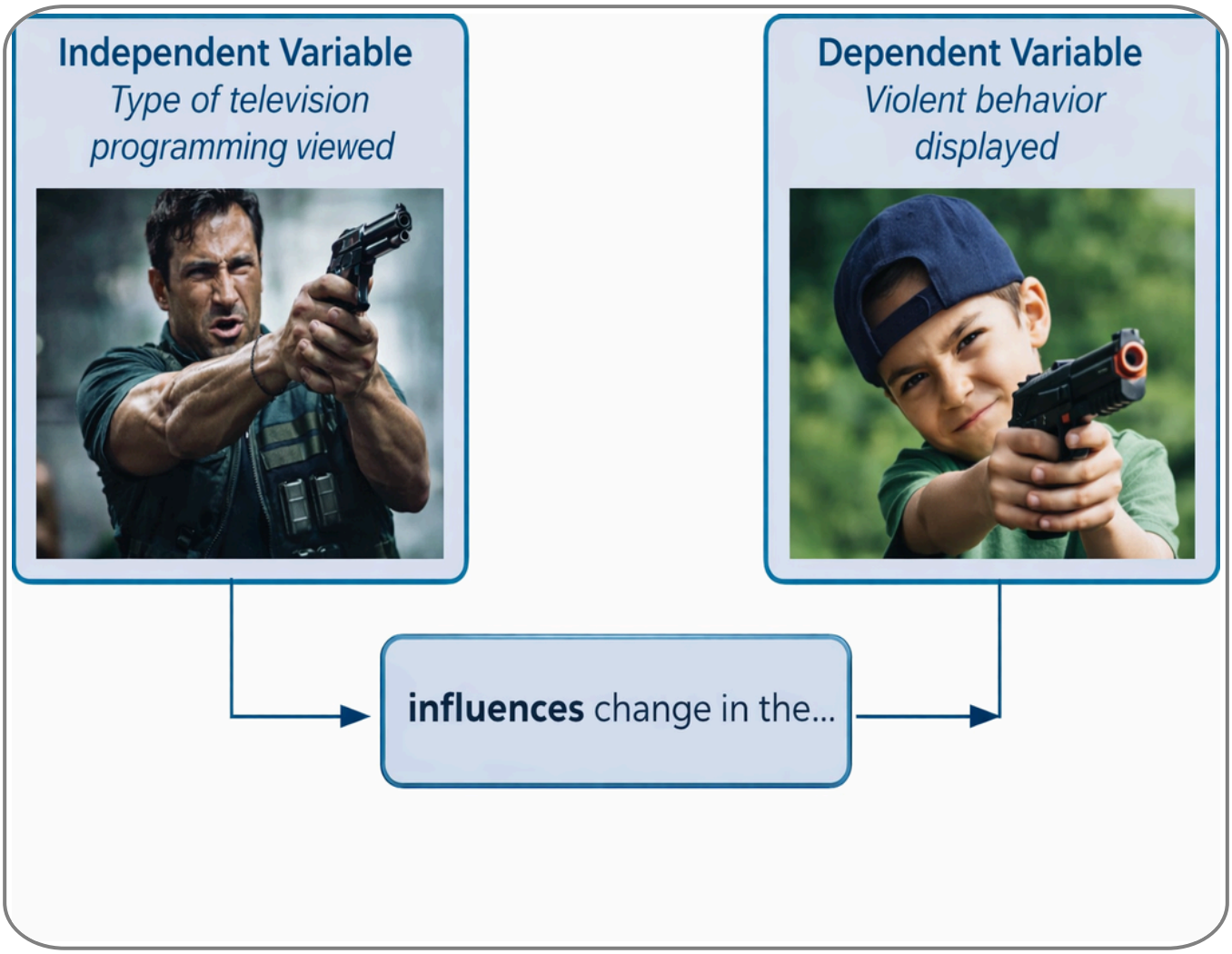

Figure 3.4.1 *Researchers may work with (a) a large population or (b) a sample group that is a subset of the larger population.*

Image Description

Diagram illustrating the relationship between independent and dependent variables. On the left, a blue-bordered box labelled “Independent Variable” with the subtitle “Type of television programming viewed” shows an image of an adult man aiming a handgun. A line and arrow point to a centre box that reads “influences change in the…”. Another arrow continues to the right box labelled “Dependent Variable” with the subtitle “Violent behaviour displayed,” showing an image of a young boy aiming a gun. The arrows indicate that the independent variable influences changes in the dependent variable.

We expect that the dependent variable will change as a function of the independent variable. In other words, the dependent variable depends on the independent variable. A good way to think about the relationship between the independent and dependent variables is with this question: What effect does the independent variable have on the **dependent variable**? Returning to our example, what effect does watching a half hour of violent television programming or nonviolent television programming have on the number of incidents of physical aggression displayed on the playground?

Activity: Test Your Understanding

Quiz Text Descriptions
Activity title: Independent vs. Dependent Variables
General instruction: Click the correct word (dependent/independent) in each sentence.

1. **Allport and intergroup contact**
    1. Intergroup contact is the **independent** variable.
    2. Prejudice is the **dependent** variable.
2. **Childhood talk and adult IQ**
    1. IQ as an adult is the **dependent** variable.
    2. Being talked to as a child is the **independent** variable.
3. **Kindness and well-being (Curry et al., 2018)**
    1. Well-being is the **dependent** variable
    2. Acts of kindness is the **independent** variable.
4. **Hugs and colds (Cohen et al., 2015)**
    1. Hugs are the **independent** variable.
    2. Symptoms associated with the common cold is the **dependent** variable.
5. **Word complexity and perceived intelligence (Oppenheimer, 2006)**
    1. Intelligence of the author is the **dependent** variable.
    2. Complexity of the text is the **independent** variable.
6. **Text formatting and memory (Diemand-Yauman et al., 2011)**
    1. Bolded vs. unbolded text is the **independent** variable.
    2. Memory is the **dependent** variable.
7. **Practice questions and exam performance (Sotola & Crede, 2020)**
    1. Practice quizzes is the **independent** variable.
    2. Performance on the final exam is the **dependent** variable.
8. **Study strategy comparison (Roediger & Karpicke, 2006)**
    1. Studying twice vs. studying once and taking a practice test is the **independent** variable.
    2. Performance on the test one week later is the **dependent** variable.
9. **Number of practice questions (Kornell, Klein, & Rawson, 2015)**
    1. The number of practice questions completed is the **independent** variable.

2. Performance on the test is the **dependent** variable.

Selecting and Assigning Experimental Participants

Now that our study is designed, we need to obtain a sample of individuals to include in our experiment. Our study involves human **participants**, so we need to determine who to include. Participants are the subjects of psychological research, and as the name implies, individuals who are involved in psychological research actively participate in the process. Often, psychological research projects rely on college students to serve as participants. In fact, the vast majority of research in psychology subfields has historically involved students as research participants (Sears, 1986; Arnett, 2008). But are college students truly representative of the general population? College students tend to be younger, more educated, more liberal, and less diverse than the general population. Although using students as test subjects is an accepted practice, relying on such a limited pool of research participants can be problematic because it is difficult to generalize findings to the larger population.

Our hypothetical experiment involves children, and we must first generate a sample of child participants. Samples are used because populations are usually too large to reasonably involve every member in our particular experiment. If possible, we should use a random sample (there are other types of samples, but for the purposes of this chapter, we will focus on random samples). A **random sample** is a subset of a larger population in which every member of the population has an equal chance of being selected. Random samples are preferred because if the sample is large enough, we can be reasonably sure that the participating individuals are representative of the larger population. This means that the percentages of characteristics in the sample—sex, ethnicity, socioeconomic level, and any other characteristics that might affect the results—are close to those percentages in the larger population.

> **In our example,**
> Let's say we decide our population of interest is fourth graders. But all fourth graders is a very large population, so we need to be more specific; instead, we might say our population of interest is all fourth graders in a particular city. We should include students from various income brackets, family situations, races, ethnicities, religions, and geographic areas of town. With this more manageable population, we can work with the local schools in selecting a random sample of around 200 fourth graders who we want to participate in our experiment.

In summary, because we cannot test all of the fourth graders in a city, we want to find a group of about 200 that reflects the composition of that city. With a representative group, we can generalize our findings to the larger population without fear of our sample being biased in some way.

Now that we have a sample, the next step of the experimental process is to split the participants into experimental and control groups through **random assignment**. With random assignment, all participants have an equal chance of being assigned to either group. There is statistical software that will randomly assign each of the fourth graders in the sample to either the experimental or the control group.

Random assignment is critical for sound experimental design. With sufficiently large samples, random assignment makes it unlikely that there are systematic differences between the groups. So, for instance, it would be very unlikely that we would get one group composed entirely of males, a given ethnic identity, or a given reli-

gious ideology. This is important because if the groups were systematically different before the experiment began, we would not know the origin of any differences we find between the groups: Were the differences preexisting, or were they caused by manipulation of the independent variable? Random assignment allows us to assume that any differences observed between experimental and control groups result from the manipulation of the independent variable.

Research Randomizer
Use this online tool to instantly generate randomized numbers and to learn more about random sampling and assignments: Research Randomizer.

Issues to Consider

While experiments allow scientists to make cause-and-effect claims, they are not without problems. True experiments require the experimenter to manipulate an independent variable, and that can complicate many questions that psychologists might want to address. For instance, imagine that you want to know what effect sex (the independent variable) has on spatial memory (the dependent variable). Although you can certainly look for differences between males and females on a task that taps into spatial memory, you cannot directly control a person's sex. We categorize this type of research approach as **quasi-experimental** and recognize that we cannot make cause-and-effect claims in these circumstances.

Experimenters are also limited by ethical constraints. For instance, you would not be able to conduct an experiment designed to determine if experiencing abuse as a child leads to lower levels of self-esteem among adults. To conduct such an experiment, you would need to randomly assign some experimental participants to a group that receives abuse, and that experiment would be unethical.

Interpreting Experimental Findings

Once data is collected from both the experimental and the control groups, a statistical analysis is conducted to find out if there are meaningful differences between the two groups. A statistical analysis determines how likely any difference found is due to chance (and thus not meaningful). In psychology, group differences are considered meaningful, or significant, if the odds that these differences occurred by chance alone are 5 percent or less. Stated another way, if we repeated this experiment 100 times, we would expect to find the same results at least 95 times out of 100.

The greatest strength of experiments is the ability to assert that any significant differences in the findings are caused by the independent variable. This occurs because random selection, random assignment, and a design that limits the effects of both experimenter bias and participant expectancy should create groups that are similar in composition and treatment. Therefore, any difference between the groups is attributable to the independent variable, and now we can finally make a causal statement. If we find that watching a violent television program results in more violent behaviour than watching a nonviolent program, we can safely say that watching violent television programs causes an increase in the display of violent behaviour.

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OpenAI. (2026). ChatGPT. [Large language model]. https://chat.openai.com/chat
Prompts

Figure 3.4.1: “Recreate the existing graphic, and replace the two images.” https://chatgpt.com/. Original source.”

3.5 Conducting Ethical Research

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, in general, approval from the IRB is required for the experiment to proceed.

An institution's IRB meets regularly to review experimental proposals that involve human participants. Image: "IHA Board Meeting 56" by International Hydropower Association, CC BY 2.0 license.

An institution's IRB requires several components in any experiment it approves. For one, each participant must provide 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.

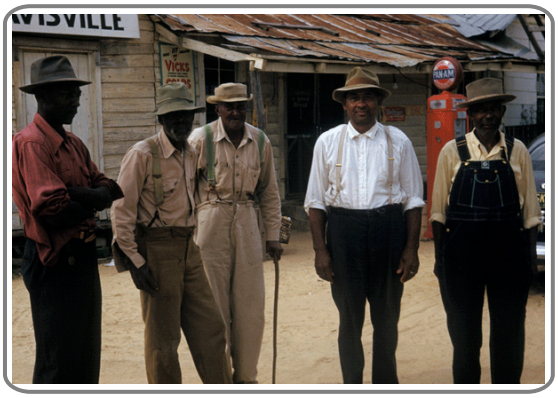
Furthermore, the informed consent guarantees that any data collected in the experiment will remain completely confidential. In some cases, data can be kept anonymous by not having the respondents put any identifying information on their questionnaires. In other cases, the data cannot be anonymous because 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.

Here's an 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.



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. Image: "Photograph of Participants in the Tuskegee Syphilis Study" by the Department of Health, Education, and Welfare, n.d., National Archives Catalogue, public domain.

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 who 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 recognized 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 to 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.

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 minimize the discomfort, illness, and pain of animals. This would include using appropriate anesthesia, 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 would also 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.

Psychologists may use animals in their research, but they make reasonable efforts to minimize the discomfort the animals experience. Image: "Wistar rat" by Janet Stephens, public domain.

Opinions about using animals in research range from complete opposition to their use to strong support (Ormandy & Schuppli, 2014). Some people argue that it is morally unacceptable to experiment on animals, while others recognize 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.

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3.6 Chapter Summary

Questions for Further Discussion

Critical Thinking Questions

1. Earlier in this section, we read about research suggesting that there is a correlation between eating cereal and weight. Cereal companies that present this information in their advertisements could lead someone to believe that eating more cereal causes healthy weight. Why would they make such a claim, and what arguments could you make to counter this cause-and-effect claim?
   Hint
   The cereal companies are trying to make a profit, so framing the research findings in this way would improve their bottom line. However, it could be that people who forgo more fatty options for breakfast are health-conscious and engage in a variety of other behaviours that help them maintain a healthy weight.
2. Recently, a study published in the journal Nutrition and Cancer found a negative correlation between coffee consumption and breast cancer. Specifically, it was found that women consuming more than 5 cups of coffee a day were less likely to develop breast cancer than women who never consumed coffee (Lowcock et al., 2013). Imagine you see a newspaper story about this research that says, "Coffee Protects Against Cancer." Why is this headline misleading, and why would a more accurate headline draw less interest?
   Hint
   Using the word protects seems to suggest causation as a function of correlation. If the headline were more accurate, it would be less interesting because indicating that two things are associated is less powerful than indicating that doing one thing causes a change in the other.
3. Sometimes, true random sampling can be very difficult to obtain. Many researchers make use of convenience samples as an alternative. For example, one popular convenience sample would involve students enrolled in Introduction to Psychology courses. What are the implications of using this sampling technique?
   Hint
   If research is limited to students enrolled in Introduction to Psychology courses, then our ability to generalize to the larger population would be dramatically reduced. One could also argue that students enrolled in Introduction to Psychology courses may not be representative of the larger population of college students at their school, much less the larger general population.
4. Some argue that animal research is inherently flawed in terms of being ethical because unlike human participants, animals do not consent to be involved in research. Do you agree with this perspective? Given that animals do not consent to be involved in research projects, what sorts of extra precautions should be taken to ensure that they receive the most humane treatment possible?
   Hint
   In general, the fact that consent cannot be obtained from animal research subjects places extra responsibility on the researcher to ensure that the animal is treated as humanely as possible and

to respect the sacrifice that the animal is making for the advancement of science. Like human research, the animals themselves should also receive some of the benefits of the research, and they do in the form of advanced veterinary medicine, and so on.

5. At the end of the last section, you were asked to design a basic experiment to answer some questions of interest. What ethical considerations should be made with the study you proposed to ensure that your experiment would conform to the scientific community's expectations of ethical research?
   Hint
   Take a few minutes to think about all of the advancements that our society has achieved as a function of research involving animal subjects. How have you, a friend, or a family member benefited directly from this kind of research?

Personal Application Questions

1. We all have a tendency to make illusory correlations from time to time. Try to think of an illusory correlation that is held by you, a family member, or a close friend. How do you think this illusory correlation came about, and what can be done in the future to combat it?
2. Are there any questions about human or animal behaviour that you would really like to answer? Generate a hypothesis and briefly describe how you would conduct an experiment to answer your question.
3. Take a few minutes to think about all of the advancements that our society has achieved as a function of research involving animal subjects. How have you, a friend, or a family member benefited directly from this kind of research?

Key Terms

- **Archival Research:** a method of research using past records or data sets to answer various research.
- **Cause-and-effect Relationship:** changes in one variable cause changes in the other variable; can be determined only through an experimental research design.
- **Clinical or Case Study:** Observational research study focusing on one or a few people.
- **Confounding Variable:** an unanticipated outside factor that affects both variables of interest, often giving the false impression that changes in one variable cause changes in the other variable, when, in actuality, the outside factor causes changes in both variables.
- **Confirmation Bias:** the tendency to ignore evidence that disproves ideas or beliefs.
- **Control Group:** serves as a basis for comparison and controls for chance factors that might influence the results of the study, by holding such factors constant across groups so that the experimental manipulation is the only difference between groups
- **Correlation:** a relationship between two or more variables; when two variables are correlated, one variable changes as the other does ("Correlation" by Steven Barnes. CC BY.).
- **Correlation Coefficient:** a number from -1 to +1, indicating the strength and direction of the relationship between variables, and usually represented by r.
- **Deductive Reasoning:** results are predicted based on a general premise.
- **Dependent Variable:** the variable that the researcher measures to see how much effect the independent variable had.
- **Double-blind Study:** an experiment in which both the researchers and the participants are blind to group assignments.
- **Empirical:** grounded in objective, tangible evidence that can be observed time and time again, regardless of who is observing.
- **Experimenter Bias:** the researcher's expectations skew the results of the study.
- **Experimental Group:** group designed to answer the research question; experimental manipulation is the only difference between the experimental and control groups, so any differences between the two are due to experimental manipulation rather than chance.
- **Fact:** objective and verifiable observation, established using evidence collected through empirical research.
- **Falsifiable:** able to be disproven by experimental results.
- **Generalize:** inferring that the results for a sample apply to the larger population.
- **Hypothesis:** (plural: hypotheses) a tentative and testable statement about the relationship between two or more variables.
- **Illusory Correlation:** seeing relationships between two things when in reality no such relationship exists.
- **Independent Variable:** variable that is influenced or controlled by the experimenter; in a sound experimental study, the independent variable is the only important difference between the experimental and control group.
- **Inductive Reasoning:** conclusions are drawn from observations.
- **Inter-rater Reliability:** a measure of agreement among observers on how they record and classify

a particular event.

- **Naturalistic Observation:** observation of behaviour in its natural setting.
- **Negative Correlation:** two variables change in different directions, with one becoming larger as the other becomes smaller; a negative correlation is not the same thing as no correlation.
- **Observer Bias:** when observations may be skewed to align with observer expectations.
- **Operational Definition:** description of what actions and operations will be used to measure the dependent variables and manipulate the independent variables.
- **Opinion:** personal judgments, conclusions, or attitudes that may or may not be accurate.
- **Participants:** subjects of psychological research.
- **Peer-reviewed Journal Article:** article read by several other scientists (usually anonymously) with expertise in the subject matter, who provide feedback regarding the quality of the manuscript before it is accepted for publication.
- **Placebo Effect:** people's expectations or beliefs influencing or determining their experience in a given situation.
- **Population:** an overall group of individuals that the researchers are interested in.
- **Positive Correlation:** two variables change in the same direction, both becoming either larger or smaller.
- **Random Assignment:** a method of experimental group assignment in which all participants have an equal chance of being assigned to either group.
- **Random Sample:** a subset of a larger population in which every member of the population has an equal chance of being selected.
- **Reliability:** consistency and reproducibility of a given result.
- **Replicate:** repeating an experiment using different samples to determine the research's reliability.
- **Sample:** a subset of individuals selected from the larger population.
- **Single-blind Study:** an experiment in which the researcher knows which participants are in the experimental group and which are in the control group.
- **Statistical Analysis:** determines how likely any difference between experimental groups is due to chance.
- **Structured Observation:** In these case studies, people are observed while engaging in set, specific tasks.
- **Survey:** list of questions to be answered by research participants—given as paper-and-pencil questionnaires, administered electronically, or conducted verbally—allowing researchers to collect data from a large number of people.
- **Theory:** a well-developed set of ideas that proposes an explanation for observed phenomena.
- **Validity:** accuracy of a given result in measuring what it is designed to measure.

Let's Review: Activity

Activity 1

Quiz Text Description

1. MultiChoice Activity

Geller, Russ, and Altomari (1986) were interested in the beer-drinking behaviour of college students. They sat in bars and took notes of how much beer college students drank by the glass, bottle, and pitcher. They found college students drank the most beer when it was out of a pitcher, then a bottle, then a glass. What type of research design did these researchers use?

a. Correlational
b. Experimental
c. Observational
d. Case study
e. Survey

2. MultiChoice Activity

Zeidan, Johnson, Gordon, and Goolkasian (2010) divided their sample of 82 undergraduate students into three groups. The first group engaged in mindfulness meditation. The second group was based in sham (fake) meditation exercises, and the third group did nothing. The results found that participants in the mindfulness meditation group reported lower negative mood, depressive symptoms, and fatigue compared to the participants in the other two groups. What type of research design does this study use?

a. Case study
b. Observational
c. Survey
d. Experimental
e. Correlational

3. MultiChoice Activity

Research into personality shows that our personality is relatively stable. Some researchers are interested in the relationship between personality variables and student success (for example, see Porpopat, 2014). If you were to advise a type of research design to study the relationship between personality and success at school, which research design is most suited to this research question?

a. Correlational
b. Case study

c. Observational
d. Experimental
e. Survey

4. MultiChoice Activity

Canada's regretful history with Aboriginal Canadians has led to several staggering statistics. For instance, research published by the Public Health Agency of Canada (2007) shows that Aboriginal Canadians have tuberculosis rates that are 26.4 times higher than Canadian-born non-Aboriginal peoples. Other research found that between 2004 and 2006 suicide rates among the First Nations youth was up to 33 times higher than in the rest of Canada (see Oliver, Peters, & Kohen, 2012). What type of research design did these studies most likely use?

a. Case study
b. Observational
c. Survey
d. Correlational
e. Experimental

5. MultiChoice Activity

Leigh and colleagues (2020) were interested in the Canadian public's knowledge, beliefs, and behaviours regarding COVID-19. Surveying 2000 Canadians, they found that 20% of their sample knew someone who had been diagnosed with COVID-19. They also found that the vast majority of their sample (80%) were complying with the government's physical distancing rules. What type of research design does this represent?

a. Correlational
b. Experimental
c. Observational
d. Survey
e. Case study

6. MultiChoice Activity

Can you remember what clothes you wore on August 15th, 2019? People with *hyperthymesia* (also known as highly superior autobiographical memory) can. People with hyperthymesia can remember events from their past, including the days and dates on which they occurred, and in precise detail.

Only six people with hyperthymesia have been confirmed in the world as of 2016. If a researcher wanted to study hyperthymesia, what research design is most suited to studying people with this condition?

a. Observational
b. Survey
c. Case study
d. Experimental
e. Correlational

7. MultiChoice Activity

Mueller and Dweck (1998), in a series of studies, showed that students who were praised for their effort subsequently outperformed students who were praised for their intelligence. What type of research design does this represent?

a. Case study
b. Experimental
c. Survey
d. Correlational
e. Observational

Solution:

1. c. Observational
2. d. Experimental
3. a. Correlational
4. c. Survey
5. d. Survey
6. c. Case study
7. b. Experimental

Activity 2

Quiz Text Description

1. MultiChoice Activity

_____ is to animal research as _____ is to human research.

a. informed consent; deception
b. IACUC; IRB
c. IRB; IACUC
d. deception; debriefing

2. MultiChoice Activity

Researchers might use _____ when providing participants with the full details of the experiment could skew their responses.

a. deception
b. informed consent
c. ethics
d. debriefing

3. MultiChoice Activity

A person's participation in a research project must be _____.

a. voluntary

b. confidential
c. public
d. rewarded

4. MultiChoice Activity

Before participating in an experiment, individuals should read and sign the _____ form.

a. IRB
b. informed consent
c. debriefing
d. ethics

Solution:

1. b. IACUC; IRB
2. a. deception
3. a. voluntary
4. b. informed consent

CHAPTER 4: HISTORICAL AND CONTEMPORARY PERSPECTIVES IN PSYCHOLOGY

Chapter Overview

4.0 Learning Objectives
4.1 The History of Psychology
4.2 Early Psychology – Structuralism and Functionalism
4.3 The History of Psychology – Psychoanalytic Theory and Gestalt Psychology
4.4 The History of Psychology – Behaviourism and Humanism
4.5 The History of Psychology – The Cognitive Revolution and Beyond
4.6 A Note About the Present
4.7 Chapter Summary

4.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Explain the importance of Wundt and James in the development of psychology.
2. Describe Freud's influence on psychology.
3. Summarize the basic tenets of Gestalt psychology.
4. Explain the role that behaviourism played in psychology's history.
5. Summarize the basic tenets of humanism.
6. Explain how the cognitive revolution shifted psychology's focus back to the mind.
7. Describe the focus of feminist, cross-cultural, and multicultural psychology, as well as racial and identity theory.

Chapter Overview

In this chapter, we will examine schools of thought that helped to shape psychology as it exists as a discipline today. We will acknowledge the limitations of this chapter and recognize that the contributions of women and people of colour are often excluded from the mainstream intro psych curriculum. We will trace the study of human behaviour from structuralism through the cognitive revolution and the emergence of feminist and cross-cultural psychology.

4.1 The History of Psychology

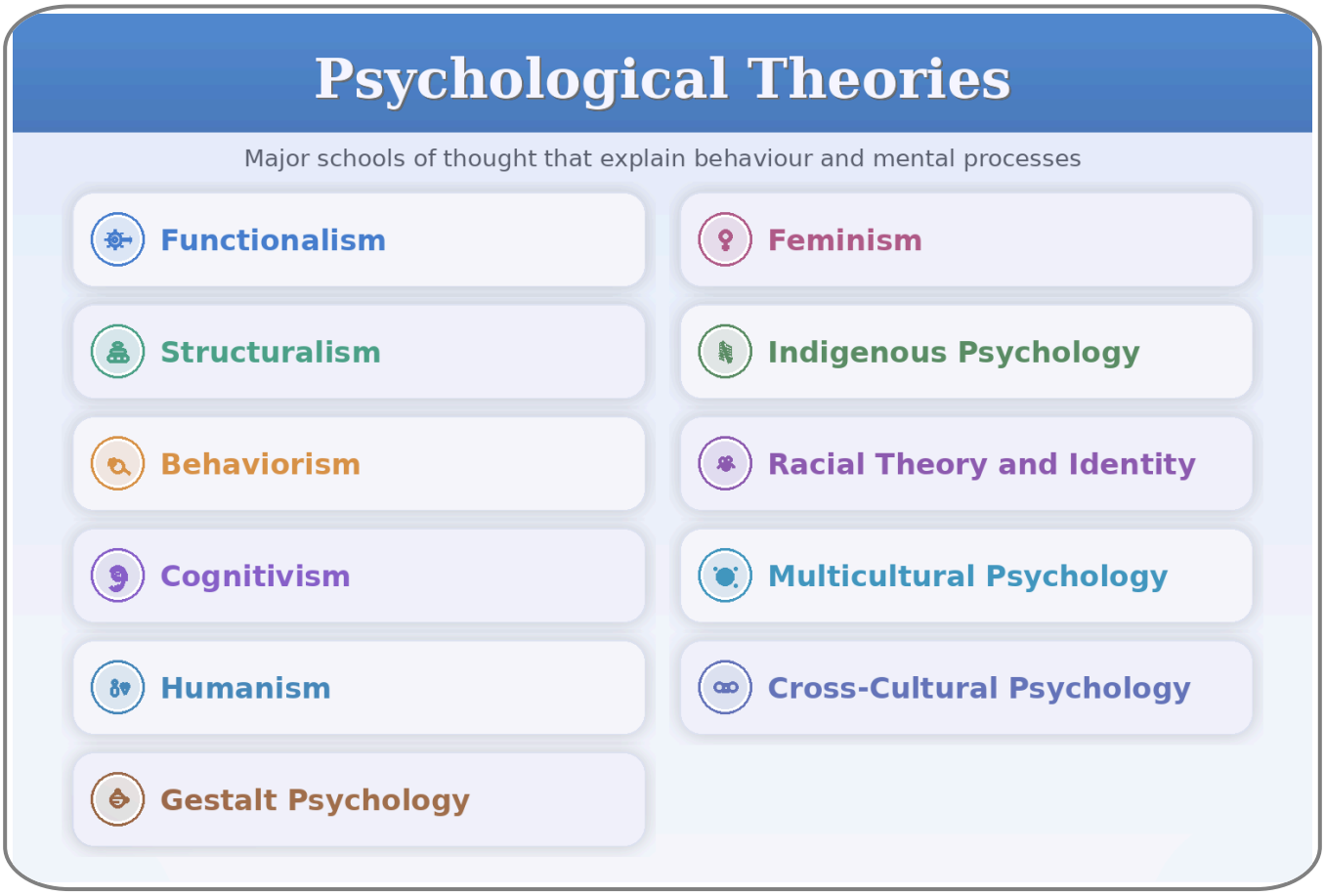


Figure 4.1. *Psychology Theories. Refer to Table 4.1 for definitions*

In this chapter, we discuss some of the early schools of thought that shaped psychology as a discipline.

Overview of Psychological Theories

Table 4.1: Psychological Theories with Definitions

Theory	Description
Functionalism	Studies mental life and emphasizes adaptation to environments.
Structuralism	Analyses consciousness, breaking it into elemental structures.
Behaviourism	Observes behaviour, ignoring internal mental state analysis.
Cognitivism	Emphasizes internal mental processes, beyond observable behaviour.
Humanism	Focuses on individual potential, emphasizing 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.

Women in Psychology

Although rarely given credit, women have been contributing to psychology since its inception as a field of study. In 1894, Margaret Floy Washburn was the first woman to be awarded a doctoral degree in psychology. She wrote *The Animal Mind: A Textbook of Comparative Psychology*, and it was the standard in the field for over 20 years. In the mid-1890s, Mary Whiton Calkins completed all requirements toward a PhD in psychology, but Harvard University refused to award her that degree because she was a woman. She had been taught and mentored by William James, who tried and failed to convince Harvard to award her the doctoral degree. Her memory research studied primacy and recency (Madigan & O'Hara, 1992), and she also wrote about how structuralism and functionalism both explained self-psychology (Calkins, 1906).

Another influential woman, Mary Cover Jones, conducted a study she considered to be a sequel to John B. Watson's study of Little Albert (you'll learn about this study in the chapter on Learning). Jones' unconditioned fear of Little Peter, who had been afraid of rabbits (Jones, 1924).

Ethnic minority women contributing to the field of psychology include Martha Bernal and Inez Beverly Prosser; their studies were related to education. Bernal, the first Latina to earn her doctoral degree in psychology (1962), conducted much of her research with Mexican American children. Prosser was the first African American woman to receive a PhD in 1933 at the University of Cincinnati (Benjamin et al., 2005).

Consider This

There are many other individuals who made significant contributions to the discipline of psychology who are overlooked in chapters (such as this one). It will probably not surprise you that those noticeably absent from these texts are often women and people of colour (Cramblet Alvarez et al., 2020).

In an OER titled Open History of Psychology: The Lives and Contributions of Marginalized Psychology Pioneers, authors Alison E. Kelly and Brittany N. Avila highlight the lives and achievements of some of these pioneers. I encourage you to check out this resource and to critically consider this chapter in light of not only those individuals whose legacies are celebrated, but also those who have been overlooked. Kelly et al. (2025) note the need for change and the benefits of creating a more inclusive curriculum.

Table 1 was adapted from Creative Tensions in Psychology Copyright © 2024 by Jessica Motherwell McFarlane, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted.

"Women in Psychology" was adapted from 1.2 History of Psychology in Psychology – 2e by Rose M. Spielman, William J. Jenkins, Marilyn D. Lovett from OpenStax, which is licensed under Creative Commons Attribution 4.0 International License.

OpenAI. (2026). ChatGPT. [Large language model]. https://chat.openai.com/chat
Prompts

Psychology theories image: "Create an image with a similar design as previous iterations that contains the following provided list of psychology theories."

4.2 Early Psychology – Structuralism and Functionalism

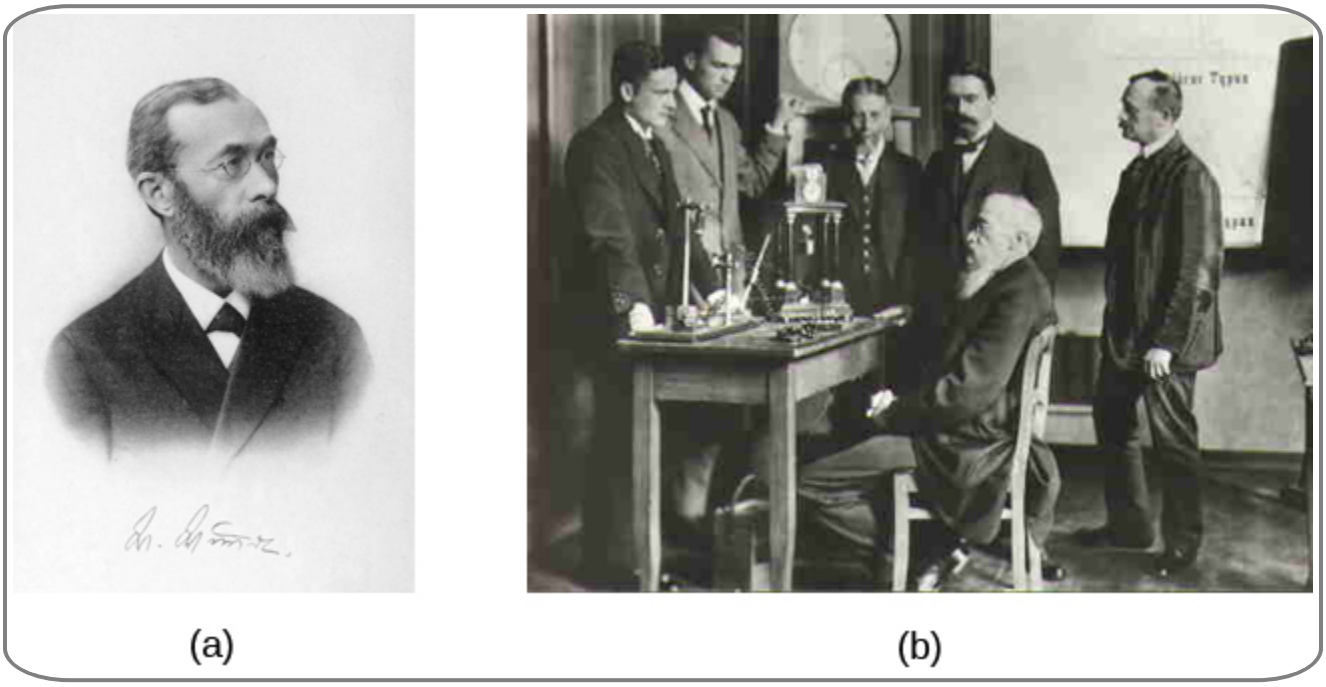
Psychology is a relatively young science with its experimental roots in the 19th century, compared, for example, to human physiology, which dates much earlier. As mentioned, anyone interested in exploring issues related to the mind generally did so in a philosophical context prior to the 19th century. Two men, working in the 19th century, are generally credited as being the founders of psychology as a science and academic discipline that was distinct from philosophy. Their names were Wilhelm Wundt and William James.

Wundt and Structuralism

Wilhelm Wundt (1832–1920) was a German scientist who was the first person to be referred to as a psychologist. His famous book entitled *Principles of Physiological Psychology* was published in 1873. Wundt viewed psychology as a scientific study of conscious experience, and he believed that the goal of psychology was to identify components of consciousness and how those components combined to result in our conscious experience. Wundt used introspection (he called it "internal perception"), a process by which someone examines their own conscious experience as objectively as possible, making the human mind like any other aspect of nature that a scientist observes.

Wundt's version of introspection used only very specific experimental conditions in which an external stimulus was designed to produce a scientifically observable (repeatable) experience of the mind (Danziger, 1980). The first stringent requirement was the use of "trained" or practiced observers, who could immediately observe and report a reaction. The second requirement was the use of repeatable stimuli that always produced the same experience in the subject and allowed the subject to expect and thus be fully attentive to the inner reaction. These experimental requirements were put in place to eliminate "interpretation" in the reporting of internal experiences and to counter the argument that there is no way to know that an individual is observing their mind or consciousness accurately, since it cannot be seen by any other person.

This attempt to understand the structure or characteristics of the mind was known as **structuralism**. Wundt established his psychology laboratory at the University at Leipzig in 1879. In this laboratory, Wundt and his students conducted experiments on, for example, reaction times. A subject, sometimes in a room isolated from the scientist, would receive a stimulus such as a light, image, or sound. The subject's reaction to the stimulus would be to push a button, and an apparatus would record the time to reaction. Wundt could measure reaction time to one-thousandth of a second (Nicolas & Ferrand, 1999).



(a) Wilhelm Wundt is credited as one of the founders of psychology. He created the first laboratory for psychological research. (b) This photo shows him seated and surrounded by fellow researchers and equipment in his laboratory in Germany. Images: "Wilhelm Wundt", by Wellcome Library, Wikimedia Commons, Public Domain, and "Wundt Research Group" by Author unknown, Wikipedia, Public Domain.

However, despite his efforts to train individuals in the process of introspection, this process remained highly subjective, and there was very little agreement between individuals. As a result, structuralism fell out of favour with the passing of Wundt's student, Edward Titchener, in 1927 (Gordon, 1995).

Activity: Test Your Understanding

Quiz Text Description
Wilhelm Wundt and Edward Titchener's approach to asking patients to look inward and describe their feelings was a part of their broader strategy to understand consciousness. This was called_____.

a. structuralism
b. functionalism
c. inner consciousness
d. psychoanalysis

Solution:

Correct answer(s): a. structuralism

Let's Watch

Watch this video to learn more about the early history of psychology.

Video: "Psychology 101 – Wundt & James: Structuralism & Functionalism – Vook" by VookInc [1:11] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube.*

James and Functionalism

William James (1842–1910) was the first American psychologist to espouse a different perspective on how psychology should operate. James was introduced to Darwin's theory of evolution by natural selection and accepted it as an explanation of an organism's characteristics. Key to that theory is the idea that natural selection leads to organisms that are adapted to their environment, including their behaviour. Adaptation means that a trait of an organism has a function for the survival and reproduction of the individual, because it has been naturally selected. As James saw it, psychology's purpose was to study the function of behaviour in the world, and as such, his perspective was known as **functionalism**.

William James, shown here in a self-portrait, was the first American psychologist. Image: "Self-portrait," Wikimedia Commons, Public Domain.

Functionalism focused on how mental activities helped an organism fit into its environment. Functionalism has a second, more subtle meaning in that functionalists were more interested in the operation of the whole mind rather than of its individual parts, which were the focus of structuralism. Like Wundt, James believed that introspection could serve as one means by which someone might study mental activities, but James also relied on more objective measures, including the use of various recording devices and examinations of concrete products of mental activities and of anatomy and physiology (Gordon, 1995).

Activity: Test Your Understanding

Quiz Text Description
William James's focus on how mental activities help a person adapt to his or her environment is known as _____.

a. structuralism
b. functionalism
c. psychoanalysis
d. inner consciousness

Solution:

Correct answer(s): b. functionalism

The Early Schools of Psychology (No Longer Active)

- **Structuralism:** Focused on understanding the conscious experience through introspection.
- **Functionalism:** Emphasized how mental activities helped an organism adapt to its environment

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

_____ focused on examining the physiology of one's behavior and other psychological aspects of the mind.

a. Wilhelm Wundt
b. William James

2. MultiChoice Activity

In the late 19th century, the early school of psychology that was heavily influenced by biology was _____.

a. psychodynamic
b. phrenology
c. functionalism
d. structuralism

3. MultiChoice Activity

This psychologist argued that psychology is independent from philosophy. He believed that the conscious elements of the mind should be scientifically studied and classified.

a. Wilhelm Wundt
b. Edward Titchener

4. MultiChoice Activity

Which school of psychology was more likely to focus on the operation of the entire mind instead of specific parts?

a. psychoanalysis
b. cognitive psychology
c. functionalism
d. structuralism

Solution:

1. b. William James
2. c. functionalism
3. a. Wilhelm Wundt
4. c. functionalism

Quiz Text Description
This activity contains a set of dialog cards, which are described below.
Activity Description or Instruction:

1. functionalism
2. structuralism

Solution:

1. focused on how mental activities helped an organism adapt to its environment
2. understanding the conscious experience through introspection

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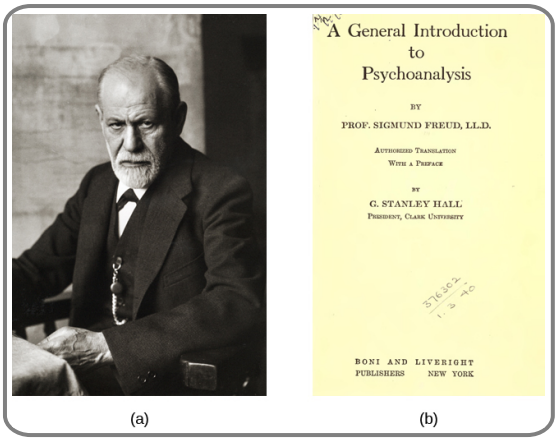
4.3 The History of Psychology - Psychoanalytic Theory and Gestalt Psychology

Perhaps one of the most influential and well-known figures in psychology's history was Sigmund Freud. Freud (1856–1939) was an Austrian neurologist who was fascinated by patients suffering from "hysteria" and neurosis. Hysteria was an ancient diagnosis for disorders, primarily of women with a wide variety of symptoms, including physical symptoms and emotional disturbances, none of which had an apparent physical cause. Freud theorized that many of his patients' problems arose from the unconscious mind. In Freud's view, the unconscious mind was a repository of feelings and urges of which we have no awareness. Gaining access to the unconscious, then, was crucial to the successful resolution of the patient's problems.



(a) Sigmund Freud was a highly influential figure in the history of psychology. (b) One of his many books, A General Introduction to Psychoanalysis, shared his ideas about psychoanalytical therapy; it was published in 1922. Image: "Sigmund Freud," by Ferdinand Schmutzer, Wikipedia and "Freud – A general introduction," by Wikisource, Public Domain.

According to Freud, the unconscious mind could be accessed through dream analysis, by examinations of the first words that came to people's minds, and through seemingly innocent slips of the tongue. **Psychoanalytic theory** focuses on the role of a person's unconscious, as well as early childhood experiences, and this particular perspective dominated clinical psychology for several decades (Thorne & Henley, 2005). Psychoanalytical theory is often used interchangeably with psychodynamic theory, but psychodynamic theory generally applies to a broader field of study based on Freud's theories as well as those of his followers.

Id, Ego, and Superego

Freud's structural model of personality divides the personality into three parts: the id, the ego, and the superego. The id is the unconscious part that is the cauldron of raw drives, such as for sex or aggression. The ego, which has conscious and unconscious elements, is the rational and reasonable part of personality. Its role is to maintain contact with the outside world to keep the individual in touch with society, and to do this, it mediates between the conflicting tendencies of the id and the superego. The superego is a person's conscience, which develops early in life and is learned from parents, teachers, and others. Like the ego, the superego has conscious and unconscious elements. When all three parts of the personality are in dynamic equilibrium, the individual is thought to be mentally healthy. However, if the ego is unable to mediate between the id and the superego, an imbalance is believed to occur in the form of psychological distress.

Freud's theory of the unconscious. Freud believed that we are only aware of a small amount of our mind's activity, and that most of it remains hidden from us in our unconscious. The information in our unconscious affects our behaviour, although we are unaware of it. Image: "Iceberg," by Uwe Kils, Wikimedia Commons, CC BY-SA 3.0.

Psychosexual Theory of Development

Freud's theories also placed a great deal of emphasis on sexual development. Freud believed that each of us must pass through a series of stages during childhood, and that if we lack proper nurturing during a particular stage, we may become stuck or fixated in that stage. Freud's psychosexual model of development includes five stages: oral, anal, phallic, latency, and genital. According to Freud, children's pleasure-seeking urges are focused on a different area of the body, called an erogenous zone, at each of these five stages. Psychologists today dispute that Freud's psychosexual stages provide a legitimate explanation for how personality develops, but what we can take away from Freud's theory is that personality is shaped, in some part, by experiences we have in childhood.

Freud's ideas were influential, and you will learn more about them when you study lifespan development, personality, and therapy. For instance, many therapists believe strongly in the unconscious and the impact of early childhood experiences on the rest of a person's life. The method of psychoanalysis, which involves the patient talking about their experiences and selves, while not invented by Freud, was certainly popularized by him and is still used today. Many of Freud's other ideas, however, are controversial.

Activity: Test Your Understanding

Quiz Text Description
This activity contains a set of dialogue cards, which are described below.
Activity Description or Instruction:

1. psychoanalytic theory

Solution:

1. focus on the role of the unconscious in affecting conscious behavior

Wertheimer, Koffka, Köhler and Gestalt Psychology

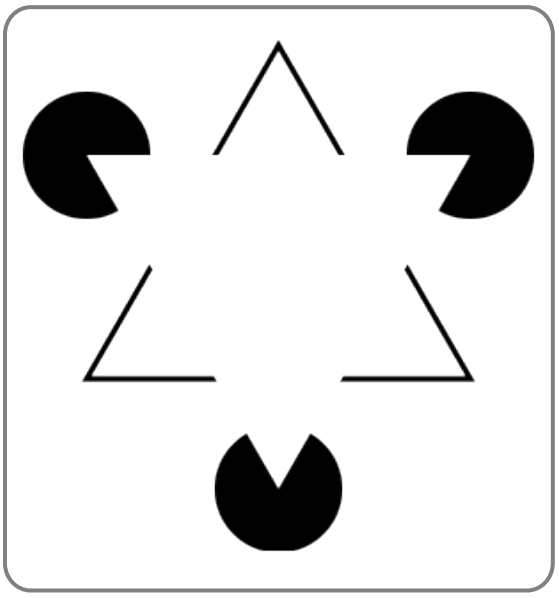
Sketch of a the head of a duck.

When you look at this image, you may see a duck or a rabbit. The sensory information remains the same, but your perception can vary dramatically. Image: Psychology 2e, by OpenStax (2020), Rice University, CC BY 4.0.

Max Wertheimer (1880–1943), Kurt Koffka (1886–1941), and Wolfgang Köhler (1887–1967) were three German psychologists who immigrated to the United States in the early 20th century to escape Nazi Germany. These men are credited with introducing psychologists in the United States to various Gestalt principles. The word Gestalt roughly translates to "whole." A major emphasis of **Gestalt psychology** deals with the fact that although a sensory experience can be broken down into individual parts, how those parts relate to each other as a whole is often what the individual responds to in perception. For example, a song may be made up of individual notes played by different instruments, but the real nature of the song is perceived in the combinations of these notes as they form the melody, rhythm, and harmony. In many ways, this particular perspective would have directly contradicted Wundt's ideas of structuralism (Thorne & Henley, 2005).

Unfortunately, in moving to the United States, these men were forced to abandon much of their work and were unable to continue to conduct research on a large scale. These factors, along with the rise of behaviourism (described next) in the United States, prevented principles of Gestalt psychology from being as influential in the United States as they had been in their native Germany (Thorne & Henley, 2005). Despite these issues, several Gestalt principles are still very influential today. Considering the human individual as a whole rather than as a sum of individually measured parts became an important foundation in humanistic theory late in the century. The ideas of Gestalt have continued to influence research on sensation and perception.

Structuralism, Freud, and the Gestalt psychologists were all concerned in one way or another with describing and understanding inner experience. But other researchers had concerns that inner experience could be a legitimate subject of scientific inquiry and chose instead to exclusively study behaviour, the objectively observable outcome of mental processes.



The "invisible" triangle you see here is an example of Gestalt. Image: General Psychology, by OpenStax and Lumen Learning, Rice University, CC BY 4.0.

Activity: Test Your Understanding

Quiz Text Description

Which quote can be best attributed to Gestalt Psychology?

a. "The real problem is not whether machines think, but whether men do." -Skinner
b. "Dreams are the royal road to the unconscious." -Freud
c. "Give me a child until he is 7 and I will show you the man." -Aristotle
d. "The whole is other than the sum of its parts." -Koffka

Solution:

Correct answer(s): d. "The whole is other than the sum of its parts." -Koffka

Consider This

Freud is probably one of the most well-known historical figures in psychology. Where have you encountered references to Freud or his ideas about the role that the unconscious mind plays in determining conscious behavior?

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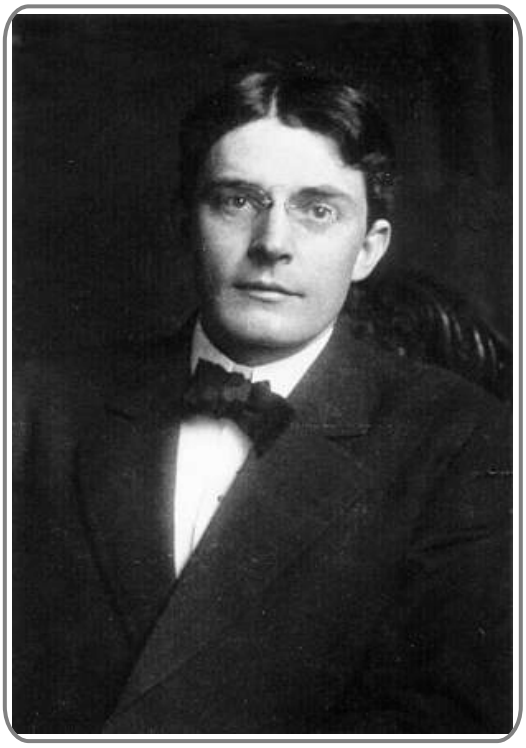
4.4 The History of Psychology - Behaviourism and Humanism

Behavioral Psychology

Early work in the field of behaviour was conducted by the Russian physiologist Ivan Pavlov (1849–1936). Pavlov studied a form of learning behaviour called a conditioned reflex, in which an animal or human produced a reflex (unconscious) response to a stimulus and, over time, was conditioned to produce the response to a different stimulus that the experimenter associated with the original stimulus. The reflex Pavlov worked with was salivation in response to the presence of food. The salivation reflex could be elicited using a second stimulus, such as a specific sound, that was presented in association with the initial food stimulus several times. Once the response to the second stimulus was "learned," the food stimulus could be omitted. Pavlov's "classical conditioning" is only one form of learning behaviour studied by behaviourists.



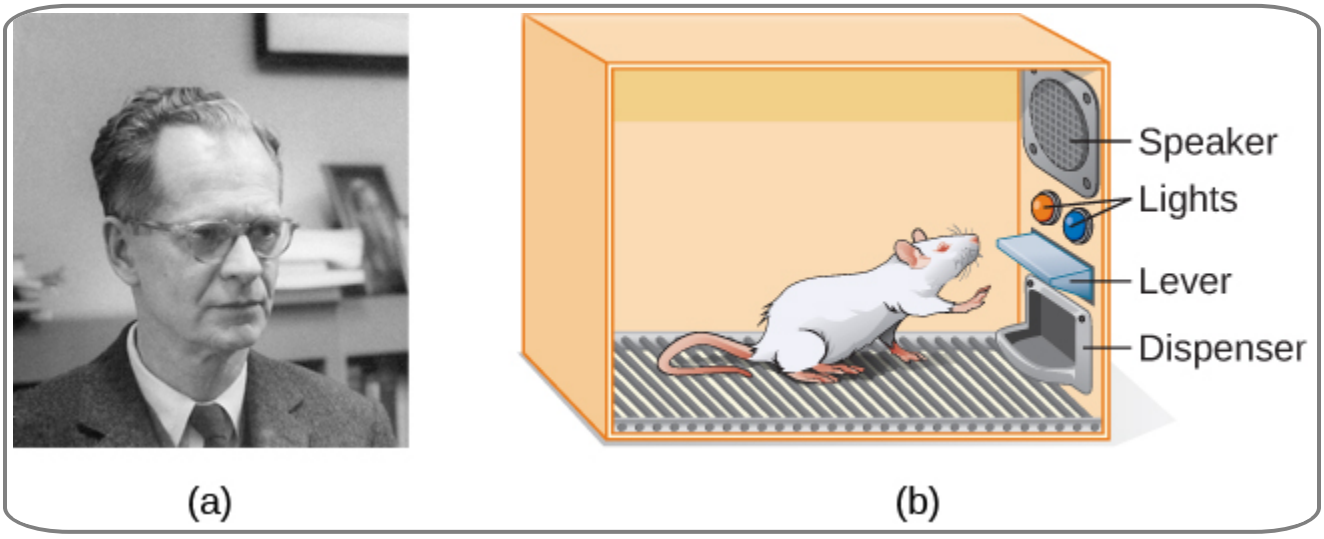
John B. Watson is known as the father of behaviourism within psychology. Image: "John Broadus Watson at Johns Hopkins," Wikipedia, Public Domain.

John B. Watson (1878–1958) was an influential American psychologist whose most famous work occurred during the early 20th century at Johns Hopkins University. While Wundt and James were concerned with understanding conscious experience, Watson thought that the study of consciousness was flawed. Because he believed that objective analysis of the mind was impossible, Watson preferred to focus directly on observable behaviour and try to bring that behaviour under control. Watson was a major proponent of shifting the focus of psychology from the mind to behaviour, and this approach of observing and controlling behaviour came to be known as **behaviourism**. A major object of study by behaviourists was learned behaviour and its interaction with inborn qualities of the organism. Behaviourism commonly used animals in experiments under the assumption that what was learned using animal models could, to some degree, be applied to human behaviour. Indeed, Tolman (1938) stated, "I believe that everything important in psychology (except … such matters as involve society and words) can be investigated in essence through the continued experimental and theoretical analysis of the determiners of rat behaviour at a choice-point in a maze."

Behaviourism dominated experimental psychology for several decades, and its influence can still be felt today (Thorne & Henley, 2005). Behaviourism is largely responsible for establishing psychology as a scientific discipline through its objective methods and especially experimentation. In addition, it is used in behavioural and cognitive-behavioural therapy. Behaviour modification is commonly used in classroom settings. Behaviourism has also led to research on environmental influences on human behaviour.

B. F. Skinner (1904–1990) was an American psychologist. Like Watson, Skinner was a behaviourist, and he concentrated on how behaviour was affected by its consequences. Therefore, Skinner spoke of reinforcement and punishment as major factors in driving behaviour. As a part of his research, Skinner developed a chamber that allowed the careful study of the principles of modifying behaviour through reinforcement and punishment.

This device, known as an operant conditioning chamber (or more familiarly, a Skinner box), has remained a crucial resource for researchers studying behaviour (Thorne & Henley, 2005).



B. F. Skinner is famous for his research on operant conditioning. (b) Modified versions of the operant conditioning chamber, or Skinner box, are still widely used in research settings today. Image: "B.F. Skinner at the Harvard Psychology Department," modification of work by "Silly rabbit," Wikimedia Commons, CC BY 3.0.

The Skinner box is a chamber that isolates the subject from the external environment and has a behaviour indicator, such as a lever or a button. When the animal pushes the button or lever, the box is able to deliver a positive reinforcement of the behaviour (such as food) or a punishment (such as a noise) or a token conditioner (such as a light) that is correlated with either the positive reinforcement or punishment.

Skinner's focus on positive and negative reinforcement of learned behaviors had a lasting influence in psychology that has waned somewhat since the growth of research in cognitive psychology. Despite this, conditioned learning is still used in human behavioral modification. Skinner's two widely read and controversial popular science books about the value of operant conditioning for creating happier lives remain as thought-provoking arguments for his approach (Greengrass, 2004).

During the early 20th century, American psychology was dominated by behaviourism and psychoanalysis. However, some psychologists were uncomfortable with what they viewed as limited perspectives being so influential to the field. They objected to the pessimism and determinism (all actions driven by the unconscious) of Freud. They also disliked the reductionism, or simplifying nature, of behaviourism. Behaviourism is also deterministic at its core, because it sees human behaviour as entirely determined by a combination of genetics and environment. Some psychologists began to form their own ideas that emphasized personal control, intentionality, and a true predisposition for "good" as important for our self-concept and our behaviour. Thus, humanism emerged.

Activity: Test Your Understanding

Quiz Text Description

1. MultiChoice Activity

Which researcher studied types of conditioned reflexes?

a. Watson
b. James
c. Pavlov
d. Koffka

2. MultiChoice Activity

The operant conditioning chamber (a.k.a. _____ box) is a device used to study the principles of operant conditioning.

a. Skinner
b. Koffka
c. Watson
d. James

3. MultiChoice Activity

_____ presented ideas and techniques for rewarding and punishing behavior.

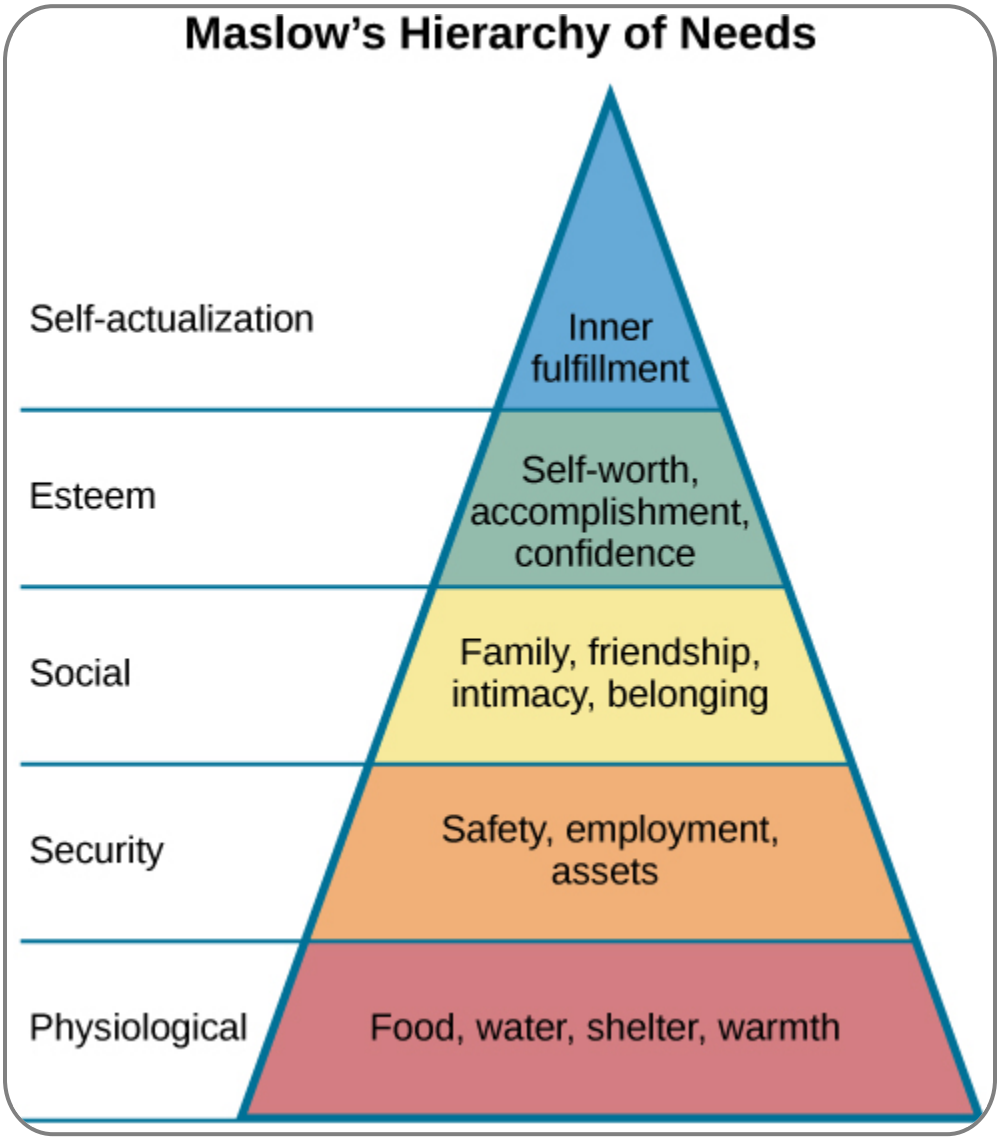
a. Ivan Pavlov
b. F. Skinner

Solution:

1. c. Pavlov
2. a. Skinner
3. b. F. Skinner

Maslow, Rogers, and Humanism

Humanism is a perspective within psychology that emphasizes the potential for good that is innate to all humans. Two of the most well-known proponents of humanistic psychology are Abraham Maslow and Carl Rogers (O'Hara, n.d.). Abraham Maslow (1908–1970) was an American psychologist who is best known for proposing a hierarchy of human needs in motivating behavior. Although this concept will be discussed in more detail in a later section, a brief overview will be provided here.



Maslow's hierarchy of needs emphasizes that basic needs for food and safety need to be met before higher-level needs can serve as motivators.

Image Description

Diagram of Maslow's Hierarchy of Needs as a colour-coded pyramid with five horizontal layers. Left-side labels align with each layer. Bottom layer: Physiological needs (food, water, shelter, warmth). Above: Security (safety, employment, assets). Middle: Social (family, friendship, intimacy, belonging). Next: Esteem (self-worth, accomplishment, confidence). Top: Self-actualization (inner fulfillment).

Maslow asserted that so long as basic needs necessary for survival were met (e.g., food, water, shelter), higher-level needs (e.g., social needs) would begin to motivate behaviour. According to Maslow, the highest-level needs relate to self-actualization, a process by which we achieve our full potential. Obviously, the focus on the positive aspects of human nature that are characteristic of the humanistic perspective is evident (Thorne & Henley, 2005).

Humanistic psychologists rejected, on principle, the research approach based on reductionist experimentation

in the tradition of the physical and biological sciences, because it missed the "whole" human being. Beginning with Maslow and Rogers, there was an insistence on a humanistic research program. This program has been largely qualitative (not measurement-based), but there exist a number of quantitative research strains within humanistic psychology, including research on happiness, self-concept, meditation, and the outcomes of humanistic psychotherapy (Friedman, 2008).

Carl Rogers (1902–1987) was also an American psychologist who, like Maslow, emphasized the potential for good that exists within all people. Rogers used a therapeutic technique known as client-centred therapy in helping his clients deal with problematic issues that resulted in their seeking psychotherapy. Unlike a psychoanalytic approach in which the therapist plays an important role in interpreting what conscious behaviour reveals about the unconscious mind, client-centred therapy involves the patient taking a lead role in the therapy session. Rogers believed that a therapist needed to display three features to maximize the effectiveness of this particular approach: unconditional positive regard, genuineness, and empathy. Unconditional positive regard refers to the fact that the therapist accepts their client for who they are, no matter what he or she might say. Provided these factors, Rogers believed that people were more than capable of dealing with and working through their own issues (Thorne & Henley, 2005).

Humanism has been influential to psychology as a whole. Both Maslow and Rogers are well-known names among students of psychology (you will read more about both men later in this text), and their ideas have influenced many scholars. Furthermore, Rogers' client-centred approach to therapy is still commonly used in psychotherapeutic settings today (O'hara, n.d.).

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

Proponents of the early school of _____ psychology argue that our thoughts, feelings, and motive are unimportant in understanding human behavior and that only observable actions should be studied.

a. Psychoanalytical
b. phrenology
c. Humanistic
d. behaviorism

2. MultiChoice Activity

Psychologist Abraham Maslow introduced the concept of a hierarchy of needs, which suggests that people are motivated to fulfill basic needs before moving on to other, more advanced needs. Consider how this may influence our development, motivation, and accomplishments. Choose which level of needs would best explain the following scenario. Mario has not been doing well in his third grade classroom. His teacher noticed that he wasn't focusing in class and mistakenly thought he was being lazy. In fact, the truth was that Mario's family couldn't afford enough food to feed their family and therefore, he regularly goes to school without any breakfast. Which level of need would best describe what is going on with Mario?

a. physiological
b. esteem
c. safety/security
d. social/belongingness

3. MultiChoice Activity

_____ focused on the potential of humans to be creative, have a positive outlook and pursue higher values through a process of self-actualization.

a. Abraham Maslow
b. Carl Rogers

4. MultiChoice Activity

_____ is most well-known for proposing his hierarchy of needs.

a. Carl Rogers
b. Abraham Maslow

c. Noam Chomsky
d. Sigmund Freud

5. MultiChoice Activity

Rogers believed that providing genuineness, empathy, and _____ in the therapeutic environment for his clients was critical to their being able to deal with their problems.

a. unconditional positive regard
b. encouragement
c. functionalism
d. apathy

Solution:

1. d. behaviorism
2. a. physiological
3. a. Abraham Maslow
4. b. Abraham Maslow
5. a. unconditional positive regard

Quiz Text Description
This activity contains a set of dialog cards, which are described below.
Activity Description or Instruction:

1. humanism
2. behaviorism

Solution:

1. perspective within psychology that emphasizes the potential for good that is innate to all humans
2. focus on observing and controlling behavior

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4.5 The History of Psychology – The Cognitive Revolution and Beyond

The Cognitive Revolution

Behaviourism's emphasis on objectivity and focus on external behaviour had pulled psychologists' attention away from the mind for a prolonged period of time. The early work of the humanistic psychologists redirected attention to the individual human as a whole and as a conscious and self-aware being. By the 1950s, new disciplinary perspectives in linguistics, neuroscience, and computer science were emerging, and these areas revived interest in the mind as a focus of scientific inquiry. This particular perspective has come to be known as the cognitive revolution (Miller, 2003). By 1967, Ulric Neisser had published the first textbook, *Cognitive Psychology*, which served as a core text in cognitive psychology courses across the country (Thorne & Henley, 2005).

Although no one person is entirely responsible for starting the **cognitivism** revolution, Noam Chomsky was very influential in the early days of this movement. Chomsky (1928–), an American linguist, was dissatisfied with the influence that behaviourism had had on psychology. He believed that psychology's focus on behaviour was short-sighted and that the field had to re-incorporate mental functioning into its purview if it were to offer any meaningful contributions to understanding behaviour (Miller, 2003).

Noam Chomsky was very influential in beginning the cognitive revolution. In 2010, this mural honouring him was put up in Philadelphia, Pennsylvania. Image: "Noam Chomsky Mural," by MTSOfan, Flickr, CC BY-NC-SA 2.0.

European psychology had never really been as influenced by behaviourism as had American psychology, and thus, the cognitive revolution helped reestablish lines of communication between European psychologists and their American counterparts. Furthermore, psychologists began to cooperate with scientists in other fields, like anthropology, linguistics, computer science, and neuroscience, among others. This interdisciplinary approach is often referred to as the cognitive sciences, and the influence and prominence of this particular perspective resonates in modern-day psychology (Miller, 2003).

Feminist, Indigenous, and Race Theories

Feminist, Indigenous, and Race Theories have emerged to challenge the cognitive revolution. These theories focus on the external, socio-cultural factors that significantly influence mental processes. They explore how cultural context, gender dynamics, racial identity, and systemic discrimination interact with and shape cognitive processes. For instance, **feminist** psychologists and theorists challenge traditional cognitive approaches by emphasizing how stereotypes about gender can shape cognitive processes. They investigate how societal expectations and biases influence the way individuals think, feel, and behave. Similarly, **Indigenous** and **racial theory and identity** emphasize the importance of cultural and racial contexts in psychological processes, exploring intersectionality (how one thing influences and then, in turn, is influenced by another thing), racial identity, and the psychology of racism.

Let's Watch

Video: "indigenous psychology" by Yopina G Pertiwi [20:35] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube*.

Feminist Psychology

The science of psychology has had an impact on human well-being, both positive and negative. The dominant influence of Western, White, and male academics in the early history of psychology meant that psychology developed with the biases inherent in those individuals, which often had negative consequences for members of society who were not White or male. Women, members of ethnic minorities in both the United States and other countries, and individuals with sexual orientations other than straight have had difficulties entering the field of psychology and therefore influencing its development. They also suffered from the attitudes of White male psychologists who were not immune to the nonscientific attitudes prevalent in the society in which they developed and worked. Until the 1960s, the science of psychology was largely a "womanless" psychology (Crawford & Marecek, 1989), meaning that few women were able to practice psychology, so they had little influence on what was studied. In addition, the experimental subjects of psychology were mostly men, which resulted from underlying assumptions that gender had no influence on psychology and that women were not of sufficient interest to study.

An article by Naomi Weisstein, first published in 1968 (Weisstein, 1993), stimulated a feminist revolution in psychology by presenting a critique of psychology as a science. She also specifically criticized male psychologists

for constructing the psychology of women entirely out of their own cultural biases and without careful experimental tests to verify any of their characterizations of women. Weisstein used, as examples, statements by prominent psychologists in the 1960s, such as this quote by Bruno Bettelheim: "We must start with the realization that, as much as women want to be good scientists or engineers, they want first and foremost to be womanly companions of men and to be mothers." Weisstein's critique formed the foundation for the subsequent development of a **feminist psychology** that attempted to be free of the influence of male cultural biases on our knowledge of the psychology of women.

Crawford & Marecek (1989) identify several feminist approaches to psychology that can be described as feminist psychology. These include re-evaluating and discovering the contributions of women to the history of psychology, studying psychological gender differences, and questioning the male bias present across the practice of the scientific approach to knowledge.

Multicultural And Cross-Cultural Psychology

Culture impacts individuals, groups, and society. An ongoing issue researchers are trying to correct is that certain populations have been over-studied, and the results of these studies have been applied to other populations. For example, Henrich, Heine, and Norenzayan discuss how WEIRD societies have been overstudied, and the results have been wrongly applied to non-WEIRD societies (2010). WEIRD stands for western, educated, industrialized, rich, and democratic. Henrich et al. found that there are many differences between people in the WEIRD group and people in less industrialized, less urban, and non-Western societies. These differences occur in a variety of areas, including perception, cooperation, and moral reasoning. That is, people vary depending on their culture and environment. **Multicultural psychologists** develop theories and conduct research with diverse populations, typically within one country. C**ross-cultural psychologists** compare populations across countries, such as participants from the United States compared to participants from China.

In 1920, Francis Cecil Sumner was the first African American to receive a PhD in psychology in the United States. Sumner established a psychology degree program at Howard University, leading to the education of a new generation of African American psychologists (Black et al., 2004). Much of the work of early psychologists from diverse backgrounds was dedicated to challenging intelligence testing and promoting innovative educational methods for children. George I. Sanchez contested such testing with Mexican American children. As a psychologist of Mexican heritage, he pointed out that the language and cultural barriers in testing were keeping children from equal opportunities (Guthrie, 1998). By 1940, he was teaching with his doctoral degree at the University of Texas at Austin and challenging segregated educational practices (Romo, 1986).

Two famous African American researchers and psychologists are Mamie Phipps Clark and her husband, Kenneth Clark. They are best known for their studies conducted on African American children and doll preference, research that was instrumental in the Brown v. Board of Education Supreme Court desegregation case. The Clarks applied their research to social services and opened the first child guidance center in Harlem (American Psychological Association, 2019).

Listen to the podcast below for a description of the Clarks' research and its impact on the Supreme Court decision.

Link to Learning

Listen to a podcast about the influence of an African American's psychology research on the historic *Brown v. Board of Education* civil rights case to learn more.

The American Psychological Association has several ethnically based organizations for professional psychologists that facilitate interactions among members. Some psychologists belonging to specific ethnic groups or cultures are interested in studying their own communities, and these organizations provide an opportunity for the growth of research on the interplay between culture and psychology.

"Cognitive Revolution," "Feminist Psychology," and "Multicultural and Cross-Cultural Psychology" sections have been adapted from "1.2 History of Psychology" in Psychology – 2e by Rose M. Spielman, William J. Jenkins, Marilyn D. Lovett from OpenStax, which is licensed under Creative Commons Attribution 4.0 International License. *Modifications: minor changes in style and content order.*

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4.6 A Note About the Present

Early Schools of Psychology: Still Active and Advanced Beyond Early Ideas

Although many early ideas in psychology have been revised or replaced, four influential schools of thought remain active in contemporary psychology and still shape how we explain behaviour, design research, and support well-being today: psychodynamic psychology, behaviourism/behaviourism, humanistic psychology, and cognitive psychology. Each emerged in a distinct historical moment—ranging from the very late 19th and early 20th centuries through the 1960s—and each offers a different lens on what drives human action: unconscious influences and early experiences (psychodynamic), observable learning and conditioning (behaviorism), human potential and growth (humanistic), and internal mental processes such as thinking and memory (cognitive). Knowing these perspectives matters because they continue to inform modern therapies, educational approaches, and everyday discussions about motivation, development, and change; they also help you recognize why psychologists sometimes ask different questions, prioritize different kinds of evidence, or interpret the same problem in different ways (OpenAI, 2026).

The chart that follows summarizes these four schools by outlining their core focus, their earliest period, and the historically important people most closely associated with each movement.

Table 2: Active Schools of Psychology

School of Psychology	Description	Earliest Period	Historically Important People
Psychodynamic Psychology	Focuses on the role of the unconscious and childhood experiences in affecting conscious behaviour.	Very late 19th to Early 20th Century	Sigmund Freud, Erik Erikson
Behaviorism	Focuses on observing and controlling behaviour through what is observable. Puts an emphasis on learning and conditioning.	Early 20th Century	Ivan Pavlov, John B. Watson, B. F. Skinner
Humanistic Psychology	Emphasizes the potential for good that is innate to all humans and rejects that psychology should focus on problems and disorders.	1950s	Abraham Maslow, Carl Rogers
Cognitive Psychology	Focuses not just on behaviour, but on mental processes and internal mental states.	1960s[1]	Ulric Neisser, Noam Chomsky, Jean Piaget, Lev Vygotsky

Table 2, adapted from the "Summary of the History of Psychology" section of "The History of Psychology—The Cognitive Revolution and Multicultural Psychology" in General Psychology Copyright © by OpenStax and

1. Although Piaget's research on cognition began in the 1920s, cognitive psychology did not become mainstream until the 1960s.

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OpenAI. (2026). ChatGPT. [Large language model]. https://chat.openai.com/chat
Prompts

Introductory paragraph to Table 2: “Using the attached file, provide a paragraph introduction to the early schools of psychology that are still active in contemporary psychology, and why this is important to know?”

4.7 Chapter Summary

Let's Reflect

- Before the time of Wundt and James, questions about the mind were considered by philosophers. However, both Wundt and James helped create psychology as a distinct scientific discipline. Wundt was a structuralist, which meant he believed that our cognitive experience was best understood by breaking that experience into its component parts. He thought this was best accomplished by introspection.
- William James was the first American psychologist, and he was a proponent of functionalism. This particular perspective focused on how mental activities served as adaptive responses to an organism's environment. Like Wundt, James also relied on introspection; however, his research approach also incorporated more objective measures.
- Sigmund Freud believed that understanding the unconscious mind was absolutely critical to understand conscious behaviour. This was especially true for individuals whom he saw who suffered from various hysterias and neuroses. Freud relied on dream analysis, slips of the tongue, and free association as means to access the unconscious. Psychoanalytic theory remained a dominant force in clinical psychology for several decades.
- Gestalt psychology was very influential in Europe. Gestalt psychology takes a holistic view of an individual and their experiences. As the Nazis came to power in Germany, Wertheimer, Koffka, and Köhler immigrated to the United States. Although they left their laboratories and their research behind, they did introduce America to Gestalt ideas. Some of the principles of Gestalt psychology are still very influential in the study of sensation and perception.
- One of the most influential schools of thought within psychology's history was behaviourism. Behaviourism focused on making psychology an objective science by studying overt behaviour and deemphasizing the importance of unobservable mental processes. John Watson is often considered the father of behaviorism, and B. F. Skinner's contributions to our understanding of principles of operant conditioning cannot be underestimated.
- As behaviourism and psychoanalytic theory took hold of so many aspects of psychology, some began to become dissatisfied with psychology's picture of human nature. Thus, a humanistic movement within psychology began to take hold. Humanism focuses on the potential of all people for good. Both Maslow and Rogers were influential in shaping humanistic psychology.
- During the 1950s, the landscape of psychology began to change. A science of behavior began to shift back to its roots of focus on mental processes. The emergence of neuroscience and computer science aided this transition. Ultimately, the cognitive revolution took hold, and people came to realize that cognition was crucial to a true appreciation and understanding of behavior.

Key Terms

- **Behaviourism:** observes behaviour, ignoring internal mental state analysis.
- **Cognitivism:** emphasizes internal mental processes, beyond observable behaviour.
- **Cross-Cultural Psychology:** compares psychological phenomena across different cultural contexts.
- **Feminism:** explores systemic sexist discrimination and gender dynamics, advocating for women's equality.
- **Functionalism:** studies mental life and emphasizes adaptation to environments.
- **Gestalt Psychology:** studies the mind's holistic processing of patterns.
- **Humanism:** focuses on individual potential, emphasizing personal growth.
- **Indigenous Psychology:** centres on Indigenous rights, traditions, and practices in understanding psychological processes.
- **Multicultural Psychology:** explores diverse cultural influences on individual psychology.
- **Racial Theory and Identity:** explores systemic racial discrimination and race's impact on identity and experiences.
- **Structuralism:** analyzes consciousness, breaking it into elemental structures.

Questions for Further Discussion

1. How has the object of study in psychology change over the history of the field since the 19th century?
2. In part, what aspect of psychology was the behaviorist approach to psychology a reaction to?
3. Freud is probably one of the most well-known historical figures in psychology. Where have you encountered references to Freud or his ideas about the role that the unconscious mind plays in determining conscious behavior?

Let's Review: Activities

Activity 1

Quiz Text Description

1. MultiChoice Activity

Based on your reading, which theorist would have been most likely to agree with this statement: Perceptual phenomena are best understood as a combination of their components?

a. Carl Rogers
b. Max Wertheimer
c. Noam Chomsky
d. William James

2. MultiChoice Activity

_____ is most well-known for proposing his hierarchy of needs.

a. Noam Chomsky
b. Sigmund Freud
c. Carl Rogers
d. Abraham Maslow

3. MultiChoice Activity

Rogers believed that providing genuineness, empathy, and _____ in the therapeutic environment for his clients was critical to their being able to deal with their problems.

a. structuralism
b. unconditional positive regard
c. functionalism
d. Gestalt

4. MultiChoice Activity

The operant conditioning chamber (aka _____ box) is a device used to study the principles of operant conditioning.

a. Skinner
b. Koffka
c. James
d. Watson

Solution:

1. b. Max Wertheimer
2. d. Abraham Maslow
3. b. unconditional positive regard
4. a. Skinner

Activity 2

Review the 4 schools discussed in section 4.6 and then test your understanding by answering the following questions:

Quiz Text Description

1. MultiChoice Activity

Which school of psychology focuses on the role of the unconscious and childhood experiences in shaping conscious behaviour?

a. Humanistic Psychology
b. Behaviourism
c. Psychodynamic Psychology
d. Cognitive Psychology

2. MultiChoice Activity

Sigmund Freud and Erik Erikson are historically important people in which school of psychology?

a. Psychodynamic Psychology
b. Cognitive Psychology
c. Behaviourism
d. Humanistic Psychology

3. MultiChoice Activity

Which school of psychology emphasizes observing and controlling behaviour through what is observable, with an emphasis on learning and conditioning?

a. Cognitive Psychology
b. Humanistic Psychology
c. Behaviourism
d. Psychodynamic Psychology

4. MultiChoice Activity

Which historically important person is associated with Behaviourism (as listed in the table)?

a. F. Skinner
b. Carl Rogers
c. Jean Piaget
d. Sigmund Freud

5. MultiChoice Activity

Ivan Pavlov, John B. Watson, and B. F. Skinner are historically important to which school of psychology?

a. Cognitive Psychology
b. Humanistic Psychology
c. Psychodynamic Psychology
d. Behaviourism

6. MultiChoice Activity

Which school of psychology emphasizes the potential for good that is innate to all humans and rejects focusing only on problems and disorders?

a. Cognitive Psychology
b. Humanistic Psychology
c. Psychodynamic Psychology
d. Behaviourism

7. MultiChoice Activity

Abraham Maslow and Carl Rogers are historically important to which school of psychology?

a. Behaviourism
b. Humanistic Psychology
c. Psychodynamic Psychology
d. Cognitive Psychology

8. MultiChoice Activity

Which school of psychology focuses not just on behaviour, but also on mental processes and internal mental states?

a. Humanistic Psychology
b. Cognitive Psychology
c. Behaviourism
d. Psychodynamic Psychology

9. MultiChoice Activity

According to the table, which school of psychology is linked to the 1960s?

a. Humanistic Psychology
b. Cognitive Psychology
c. Psychodynamic Psychology

d. Behaviourism

10. MultiChoice Activity

Ulric Neisser, Noam Chomsky, Jean Piaget, and Lev Vygotsky are historically important people in which school of psychology?

a. Psychodynamic Psychology
b. Behaviourism
c. Cognitive Psychology
d. Humanistic Psychology

Solution:

1. c. Psychodynamic Psychology
2. a. Psychodynamic Psychology
3. c. Behaviourism
4. a. F. Skinner
5. d. Behaviourism
6. b. Humanistic Psychology
7. b. Humanistic Psychology
8. b. Cognitive Psychology
9. b. Cognitive Psychology
10. c. Cognitive Psychology

Questions for Further Discussion adapted from “History of Psychology” in Psychology – 2e by Rose M. Spielman, William J. Jenkins, Marilyn D. Lovett from OpenStax, which is licensed under Creative Commons Attribution 4.0 International License.

CHAPTER 5: BIOPSYCHOLOGY

Chapter Overview

5.0 Learning Objectives
5.1 Nature or Nurture?
5.2 Genetic Variation
5.3 Gene-Environment Interactions
5.4 Chapter Summary

5.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Explain the basic principles of the theory of evolution by natural selection.
2. Describe the differences between genotype and phenotype.
3. Discuss how gene-environment interactions are critical for the expression of physical and psychological characteristics.

Chapter Overview

Is human behaviour the result of genetics (nature) or environment (nurture)? In this chapter, we will learn about this classic debate within psychology. On the biological side, we will explore natural selection and how evolutionary theory can help us to understand human behaviours. We will differentiate between genetic inheritance and gene expression, and explain how researchers use twin studies to better understand the extent to which nature and nurture influence a given behaviour. Finally, we will look at a field of study called epigenetics, which examines the complex ways in which nature and nurture interact to produce human traits and behaviours.

This chapter has been adapted from "3.1 Human Genetics" in Psychology – 2e by Rose M. Spielman, William J. Jenkins, Marilyn D. Lovett from OpenStax, which is licensed under Creative Commons Attribution 4.0 International License unless otherwise noted. *Modification: replaced image in 5.3, grammar and spelling changes, and APA reference updates.*

5.1 Nature or Nurture?

Psychological researchers study genetics in order to better understand the biological factors that contribute to certain behaviors. While all humans share certain biological mechanisms, we are each unique. And while our bodies have many of the same parts—brains and hormones and cells with genetic codes—these are expressed in a wide variety of behaviours, thoughts, and reactions.

Why do two people infected by the same disease have different outcomes: one surviving and one succumbing to the ailment? How are genetic diseases passed through family lines? Are there genetic components to psychological disorders, such as depression or schizophrenia? To what extent might there be a psychological basis to health conditions such as childhood obesity?

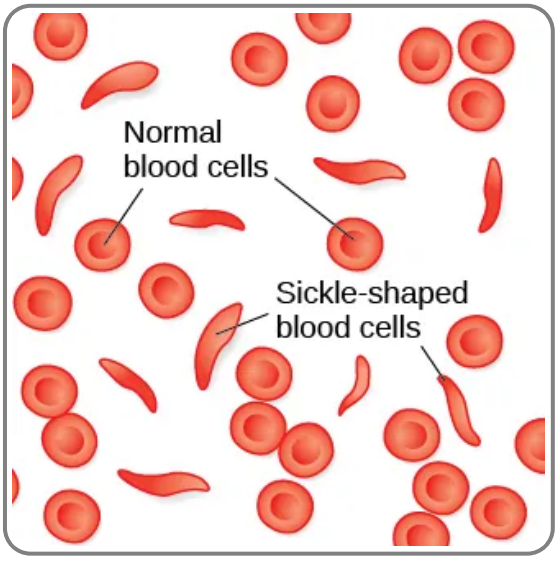

Figure 5.1.1 *Normal blood cells travel freely through the blood vessels, while sickle-shaped cells form blockages preventing blood flow.*

To explore these questions, let's start by focusing on a specific genetic disorder, sickle cell anemia, and how it might manifest in two affected sisters. Sickle-cell anemia is a genetic condition in which red blood cells, which are normally round, take on a crescent-like shape (Figure 5.1.1). The changed shape of these cells affects how they function: sickle-shaped cells can clog blood vessels and block blood flow, leading to high fever, severe pain, swelling, and tissue damage.

Many people with sickle-cell anemia—and the particular genetic mutation that causes it—die at an early age. While the notion of "survival of the fittest" may suggest that people with this disorder have a low survival rate and therefore the disorder will become less common, this is not the case. Despite the negative evolutionary effects associated with this genetic mutation, the sickle-cell gene remains relatively common among people of African descent. Why is this? The explanation is illustrated with the following scenario.

Here's an Example

Imagine two young women—Luwi and Sena—sisters in rural Zambia, Africa. Luwi carries the gene for sickle-cell anemia; Sena does not carry the gene. Sickle-cell carriers have one copy of the sickle-cell gene but do not have full-blown sickle-cell anemia. They experience symptoms only if they are severely dehydrated or are deprived of oxygen (as in mountain climbing). Carriers are thought to be immune to malaria (an often deadly disease that is widespread in tropical climates) because changes in their blood chemistry and immune functioning prevent the malaria parasite from having its effects (Gong et al., 2013). However, full-blown sickle-cell anemia, with two copies of the sickle-cell gene, does not provide immunity to malaria.

While walking home from school, both sisters are bitten by mosquitoes carrying the malaria parasite. Luwi is protected against malaria because she carries the sickle-cell mutation. Sena, on the other hand, develops malaria and dies just two weeks later. Luwi survives and eventually has children, to whom she may pass on the sickle-cell mutation.

Link to Learning
Visit the DNA Learning Center to learn how a mutation in DNA leads to sickle cell anemia.

Malaria is rare in the United States, so the sickle-cell gene benefits nobody: the gene manifests primarily in minor health problems for carriers with one copy, or a severe full-blown disease with no health benefits for carriers with two copies. However, the situation is quite different in other parts of the world. In parts of Africa where malaria is prevalent, having the sickle-cell mutation does provide health benefits for carriers (protection from malaria).

The story of malaria fits with Charles Darwin's theory of **evolution by natural selection** (Figure 5.1.2). In simple terms, the theory states that organisms that are better suited for their environment will survive and reproduce, while those that are poorly suited for their environment will die off. In our example, we can see that, as a carrier, Luwi's mutation is highly adaptive in her African homeland; however, if she resided in the United States (where malaria is rare), her mutation could prove costly, with a high probability of the disease in her descendants and minor health problems of her own.

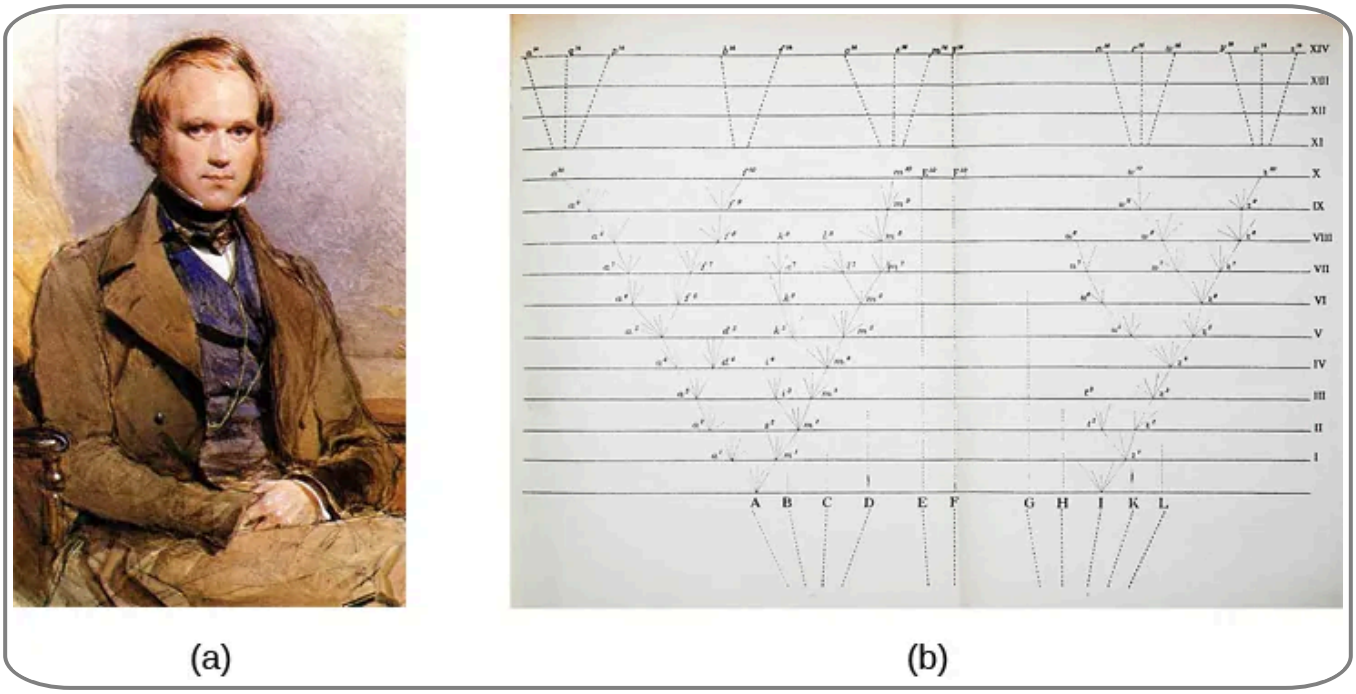

Figure 5.1.2 *(a) In 1859, Charles Darwin proposed his theory of evolution by natural selection in his book, On the Origin of Species. (b) The book contains just one illustration: this diagram that shows how species evolve over time through natural selection. Image: "Portrait of Charles Darwin," by G. Richmond, and "On the Origin of Species," by Alexei Kouprianov, Wikimedia Commons, Public Domain.*

Consider This: Two Perspectives on Genetics and Behaviour

It's easy to get confused about two fields that study the interaction of genes and the environment, such as the fields of evolutionary psychology and behavioural genetics. How can we tell them apart?

In both fields, it is understood that genes not only code for particular traits, but also contribute to certain patterns of cognition and behaviour. **Evolutionary psychology** focuses on how universal patterns of behaviour and cognitive processes have evolved over time. Therefore, variations in cognition and behaviour would make individuals more or less successful in reproducing and passing those genes on to their offspring. Evolutionary psychologists study a variety of psychological phenomena that may have evolved as adaptations, including fear response, food preferences, mate selection, and cooperative behaviours (Confer et al., 2010).

Whereas evolutionary psychologists focus on universal patterns that evolved over millions of years, behavioural geneticists study how individual differences arise, in the present, through the interaction of genes and the environment. When studying human behaviour, behavioural geneticists often employ twin and adoption studies to research questions of interest. Twin studies compare the likelihood that a given behavioural trait is shared among identical and fraternal twins; adoption studies compare those rates among biologically related relatives and adopted relatives. Both approaches provide some insight into the relative importance of genes and environment for the expression of a given trait.

Link to Learning

Watch this interview with evolutionary psychologist David Buss to learn more about how a psychologist approaches evolution within the social sciences.

5.2 Genetic Variation

Genetic variation, the genetic difference between individuals, is what contributes to a species' adaptation to its environment. In humans, genetic variation begins with an egg, about 100 million sperm, and fertilization. Roughly once per month, active ovaries release an egg from follicles. During the egg's journey from the ovary through the fallopian tubes to the uterus, a sperm may fertilize the egg.

The egg and the sperm each contain 23 chromosomes. **Chromosomes** are long strands of genetic material called **deoxyribonucleic acid (DNA)**. DNA is a helix-shaped molecule made up of nucleotide base pairs. On each chromosome, DNA sequences encode **genes** that control or partially control a number of visible characteristics, known as traits, such as eye colour, hair colour, and so on. A single gene may have multiple possible variations, or alleles. An **allele** is a specific version of a gene. So, a given gene may code for the trait of hair colour, and the different alleles of that gene affect which hair colour an individual has.

When a sperm and egg fuse, their 23 chromosomes combine to create a zygote with 46 chromosomes (23 pairs). Therefore, each parent contributes half the genetic information carried by the offspring; the resulting physical characteristics of the offspring (called the phenotype) are determined by the interaction of genetic material supplied by the sperm and egg (called the genotype). A person's **genotype** is the genetic makeup of that individual. **Phenotype**, on the other hand, refers to an individual's inherited physical characteristics, which are influenced by both genetic and environmental factors (Figure 5.2.1).

Figure 5.2.1 *(a) Genotype refers to the genetic makeup of an individual based on the genetic material (DNA) inherited from one's genetic contributors. (b) Phenotype describes an individual's observable characteristics, such as hair colour, skin colour, height, and build. Images: "DNA Molecule" by Erick Rumualdo Bustos Ortega, CC BY-SA 3.0 (modification of work by Caroline Davis) and "Unknown"(modification of work by Cory Zanker).*

Note that, in genetics and reproduction, "parent" is often used to describe the individual organisms that contribute genetic material to offspring, usually in the form of gamete cells (sperm and egg). The concept of a genetic parent is distinct from social and legal concepts of parenthood, and may differ from those whom people consider their parents.

Most traits are controlled by multiple genes, but some traits are controlled by one gene. A characteristic like a cleft chin, for example, is influenced by a single gene from each parent. In this example, we will call the gene for cleft chin "B," and the gene for smooth chin "b." A cleft chin is a dominant trait, which means that having

the **dominant allele** either from one parent (Bb) or both parents (BB) will always result in the phenotype associated with the dominant allele. When someone has two copies of the same allele, they are said to be **homozygous** for that allele. When someone has a combination of alleles for a given gene, they are said to be **heterozygous**. For example, a smooth chin is a recessive trait, which means that an individual will only display the smooth chin phenotype if they are homozygous for that **recessive allele** (bb).

Imagine that a person with a cleft chin mates with a person with a smooth chin. What type of chin will their offspring have? The answer to that depends on which alleles each parent carries. If the person with a cleft is homozygous for cleft chin (BB), their offspring will always have cleft chin. It gets a little more complicated, however, if the person is heterozygous for this gene (Bb). Since the other person has a smooth chin—therefore homozygous for the recessive allele (bb)—we can expect the offspring to have a 50% chance of having a cleft chin and a 50% chance of having a smooth chin (Figure 5.2.2).

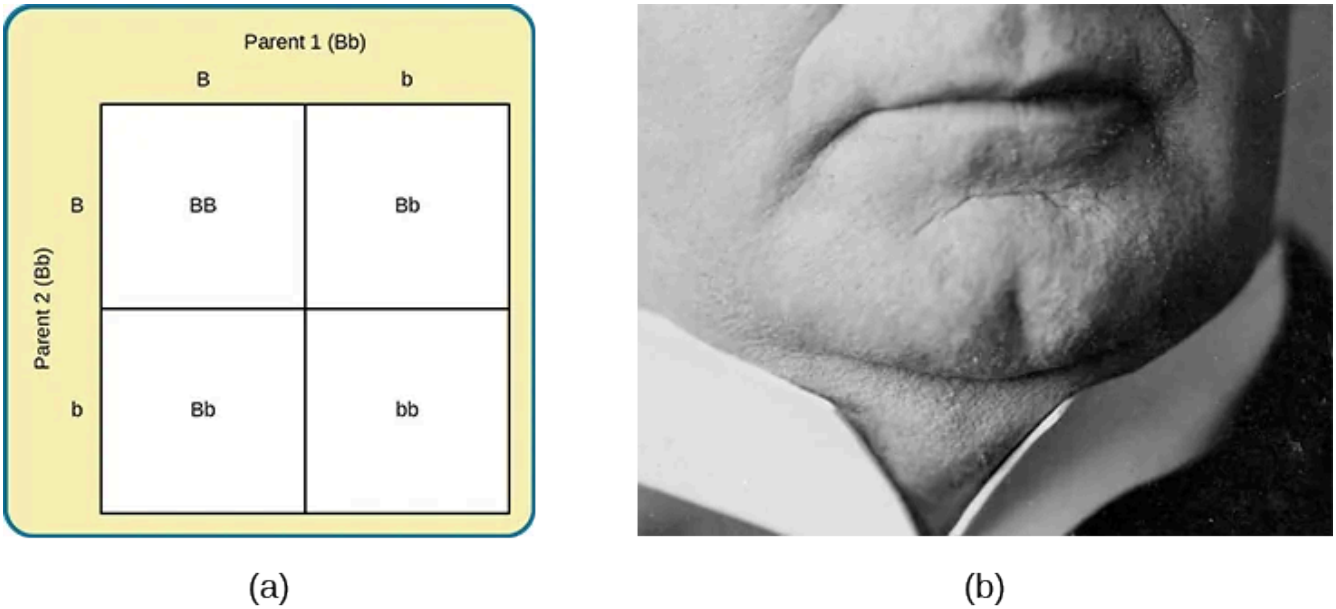

Figure 5.2.2 *(a) A Punnett square is a tool used to predict how genes will interact in the production of offspring. The capital B represents the dominant allele, and the lowercase b represents the recessive allele. In the example of the cleft chin, where B is the cleft chin (dominant allele), wherever a pair contains the dominant allele, B, you can expect a cleft chin phenotype. You can expect a smooth chin phenotype only when there are two copies of the recessive allele, bb. (b) A cleft chin, shown here, is an inherited trait. Image: "A cleft chin on William McKinley," Wikipedia, public domain.*

Image Long Description

A 2×2 Punnett square illustrating a genetic cross between two heterozygous parents labeled Parent 1 (Bb) across the top and Parent 2 (Bb) along the left side. The columns are labeled B and b, and the rows are labelled B and b. The resulting genotype combinations inside the grid are BB in the top-left square, Bb in the top-right square, Bb in the bottom-left square, and bb in the bottom-right square, demonstrating a 1:2:1 genotypic ratio.

Here's an Example

In sickle cell anemia, heterozygous carriers (like Luwi from the example) can develop blood resistance to malaria infection, while those who are homozygous (like Sena) have a potentially lethal blood disorder. Sickle-cell anemia is just one of many genetic disorders caused by the pairing of two recessive genes. For example, phenylketonuria (PKU) is a condition in which individuals lack an enzyme that normally converts harmful amino acids into harmless byproducts. If someone with this condition goes untreated, they will experience significant deficits in cognitive function, seizures, and an increased risk of various psychiatric disorders. Because PKU is a recessive trait, each parent must have at least one copy of the recessive allele in order to produce a child with the condition (Figure 5.2.3).

So far, we have discussed traits that involve just one gene, but few human characteristics are controlled by a single gene. Most traits are **polygenic**: controlled by more than one gene. Height is one example of a polygenic trait, as are skin colour and weight.

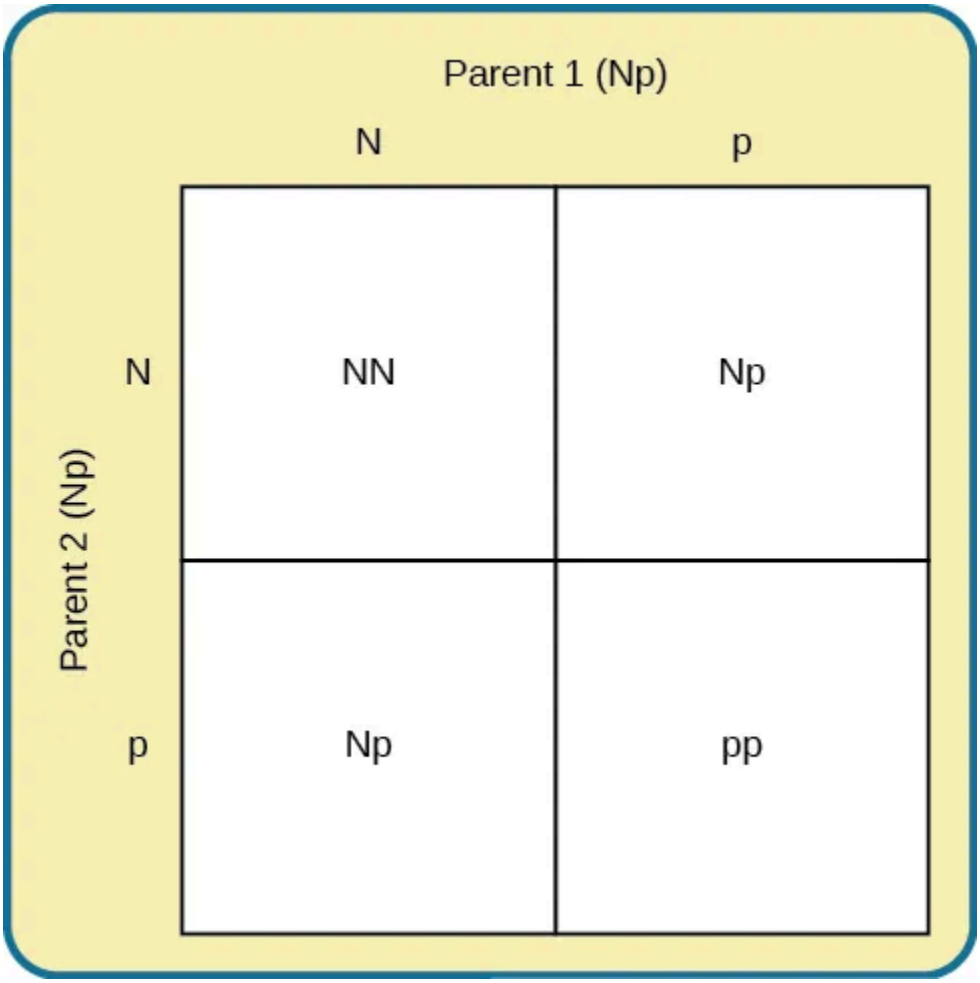

Figure 5.2.3 *In this Punnett square, N represents the normal allele, and p represents the recessive allele that is associated with PKU. If two individuals mate who are both heterozygous for the allele associated with PKU mate, their offspring have a 25% chance of expressing the PKU phenotype.*

Image Long Description

A 2×2 Punnett square illustrating a genetic cross between two heterozygous parents labeled Parent 1 (Np) across the top and Parent 2 (Np) along the left side. Parent 1 contributes gametes N and p across the columns, and Parent 2 contributes gametes N and p down the rows. The resulting genotype combinations in the four boxes are NN in the top-left square, Np in the top-right square, Np in the bottom-left square, and pp in the bottom-right square, demonstrating a 1:2:1 genotypic ratio.

Consider This: Human Diversity

This chapter focuses on biology. Later in this course, you will learn about social psychology and issues of race, prejudice, and discrimination. When we focus strictly on biology, race becomes a weak construct. After the sequencing of the human genome at the turn of the millennium, many scientists began to argue that race was not a useful variable in genetic research and that its continued use represents a potential source of confusion and harm. The racial categories that some believe to be helpful in studying genetic diversity in humans are largely irrelevant. A person's skin tone, eye colour, and hair texture are functions of their genetic makeup, but there is actually more genetic variation within a given racial category than there is between racial categories. In some cases, focus on race has led to difficulties with misdiagnoses and/or underdiagnoses of diseases ranging from sickle cell anemia to cystic fibrosis. Some argue that we need to distinguish between ancestry and race and then focus on ancestry. This approach would facilitate greater understanding of human genetic diversity (Yudell et al., 2016).

Activities: Let's Review

Activity 1

Quiz Text Description

A(n) _____ is a sudden, permanent change in a sequence of DNA.

a. allele
b. chromosome
c. epigenetics
d. mutation

Solution:

Correct answer(s): d. mutation

Activity 2

Quiz Text Description

1. MultiChoice Activity

_____ refers to a person's genetic makeup, while _____ refers to a person's physical characteristics.

a. DNA; gene
b. Genotype; phenotype
c. Phenotype; genotype
d. Gene; DNA

2. MultiChoice Activity

Humans have _____ pairs of chromosomes.

a. 23
b. 78
c. 46
d. 15

Solution:

1. b. Genotype; phenotype
2. a. 23

5.3 Gene-Environment Interactions

Genes do not exist in a vacuum. Although we are all biological organisms, we also exist in an environment that is incredibly important in determining not only when and how our genes express themselves, but also in what combination. Each of us represents a unique interaction between our genetic makeup and our environment; range of reaction is one way to describe this interaction. **Range of reaction** asserts that our genes set the boundaries within which we can operate, and our environment interacts with the genes to determine where in that range we will fall. For example, if an individual's genetic makeup predisposes them to high levels of intellectual potential and they are reared in a rich, stimulating environment, then they will be more likely to achieve full potential than if they were raised under conditions of significant deprivation. According to the concept of range of reaction, genes set definite limits on potential, and environment determines how much of that potential is achieved. Some disagree with this theory and argue that genes do not set a limit on a person's potential with reaction norms being determined by the environment. For example, when individuals experience neglect or abuse early in life, they are more likely to exhibit adverse psychological and/or physical conditions that can last throughout their lives. These conditions may develop as a function of the negative environmental experiences in individuals from dissimilar genetic backgrounds (Miguel et al., 2019; Short & Baram, 2019).

Another perspective on the interaction between genes and the environment is the concept of **genetic environmental correlation**. Stated simply, our genes influence our environment, and our environment influences the expression of our genes. Not only do our genes and environment interact, as in a range of reactions, but they also influence one another bidirectionally. For example, the child of an NBA player would probably be exposed to basketball from an early age. Such exposure might allow the child to realize their full genetic, athletic potential. Thus, the parents' genes, which the child shares, influence the child's environment, and that environment, in turn, is well-suited to support the child's genetic potential.

Nature and nurture work together like complex pieces of a human puzzle. The interaction of our environment and genes makes us the individuals we are. Image: "Puzzle," by Berna, Pexels License.

In another approach to gene-environment interactions, the field of **epigenetics** looks beyond the genotype itself and studies how the same genotype can be expressed in different ways. In other words, researchers study how the same genotype can lead to very different phenotypes. As mentioned earlier, gene expression is often influenced by environmental context in ways that are not entirely obvious. For instance, identical twins share the same genetic information (**identical twins** develop from a single fertilized egg that splits, so the genetic material is exactly the same in each; in contrast, **fraternal twins** usually result from two different eggs fertilized by different sperm, so the genetic material varies as with non-twin siblings). But even with identical genes, there remains an incredible amount of variability in how gene expression can unfold over the course of each twin's life. Sometimes, one twin will develop a disease and the other will not. In one example, Aliya, an identical twin, died from cancer at age 7, but her twin, now 19 years old, has never had cancer. Although these individuals share an identical genotype, their phenotypes differ as a result of how that genetic information is expressed over time and through their unique environmental interactions. The epigenetic perspective is very different from range of reaction, because here the genotype is not fixed and limited.

Link to Learning

Watch this video from *Learn. Genetics* about the epigenetics of twin studies to learn more

Genes affect more than our physical characteristics. Indeed, scientists have found genetic linkages to a number of behavioural characteristics, ranging from basic personality traits to

sexual orientation to spirituality (for example, see Comings et al., 2000). Genes are also associated with temperament and a number of psychological disorders, such as depression and schizophrenia. So while it is true that genes provide the biological blueprints for our cells, tissues, organs, and body, they also have a significant impact on our experiences and our behaviours.

Let's look at the following findings regarding schizophrenia in light of our three views of gene-environment interactions. Which view do you think best explains this evidence?

Let's Focus: Findings Regarding Schizophrenia

In a 2004 study by Tienari and colleagues, adoptees whose biological mothers had schizophrenia and who had been raised in a disturbed family environment were much more likely to develop schizophrenia or another psychotic disorder than were any of the other groups in the study:

- Of adoptees whose biological mothers had schizophrenia (high genetic risk) and who were raised in disturbed family environments, 36.8% were likely to develop schizophrenia.
- Of adoptees whose biological mothers had schizophrenia (high genetic risk) and who were raised in healthy family environments, 5.8% were likely to develop schizophrenia.
- Of adoptees with a low genetic risk (whose mothers did not have schizophrenia) and who were raised in disturbed family environments, 5.3% were likely to develop schizophrenia.
- Of adoptees with a low genetic risk (whose mothers did not have schizophrenia) and who were raised in healthy family environments, 4.8% were likely to develop schizophrenia.

The study shows that adoptees with high genetic risk were most likely to develop schizophrenia if they were raised in disturbed home environments. This research lends credibility to the notion that both genetic vulnerability and environmental stress are necessary for schizophrenia to develop, and that genes alone do not tell the full tale.

5.4 Chapter Summary

Let's Reflect

Genes are sequences of DNA that code for a particular trait. Different versions of a gene are called alleles—sometimes alleles can be classified as dominant or recessive. A dominant allele always results in the dominant phenotype. In order to exhibit a recessive phenotype, an individual must be homozygous for the recessive allele. Genes affect both physical and psychological characteristics. Ultimately, how and when a gene is expressed, and what the outcome will be—in terms of both physical and psychological characteristics—is a function of the interaction between our genes and our environments.

Key Terms

- **Allele:** a specific version of a gene.
- **Chromosome:** a long strand of genetic information.
- **Deoxyribonucleic Acid (DNA):** helix-shaped molecule made of nucleotide base pairs.
- **Dominant Allele:** allele whose phenotype will be expressed in an individual that possesses that allele.
- **Epigenetics:** study of gene-environment interactions, such as how the same genotype leads to different phenotypes.
- **Fraternal Twins:** twins who develop from two different eggs fertilized by different sperm, so their genetic material varies, the same as in non-twin siblings.
- **Gene:** a sequence of DNA that controls or partially controls physical characteristics.
- **Genetic Environmental Correlation:** a view of gene-environment interaction that asserts our genes affect our environment, and our environment influences the expression of our genes.
- **Genotype:** genetic makeup of an individual.
- **Heterozygous:** consisting of two different alleles.
- **Identical Twins:** twins that develop from the same sperm and egg.
- **Mutation:** sudden, permanent change in a gene.
- **Phenotype:** an individual's inheritable physical characteristics.
- **Polygenic:** multiple genes affecting a given trait.
- **Recessive Allele:** allele whose phenotype will be expressed only if an individual is homozygous for that allele.
- **Theory of Evolution by Natural Selection:** states that organisms that are better suited for their environments will survive and reproduce compared to those that are poorly suited for their environments.

Question for Further Discussion

You share half of your genetic makeup with each of your parents, but you are no doubt very different from both of them. Spend a few minutes jotting down the similarities and differences between you and your parents. How do you think your unique environment and experiences have contributed to some of the differences you see?

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

Which example supports the argument that genetics largely influences our behaviour?

a. Children who are sung to are more likely to develop musical talent
b. Children whose mothers read to them often are likely to have better reading scores in third grade
c. An adopted child's personality more closely resembles his biological parents than his adoptive parents
d. Children with tall parents do not grow to their full height if they do not eat a healthy diet

2. MultiChoice Activity

The scientific discipline in which similarities among individuals are analyzed based on how biologically related they is called

a. quantitative genetics.
b. behavioural genetics.
c. behaviourism
d. adoption studies.

3. MultiChoice Activity

Raul is having a discussion with his mother about his father, Tomas, and his brother, Hector. Tomas, the father, is an alcoholic, and Raul expresses to his mother that he is concerned about his brother, Hector, who is also beginning to drink a lot. Raul does not want his brother to turn out like his father. Raul's mother tells him that there have been several men in the family who are alcoholics, such as his grandfather and two uncles. She says that it runs in the family and that his brother, Hector, can't help himself, and he will also be an alcoholic. Raul responds that he thinks they could stop drinking if they wanted to, despite the history of alcoholism in the family. "After all, look at me. I don't drink, and my friends don't either. I don't think I will become an alcoholic because I have friends who know how to control themselves." Raul's opinion best supports

a. behavioural genetics.
b. behaviourism.
c. the idea that nature can influence nurture.
d. the idea that nurture can influence nature.

"Summary," "Key Terms," and "Personal Application Questions" adapted from Psychology – 2e by Rose M. Spiel-

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CHAPTER 6: THE BRAIN AND NERVOUS SYSTEM

Chapter Overview

6.0 Learning Objectives
6.1 Parts of the Nervous System – The Peripheral Nervous System
6.2 Parts of the Nervous System – Central Nervous System I
6.3 Parts of the Nervous System – Central Nervous System II
6.4 Cells of the Nervous System
6.5 Brain Imaging
6.6 Chapter Summary

6.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Describe the difference between the central and peripheral nervous systems.
2. Explain the difference between the somatic and autonomic nervous systems.
3. Differentiate between the sympathetic and parasympathetic divisions of the autonomic nervous system.
4. Explain the functions of the spinal cord.
5. Identify the hemispheres and lobes of the brain.
6. Identify the basic parts of a neuron.
7. Describe how neurons communicate with each other.
8. Explain how drugs act as agonists or antagonists for a given neurotransmitter system.
9. Describe the types of techniques available to clinicians and researchers to image or scan the brain.

Chapter Overview

In this chapter, we will learn about the body's nervous system. First, we will identify the functions of the peripheral nervous system, including the body's "fight or flight" response. Next, we will examine the functions of the brain and spinal cord. We will explore the building blocks of the nervous system – neurons – and how they communicate with one another. We will consider the ways in which psychoactive drugs alter neural activity and the impact this has on behaviour and mental processes. Finally, we will explore the methods that researchers use to study the structure and function of the brain.

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6.1 Parts of the Nervous System – The Peripheral Nervous System

The nervous system can be divided into two major subdivisions: the central nervous system (CNS) and the peripheral nervous system (PNS), shown in. The CNS is comprised of 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.

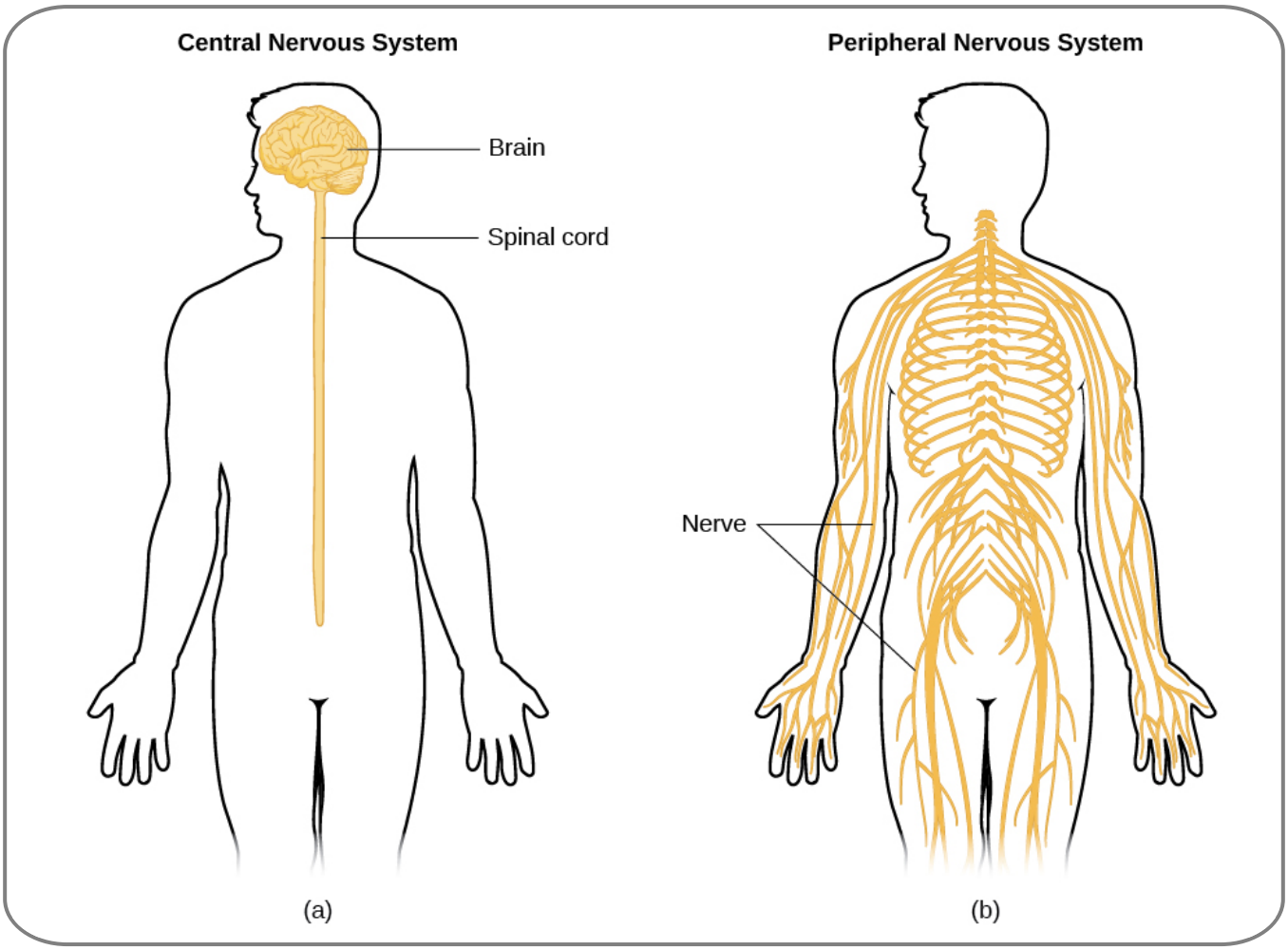

Figure 6.1.1 *The nervous system is divided into two major parts: (a) the Central Nervous System and (b) the Peripheral Nervous System.*

Image Description

Side-by-side diagram comparing the nervous system divisions. On the left, a front-facing human outline labeled Central Nervous System highlights the brain and spinal cord in yellow. On the right, a back-facing human outline labeled Peripheral Nervous System shows yellow nerves branching from the spinal cord throughout the torso, arms, and legs, with one nerve labeled.

Peripheral Nervous System

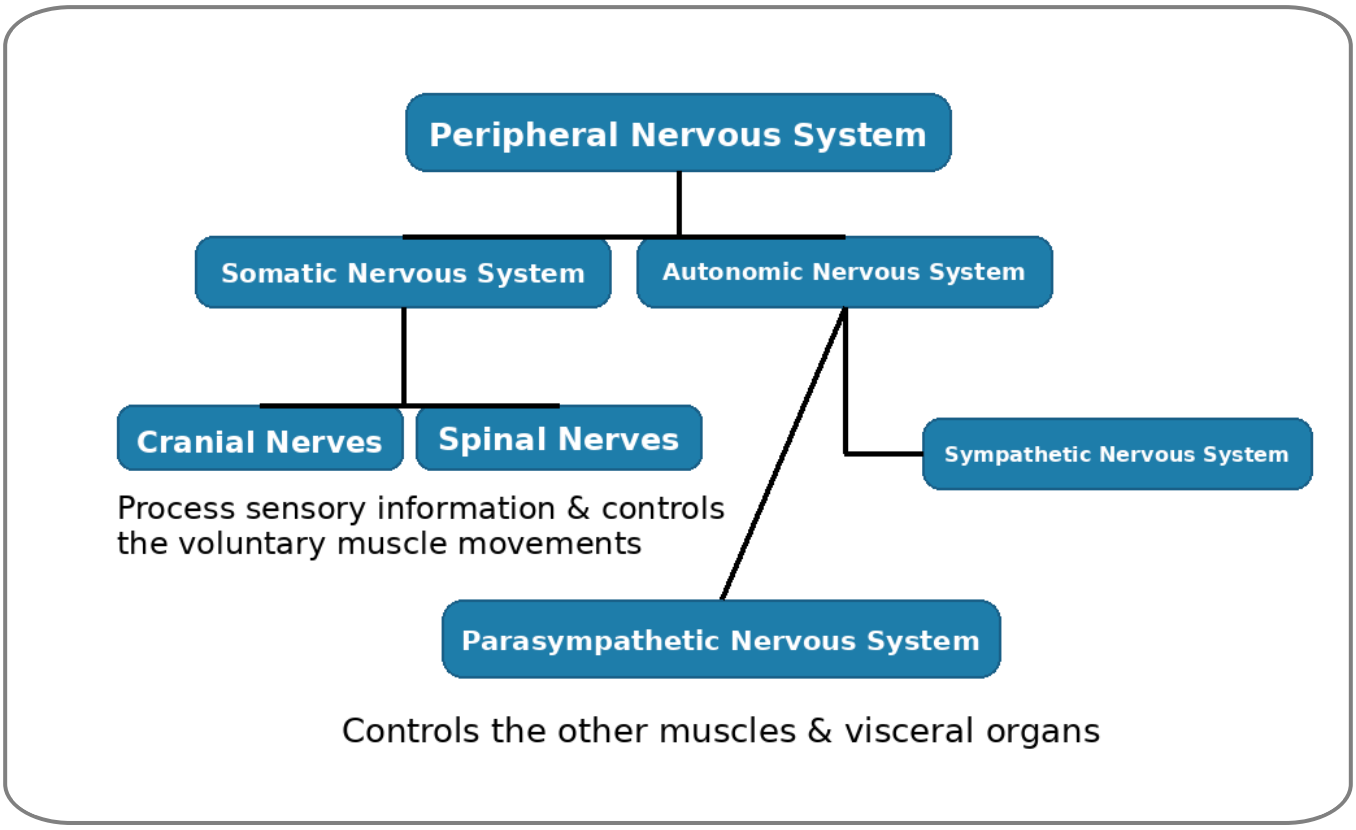

Figure 6.1.2 *The various components of the peripheral nervous system. Image: "The Peripheral Nervous System," by Aneeq Ahmad, nobaproject.com, CC BY-NC-SA 4.0. Modification: Recreated with updated design and color from the original.*

Image Description

Flowchart showing the organization of the Peripheral Nervous System. It branches into the Somatic Nervous System and the Autonomic Nervous System. The somatic system branches into Cranial Nerves and Spinal Nerves, labelled as processing sensory information and controlling voluntary muscle movements. The autonomic system branches into the Sympathetic Nervous System and the Parasympathetic Nervous System, labelled as controlling other muscles and visceral organs.

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 traditionally 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"). Each nerve is basically a two-way superhighway, containing thousands of axons, both efferent and afferent.

The autonomic nervous system controls our internal organs and glands and is generally considered to be outside the realm of voluntary control. It can be further subdivided into the sympathetic and parasympathetic divisions. 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. **Homeostasis** is a state of equilibrium, in which biological conditions (such as body temperature) are maintained at optimal levels.

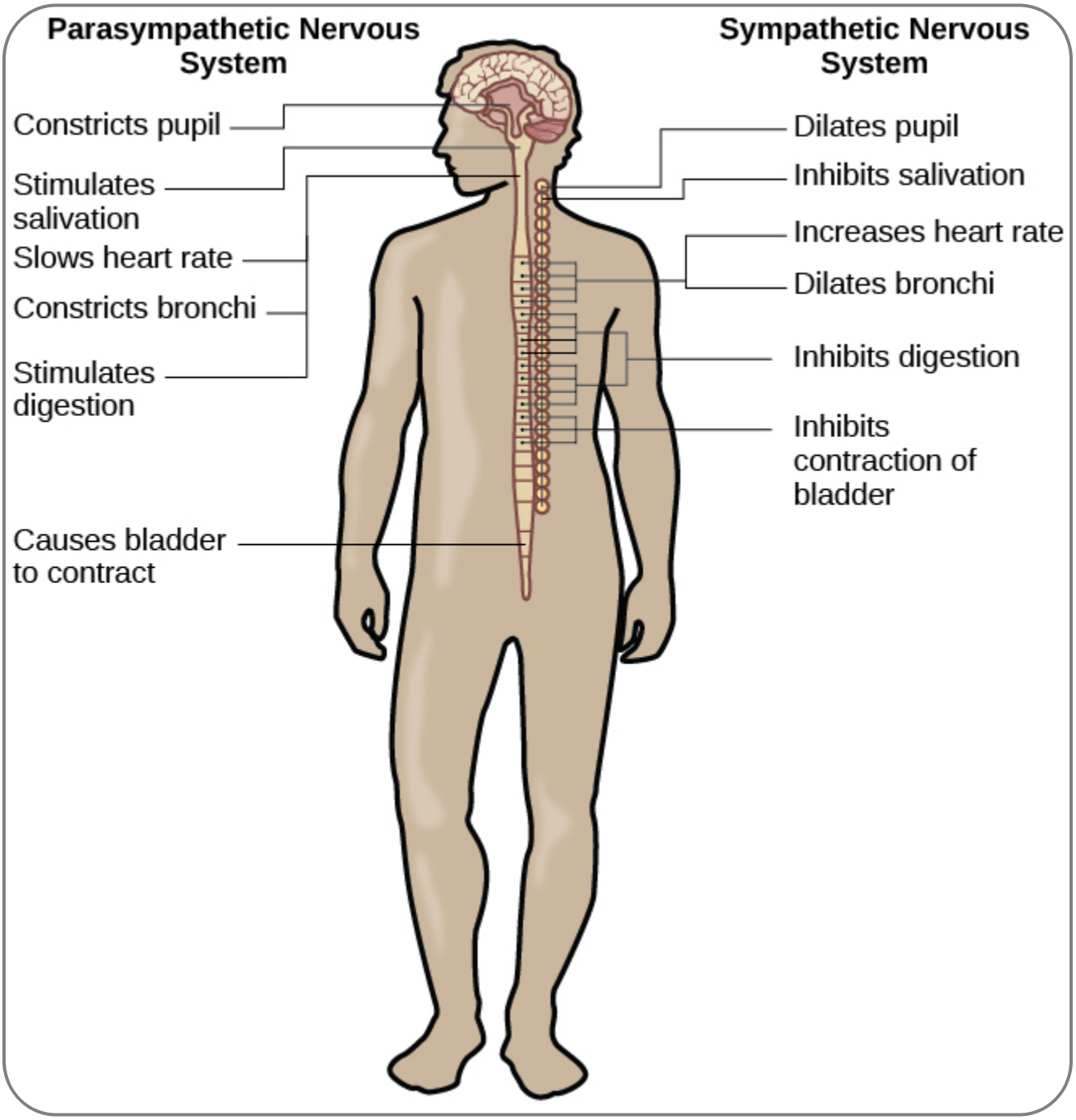

Figure 6.1.3 *The sympathetic and parasympathetic divisions of the autonomic nervous system have the opposite effects on various systems.*

Image Description

Diagram of a human body comparing the parasympathetic and sympathetic nervous systems and their effects on organs. Parasympathetic side: constricts pupils, stimulates salivation, slows heart rate, constricts bronchi, stimulates digestion, and causes the bladder to contract. Sympathetic side: dilates pupils, inhibits salivation, increases heart rate, dilates bronchi, inhibits digestion, and inhibits contraction of the bladder.

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, out hunting small game, suddenly disturbs a large bear with her cubs. At that moment, his body undergoes a series of changes—a direct function of sympathetic activation—preparing him to face the threat. His pupils dilate, his heart rate and blood pressure increase, his bladder relaxes, his liver releases glucose, and adrenaline surges into his bloodstream. 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 any 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 et al., 2006) is among the many negative consequences of persistent and repeated exposure to stressful situations.

Once the threat has been resolved, the parasympathetic nervous system takes over and returns bodily functions to a relaxed state. Our hunter's heart rate and blood pressure return to normal, his pupils constrict, he regains control of his bladder, and the liver begins to store glucose in the form of glycogen for future use. These processes are associated with activation of the parasympathetic nervous system.

Activity: Test Your Understanding

Quiz Text Description

1. MultiChoice Activity

Which of these is most likely to activate the sympathetic nervous system?

a. Receiving an email from your professor saying the grades for a particularly difficult midterm have been released.
b. The desire to stand up and walk towards the kettle to make yourself a cup of tea.
c. Lying down on a field and staring at the clouds.
d. Walking into a room and forgetting why you walked there in the first place.
e. Listening to a guided meditation on your headphones.

2. MultiChoice Activity

Which of these is most likely to activate the parasympathetic nervous system?

a. Walking into a room and forgetting why you walked there in the first place.
b. Lying down in a field and staring at the clouds.
c. Listening to a guided meditation on your headphones.
d. The desire to stand up and walk towards the kettle to make yourself a cup of tea.
e. Receiving an email from your professor saying the grades for a particularly difficult midterm have been released.

3. MultiChoice Activity

Which of these is most likely to use the somatic nervous system?

a. Receiving an email from your professor saying the grades for a particularly difficult midterm have been released.
b. Listening to a guided meditation on your headphones.
c. The desire to stand up and walk towards the kettle to make yourself a cup of tea.
d. Walking into a room and forgetting why you walked there in the first place.
e. Lying down in a field and staring at the clouds.

Solution:

1. a. Receiving an email from your professor saying the grades for a particularly difficult midterm have been released.
2. b. Lying down on a field and staring at the clouds.; c. Listening to a guided meditation on your headphones.;
3. c. The desire to stand up and walk towards the kettle to make yourself a cup of tea.; d. Walking into a room and forgetting why you walked there in the first place.;

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6.2 Parts of the Nervous System – Central Nervous System I

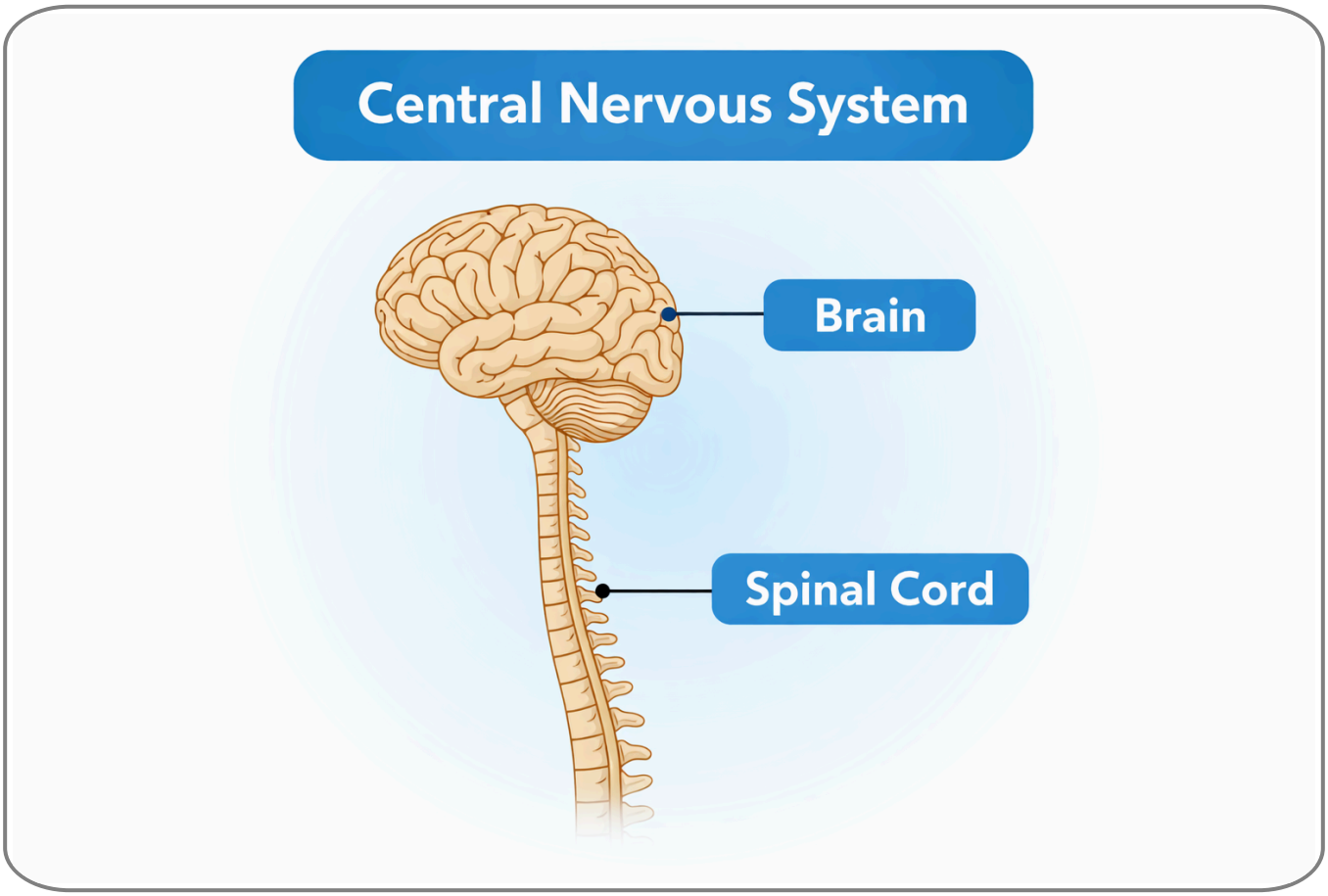


Figure 6.2.1 *The Central Nervous System.*

The Brain and Spinal Cord

The brain is a remarkably complex organ comprised of billions of interconnected neurons and glia. It is a bilateral, or two-sided, structure that can be separated into distinct lobes. Each lobe is associated with certain types of functions, but, ultimately, all of the areas of the brain interact with one another to provide the foundation for our thoughts and behaviours. In this section, we discuss the overall organization of the brain and the functions associated with different brain areas, beginning with what can be seen as an extension of the brain, the spinal cord.

The Spinal Cord

It can be said that the spinal cord is what connects the brain to the outside world. Because of it, the brain can

act. The spinal cord is like a relay station, but a very smart one. It not only routes messages to and from the brain, but it also has its own system of automatic processes, called reflexes.

The top of the spinal cord merges with the brain stem, where the basic processes of life are controlled, such as breathing and digestion. In the opposite direction, the spinal cord ends just below the ribs—contrary to what we might expect, it does not extend all the way to the base of the spine.

The spinal cord is functionally organized into 30 segments, corresponding with the vertebrae. Each segment is 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. Messages travel to and from the brain through every segment.

Some sensory messages are immediately acted on by the spinal cord, without any input from the brain. Withdrawal from heat and the knee-jerk reaction are two examples. When a sensory message meets certain parameters, the spinal cord initiates an automatic reflex. The signal passes from the sensory nerve to a simple processing center, which initiates a motor command. Seconds are saved because messages don't have to go to the brain, be processed, and get sent back. In matters of survival, the spinal reflexes allow the body to react extraordinarily fast.

The spinal cord is protected by bony vertebrae and cushioned in cerebrospinal fluid, but injuries still occur. When the spinal cord is damaged at a specific segment, the lower segments are cut off from the brain, causing paralysis. Therefore, the less damage to the spine, the fewer functions an injured individual loses.

The Brain – Two Hemispheres

The surface of the brain, known as the **cerebral cortex**, is very uneven, characterized by a distinctive pattern of folds or bumps, known as **gyri** (singular: gyrus), and grooves, known as **sulci** (singular: sulcus), as shown in Figure 6.2.2. These gyri and sulci form important landmarks that allow us to separate the brain into functional centers. The most prominent sulcus, known as the longitudinal fissure, is the deep groove that separates the brain into two halves or hemispheres: the left hemisphere and the right hemisphere.

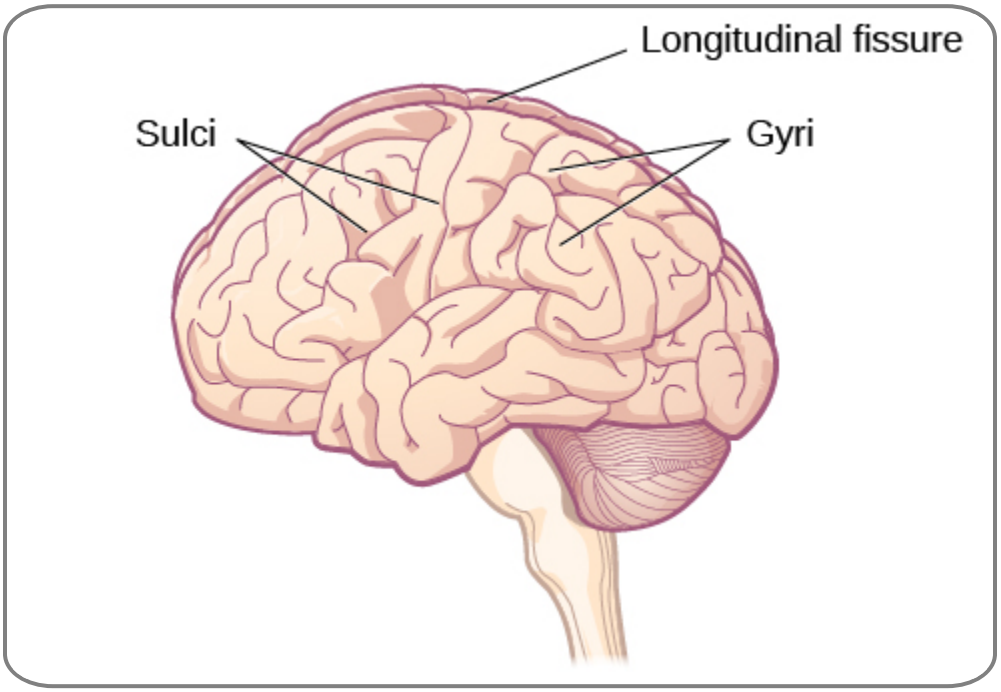


Figure 6.2.2 *The surface of the brain is covered with gyri and sulci. A deep sulcus is called a fissure, such as the longitudinal fissure that divides the brain into left and right hemispheres. Image: modification of work by Bruce Blaus, in Psychology – H5P edition, CC BY 4.0.*

There is evidence of some specialization of function—referred to as **lateralization**—in each hemisphere, mainly regarding differences in language ability. Beyond that, however, the differences that have been found have been minor. What we do know is that the left hemisphere controls the right half of the body, and the right hemisphere controls the left half of the body.

The two hemispheres are connected by a thick band of neural fibres known as the **corpus callosum**, consisting of about 200 million axons. The corpus callosum allows the two hemispheres to communicate with each other and allows for information being processed on one side of the brain to be shared with the other side.

Normally, we are not aware of the different roles that our two hemispheres play in day-to-day functions, but there are people who come to know the capabilities and functions of their two hemispheres quite well. In some cases of severe epilepsy, doctors elect to sever the corpus callosum as a means of controlling the spread of seizures. While this is an effective treatment option, it results in individuals who have split brains. After surgery, these split-brain patients show a variety of interesting behaviours. For instance, a split-brain patient is unable to name a picture that is shown in the patient's left visual field because the information is only available in the largely nonverbal right hemisphere. However, they are able to 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).

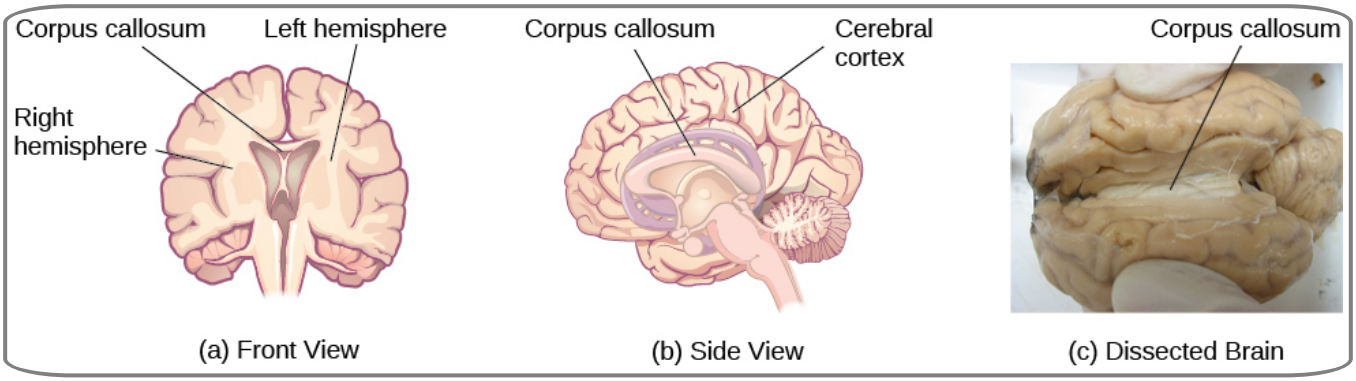


Figure 6.2.3 *(a, b) The corpus callosum connects the left and right hemispheres of the brain. (c) A scientist spreads this dissected sheep brain apart to show the corpus callosum between the hemispheres. Image: Modification of work by Aaron Bornstein (C), in Psychology – H5P edition, CC BY 4.0.*

Much of what we know about the functions of different areas of the brain comes from studying changes in the behaviour and ability of individuals who have suffered damage to the brain. For example, researchers study the behavioural changes caused by strokes to learn about the functions of specific brain areas. A stroke, caused by an interruption of blood flow to a region in the brain, causes a loss of brain function in the affected region. The damage can be in a small area, and, if it is, this gives researchers the opportunity to link any resulting behavioural changes to a specific area. The types of deficits displayed after a stroke will be largely dependent on where in the brain the damage occurred.

Here's an Example

Consider Theona, an intelligent, self-sufficient woman, who is 62 years old. Recently, she suffered a stroke in the front portion of her right hemisphere. As a result, she has great difficulty moving her left leg. (As you learned earlier, the right hemisphere controls the left side of the body; also, the brain's main motor centers are located at the front of the head, in the frontal lobe.) Theona has also experienced behavioral changes. For example, while in the produce section of the grocery store, she sometimes eats grapes, strawberries, and apples directly from their bins before paying for them. This behavior—which would have been very embarrassing to her before the stroke—is consistent with damage in another region in the frontal lobe—the prefrontal cortex, which is associated with judgment, reasoning, and impulse control.

Forebrain Structures

The two hemispheres of the cerebral cortex are part of the forebrain, which is the largest part of the brain. The forebrain contains the cerebral cortex and a number of other structures that lie beneath the **cortex** (called subcortical structures): **thalamus,** hypothalamus, pituitary gland, and **the limbic system** (a collection of structures). The cerebral cortex, which is the outer surface of the brain, is associated with higher-level processes

such as consciousness, thought, emotion, reasoning, language, and memory. Each cerebral hemisphere can be subdivided into four lobes, each associated with different functions.

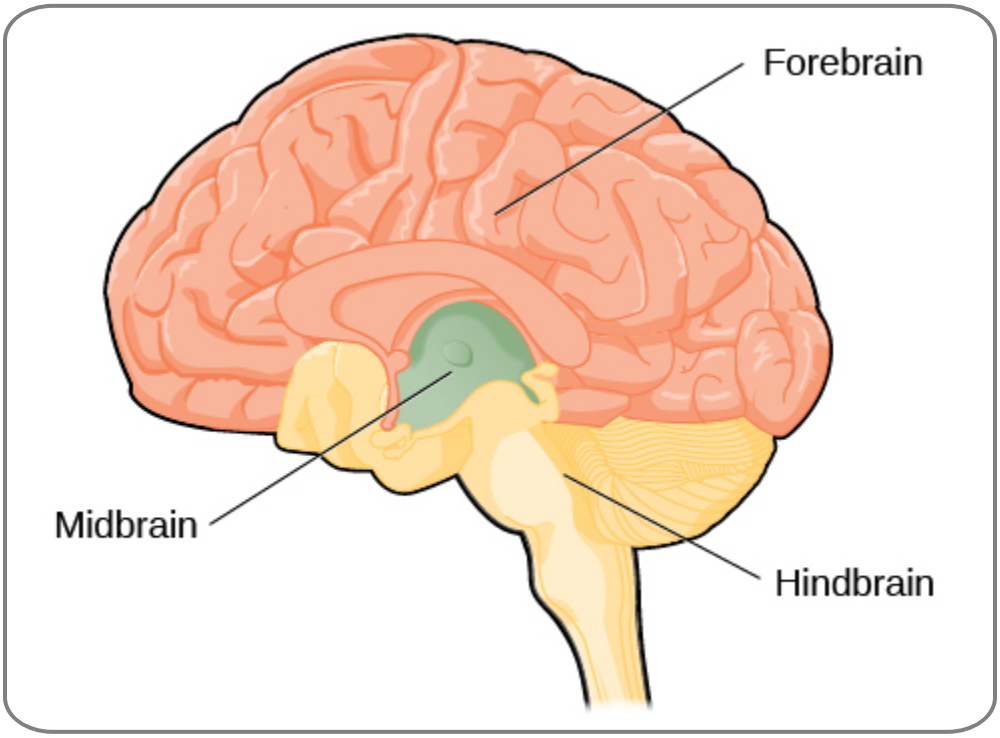


Figure 6.2.4 *The brain and its parts can be divided into three main categories: the forebrain, midbrain, and hindbrain.*

Lobes of the Brain

The four lobes of the brain are the frontal, parietal, temporal, and occipital lobes. The frontal lobe is located in the forward part of the brain, extending back to a fissure known as the central sulcus.

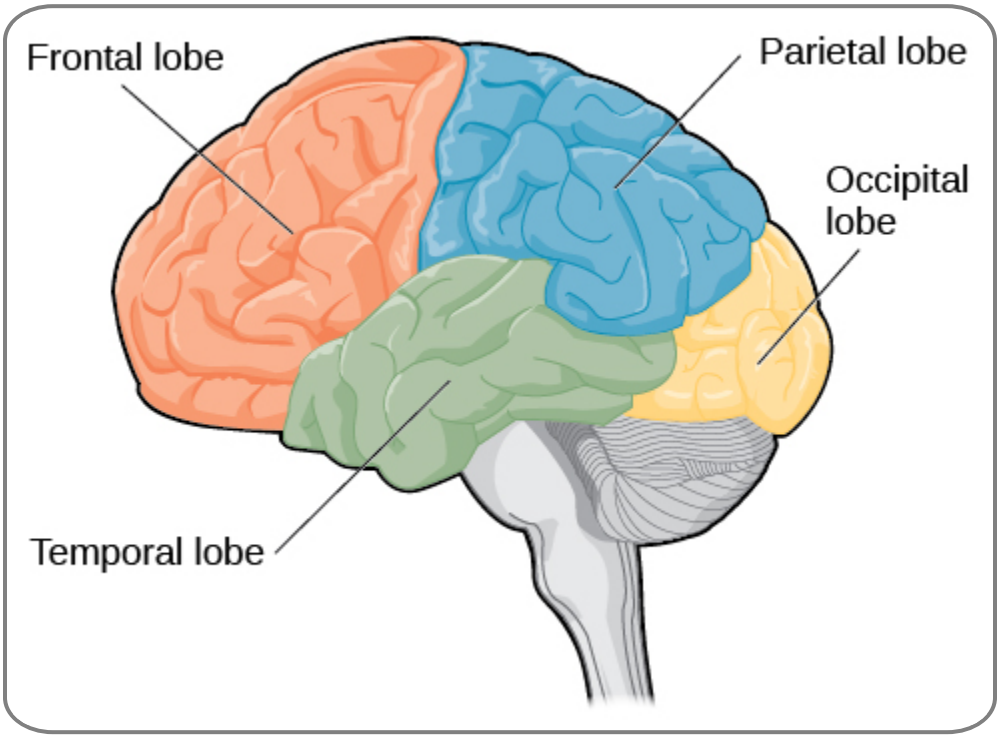


Figure 6.2.5. *The lobes of the brain are shown: From left to right – Frontal, Parietal, Occipital, and Temporal Lobes.*

Lobes of the Brain – The Frontal Lobe

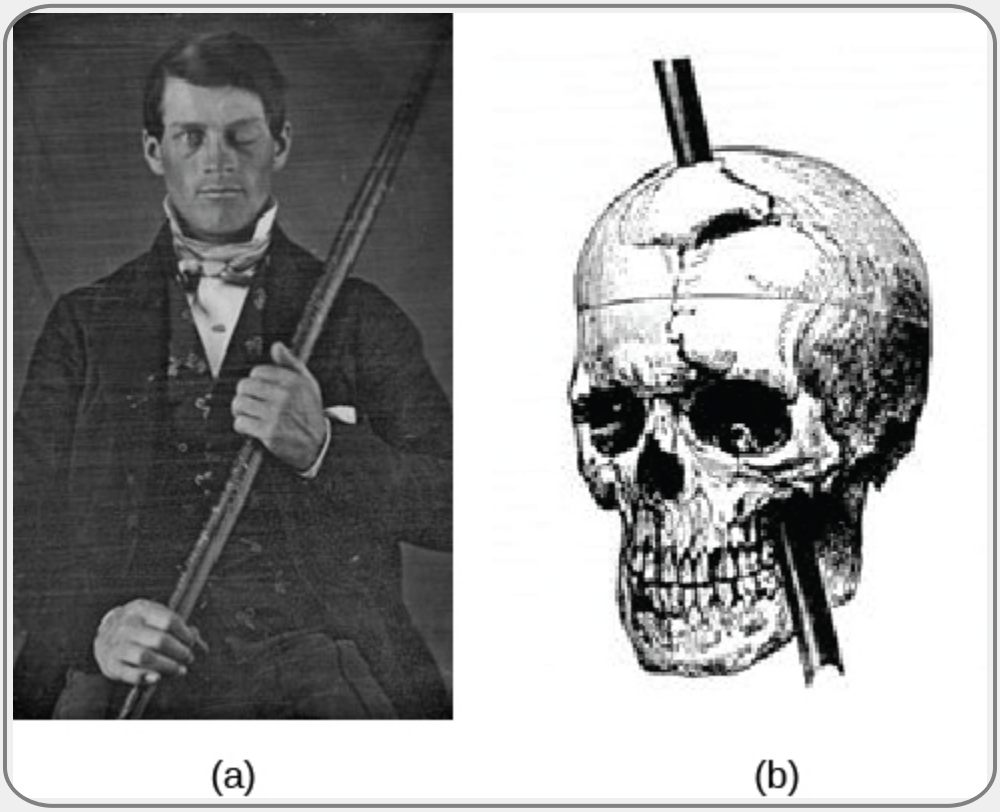
The **frontal lobe** is involved in reasoning, motor control, emotion, and language. It contains the motor cortex, which is involved in planning and coordinating movement; the **prefrontal cortex**, which is responsible for higher-level cognitive functioning; and Broca's area, which is essential for language production.

Here's an Eample: Phineas Gage

Probably the most famous case of frontal lobe damage is that of a man by the name of Phineas Gage. On September 13, 1848, Gage (age 25) was working as a railroad foreman in Vermont. He and his crew were using an iron rod to tamp explosives down into a blasting hole to remove rock along the railway's path. Unfortunately, the iron rod created a spark and caused the rod to explode out of the blasting hole, into Gage's face, and through his skull. Although lying in a pool of his own blood with brain matter emerging from his head, Gage was conscious and able to get up, walk, and speak. But in the months following his accident, people noticed that his personality had changed. Many of his friends described him as no longer being himself. Before the accident, it was said that Gage was a well-mannered, soft-spoken man, but he began to behave in odd and inappropriate ways after the accident. Such changes in personality would be consistent with loss of impulse control—a frontal lobe function.

Beyond the damage to the frontal lobe itself, subsequent investigations into the rod's path also identified probable damage to pathways between the frontal lobe and other brain structures, including the limbic system. With connections between the planning functions of the frontal lobe and the emotional processes of the limbic system severed, Gage had difficulty controlling his emotional impulses.

However, there is some evidence suggesting that the dramatic changes in Gage's personality were exaggerated and embellished. Gage's case occurred in the midst of a 19th century debate over localization—regarding whether certain areas of the brain are associated with particular functions. On the basis of extremely limited information about Gage, the extent of his injury, and his life before and after the accident, scientists tended to find support for their own views, on whichever side of the debate they fell (Macmillan, 1999).



(a) Phineas Gage holds the iron rod that penetrated his skull in a 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. Images: Modification of "Phineas Gage Daguerreotype, by Jack and Beverly Wilgus, Wikimedia Commons, CC BY-SA 3.0, and "Phineas Gage – 1868 skull diagram," by John M. Harlow, M.D., Public Domain.

Lobes of the Brain – The Parietal Lobe

The brain's **parietal lobe** is located immediately behind the frontal lobe, and is involved in processing information from the body's senses. It contains the **somatosensory cortex**, which is essential for processing sensory information from across the body, such as touch, temperature, and pain. The somatosensory cortex is organized topographically, which means that spatial relationships that exist in the body are maintained on the surface of the somatosensory cortex. For example, the portion of the cortex that processes sensory information from the hand is adjacent to the portion that processes information from the wrist.

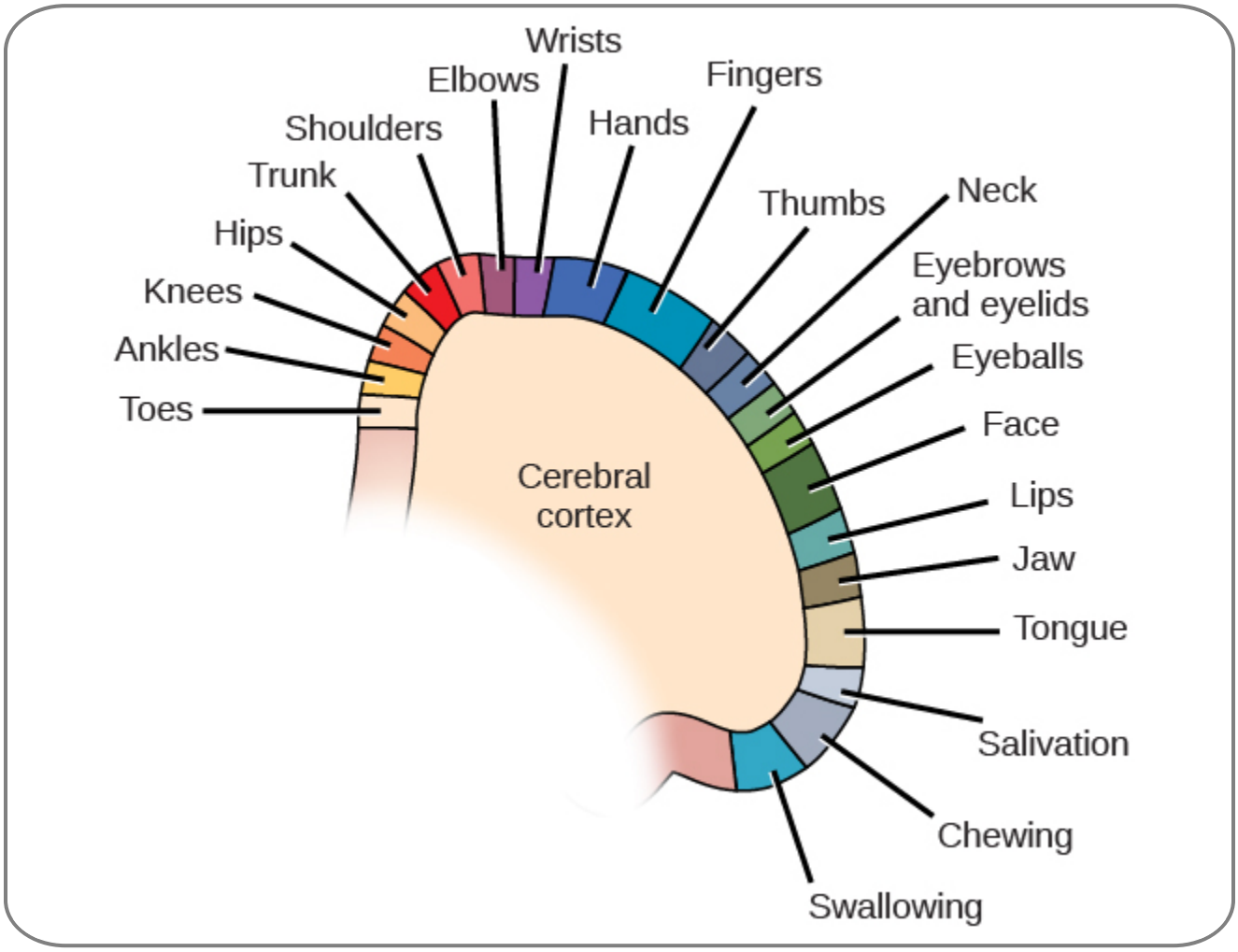


Figure 6.2.6. *Spatial relationships in the body are mirrored in the organization of the somatosensory cortex.*

Image Description

Diagram of the cerebral cortex (motor/sensory homunculus map) showing body-part representation arranged along the cortex. A curved, colour-coded strip around the outer edge of the cortex is labelled with body areas. On the left side, labels progress from toes, ankles, knees, hips, trunk, shoulders, elbows, wrists, hands, and fingers near the top. On the right side, labels include thumbs, neck, eyebrows, eyelids, eyeballs, face, lips, jaw, tongue, salivation, chewing, and swallowing. The center of the brain shape is labelled "Cerebral cortex."

The Lobes of the Brain – Temporal Lobe

The **temporal lobe** is located on the side of the head (temporal means "near the temples"), and is associated with hearing, memory, emotion, and some aspects of language. The **auditory cortex**, the main area responsible for processing auditory information, is located within the temporal lobe. **Wernicke's area,** important for speech comprehension, is also located here. Whereas individuals with damage to **Broca's area** have difficulty producing language, those with damage to Wernicke's area can produce sensible language, but they are unable to understand it.

Here's an Example: Broca's Area

People who suffer damage to Broca's area have great difficulty producing language of any form. For example, Padma was an electrical engineer who was socially active and a caring, involved mother. About twenty years ago, she was in a car accident and suffered damage to her Broca's area. She completely lost the ability to speak and form any kind of meaningful language. There is nothing wrong with her mouth or her vocal cords, but she is unable to produce words. She can follow directions but can't respond verbally, and she can read but no longer write. She can do routine tasks like running to the market to buy milk, but she cannot communicate verbally if a situation calls for it.

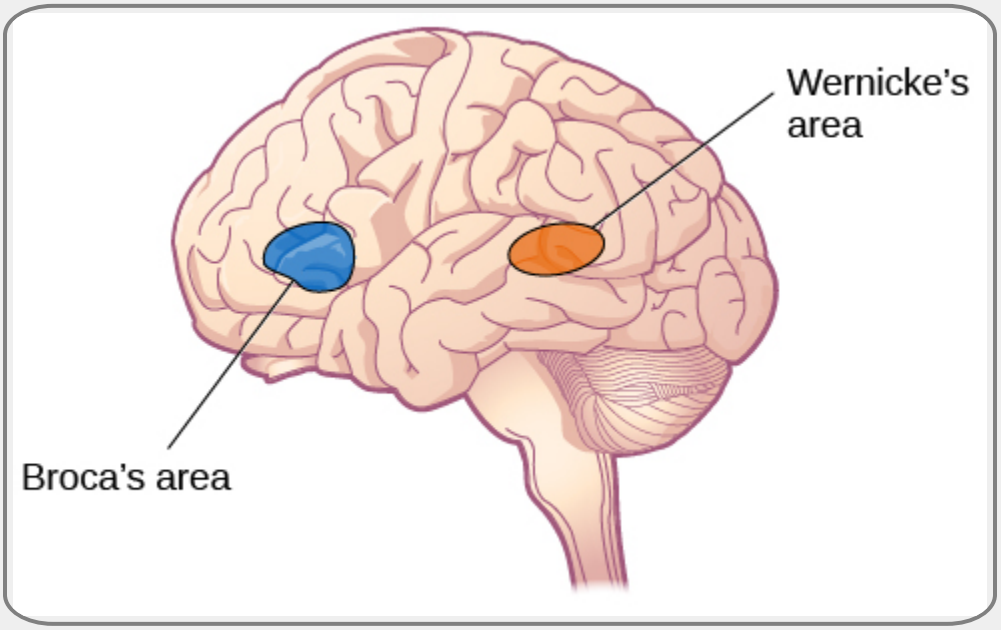


Figure 6.2.7. *Damage to either Broca's area or Wernicke's area can result in language deficits. The types of deficits are very different, however, depending on which area is affected.*

The Lobes of the Brain – Occipital Lobe

The **occipital lobe** is located at the very back of the brain, and contains the **primary visual cortex**, which is responsible for interpreting incoming visual information. The occipital cortex is organized retinotopically, which means there is a close relationship between the position of an object in a person's visual field and the position of that object's representation on the cortex. You will learn much more about how visual information is processed in the occipital lobe when you study sensation and perception.

Activity: Test You're Understanding

Drag the labels to the correct part of their corresponding part of the brain.

Quiz Text Description
This H5P question set includes drag-and-drop activities about the forebrain and cerebral lobes. The first three questions use the same side-view diagram of a colour-coded brain (frontal, parietal, temporal, and occipital lobes), and learners drag labels or functions to the correct lobe. The final question is a drag-the-words item about Broca's area and Wernicke's area.

Question 1 (Drag and Drop) – Brain lobes

Descriptive text:
A lateral (side) view of the brain is shown with four colour-coded lobes. Learners drag the labels Frontal lobe, Parietal lobe, Temporal lobe, and Occipital lobe to the correct regions on the brain diagram.

- Frontal lobe = front region
- Parietal lobe = upper middle region
- Temporal lobe = lower side region
- Occipital lobe = back region

Question 2 (Drag and Drop) – Lobe functions

Descriptive text:
The same side-view, colour-coded brain diagram is shown. Learners drag functional labels to the correct lobe regions. The labels are: Visual processing, Audio processing, Thinking and planning, and Sensory processing.
Correct matches:

- Frontal lobe → Thinking and planning
- Parietal lobe → Sensory processing
- Temporal lobe → Audio processing
- Occipital lobe → Visual processing

Question 3 (Drag and Drop) – Specialized cortical areas

Descriptive text:
The same brain lobe diagram is shown. Learners drag labels for specialized brain functions/areas to the correct lobe regions. The labels are: Somatosensory cortex, Wernicke's area, Motor control, and Broca's area.
Correct matches:

- Frontal lobe → Broca's area and Motor control
- Parietal lobe → Somatosensory cortex
- Temporal lobe → Wernicke's area
  (The occipital lobe is shown, but is not used for a correct match in this item.)

Question 4 (Drag the Words) – Language areas

Descriptive text:
Learners drag the correct terms into two sentences about language functions in the brain. The correct terms are Broca's area and Wernicke's area. The completed statements are:

- Broca's area is responsible for language production (forming words and sentences).
- Wernicke's area is responsible for language comprehension (understanding and effectively using words and phrases).

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OpenAI. (2026). ChatGPT (5.2) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 6.2.1: "Create an illustration graphic depicting the brain and spinal cord as the two components of the body's central nervous system."

6.3 Parts of the Nervous System – Central Nervous System II

Other Areas of the Forebrain – Thalamus and Limbic System

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.

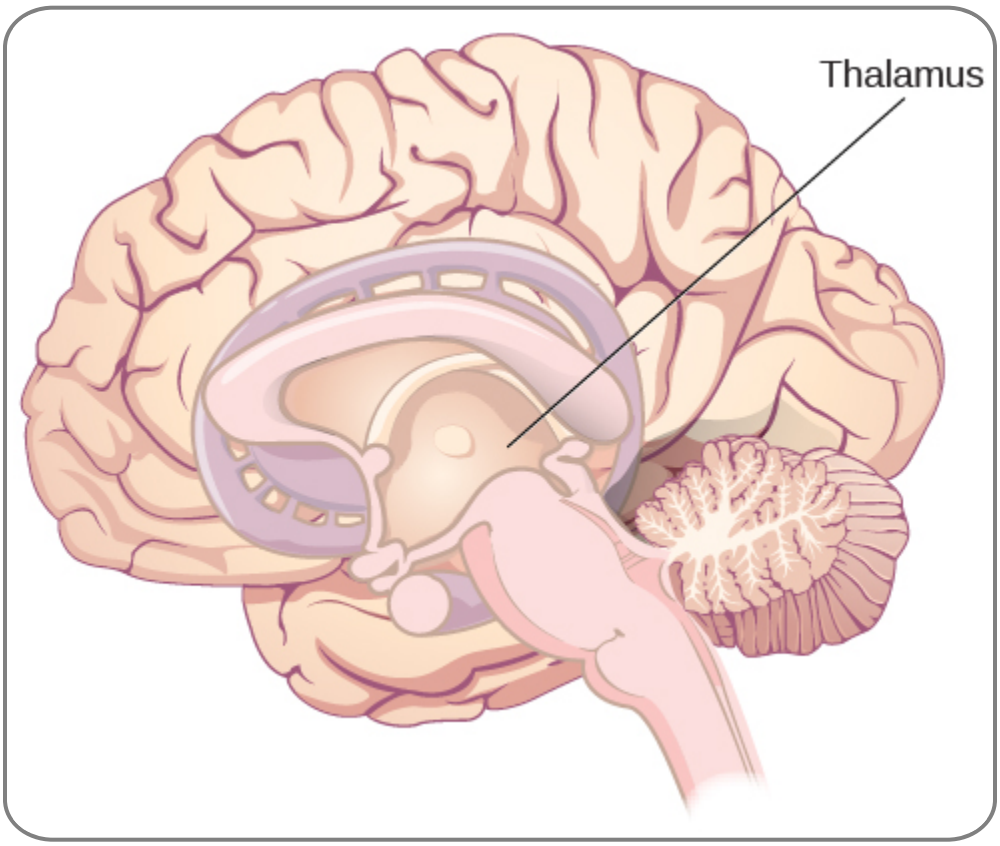

Figure 6.2.8. *The thalamus serves as the relay center of the brain, where most senses are routed for processing.*

The **limbic system** is involved in processing both emotion and memory. Interestingly, the sense of smell projects directly to the limbic system; therefore, not surprisingly, smell can evoke emotional responses in ways that other sensory modalities cannot. 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. 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.

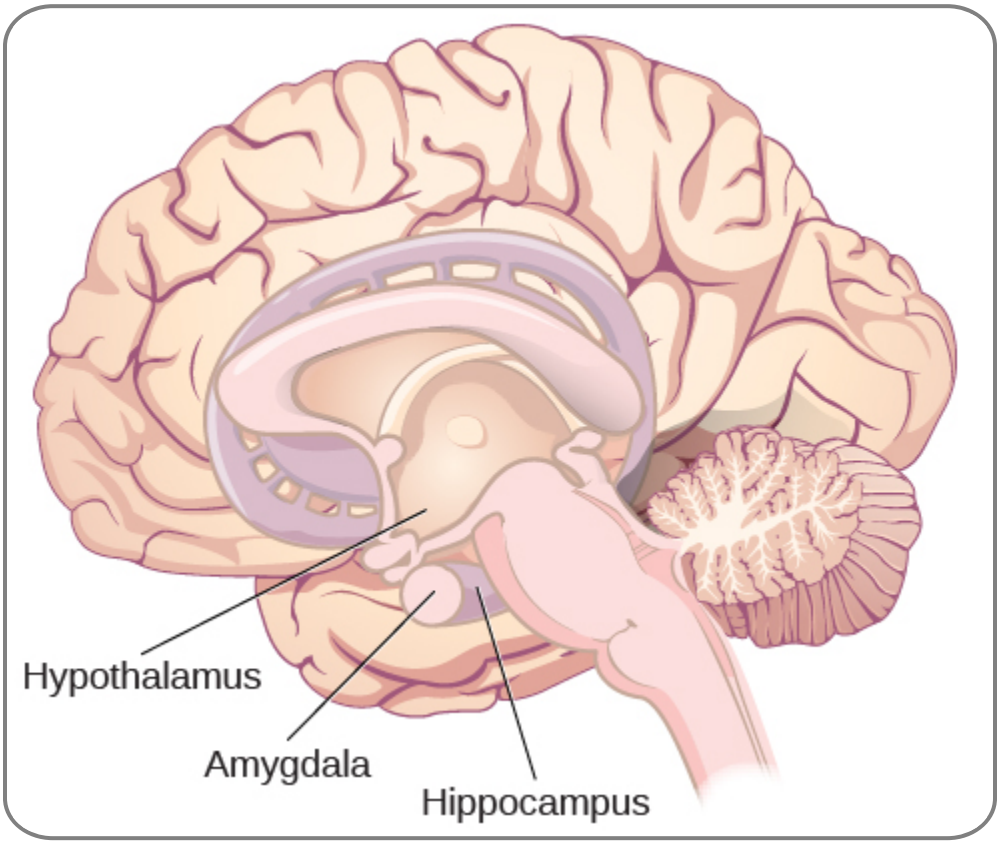

Figure 6.2.9. *The limbic system is involved in mediating emotional response and memory.*

Activity: Test Your Understanding

Drag the labels to the correct part of their corresponding part of the brain.

Quiz Text Description
This H5P quiz reviews major brain structures and their functions. The first three questions use a side-view/sagittal brain diagram (showing the cerebrum, inner forebrain structures, brainstem, and cerebellum) with drag-and-drop labels/functions placed onto target areas in the central forebrain. The remaining four questions are multiple-choice questions about the amygdala, hippocampus, and hypothalamus

Question 1 (Drag and Drop) – Brain structure labels

Descriptive text:
A sagittal (side cross-section) brain diagram is shown. Learners drag three labels to the correct internal brain structures in the forebrain region. The labels are:

- Thalamus
- Hypothalamus
- Amygdala

The target areas are small regions located near the center/lower center of the brain diagram.

Question 2 (Drag and Drop) – Brain structure functions

Descriptive text:
The same sagittal brain diagram is shown. Learners drag function labels to the correct internal forebrain structures. The labels are:

- Regulates hormones
- Regulates emotions
- Regulates sensory stimuli

Correct matches are:

- Hypothalamus → regulates hormones
- Amygdala → regulates emotions
- Thalamus → regulates sensory stimuli

Question 3 (Drag and Drop) – Hypothalamus and hippocampus functions

Descriptive text:
The same sagittal brain diagram is shown. Learners drag two function labels to the correct structures. The labels are:

- Connects to the endocrine system
- Learning and memory

Correct matches are:

- Hypothalamus → connects to endocrine system
- Hippocampus → learning and memory

Question 4 (Multiple Choice) – Amygdala damage

Descriptive text:
A scenario-based multiple-choice question asks what would likely happen if a neurosurgeon accidentally injured a patient's amygdala during surgery. The correct answer identifies changes to emotion and difficulty linking memories with emotions.

Question 5 (Multiple Choice) – Stroke and memory (hippocampus)

Descriptive text:
A case-study multiple-choice question describes a patient who, after a stroke, remembers the past but has memory-related difficulties linked to changes in brain function. Learners identify the affected brain structure. The correct answer is the hippocampus.

Question 6 (Multiple Choice) – Eating behavior and hypothalamus

Descriptive text:
A fill-in-the-blank multiple-choice question asks which brain area, when damaged, can cause loss of control over food intake (eating too much or too little). The correct answer is the hypothalamus.

Question 7 (Multiple Choice) – Hippocampus and memory use

Descriptive text:
A multiple-choice question asks when a person's hippocampus would most likely be active. The correct answer is during a memory-related task (for example, taking an exam).

Here's an Example: The Case of Henry Molaison (H.M.)

In 1953, Henry Gustav Molaison (H. M.) was a 27-year-old man who experienced severe seizures. In an attempt to control his seizures, H. M. underwent brain surgery to remove his hippocampus and amygdala.

Following the surgery, H.M's seizures became much less severe, but he also suffered some unexpected—and devastating—consequences of the surgery: he lost his ability to form many types of new memories. For example, he was unable to learn new facts, such as who was the president of the United States. He was able to learn new skills, but afterward, he had no recollection of learning them. For example, while he might learn to use a computer, he would have no conscious memory of ever having used one. He could not remember new faces, and he was unable to remember events, even immediately after they occurred.

Researchers were fascinated by his experience, and he is considered one of the most studied cases in medical and psychological history (Hardt et al., 2010; Squire, 2009). Indeed, his case has provided tremendous insight into the role that the hippocampus plays in the consolidation of new learning into explicit memory.

Link to Learning
Clive Wearing, an accomplished musician, lost the ability to form new memories when his hippocampus was damaged through illness. Check out the first few minutes of this documentary video for an introduction to this man and his condition: Clive Wearing Living Without Memory.

Midbrain and Hindbrain Structures

The **midbrain** comprises structures located deep within the brain, between the forebrain and the hindbrain. The **reticular formation** is centred in the midbrain, but it actually extends up into the forebrain and down into the hindbrain. The reticular formation is important in regulating the sleep/wake cycle, arousal, alertness, and motor activity.

The **substantia nigra** (Latin for "black substance") and the **ventral tegmental area (VTA)** are also located in the midbrain. Both regions contain cell bodies that produce the neurotransmitter dopamine, and both are critical for movement. Degeneration of the substantia nigra and VTA is involved in Parkinson's disease. In addition, these structures are involved in mood, reward, and addiction (George et al., 2012).

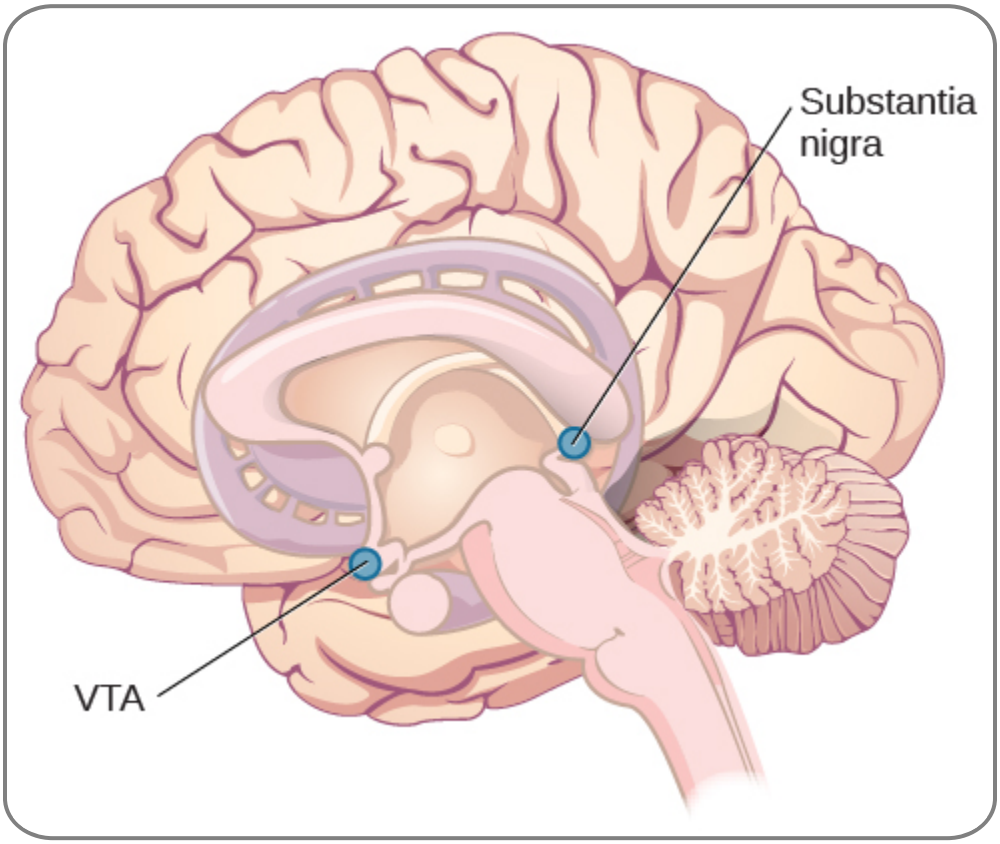

Figure 6.2.10. *The substantia nigra and ventral tegmental area (VTA) are located in the midbrain.*

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. 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** serves to connect the brain and spinal cord. It is also involved in regulating brain activity during sleep. The medulla, pons, and midbrain together are known as the **brainstem**.

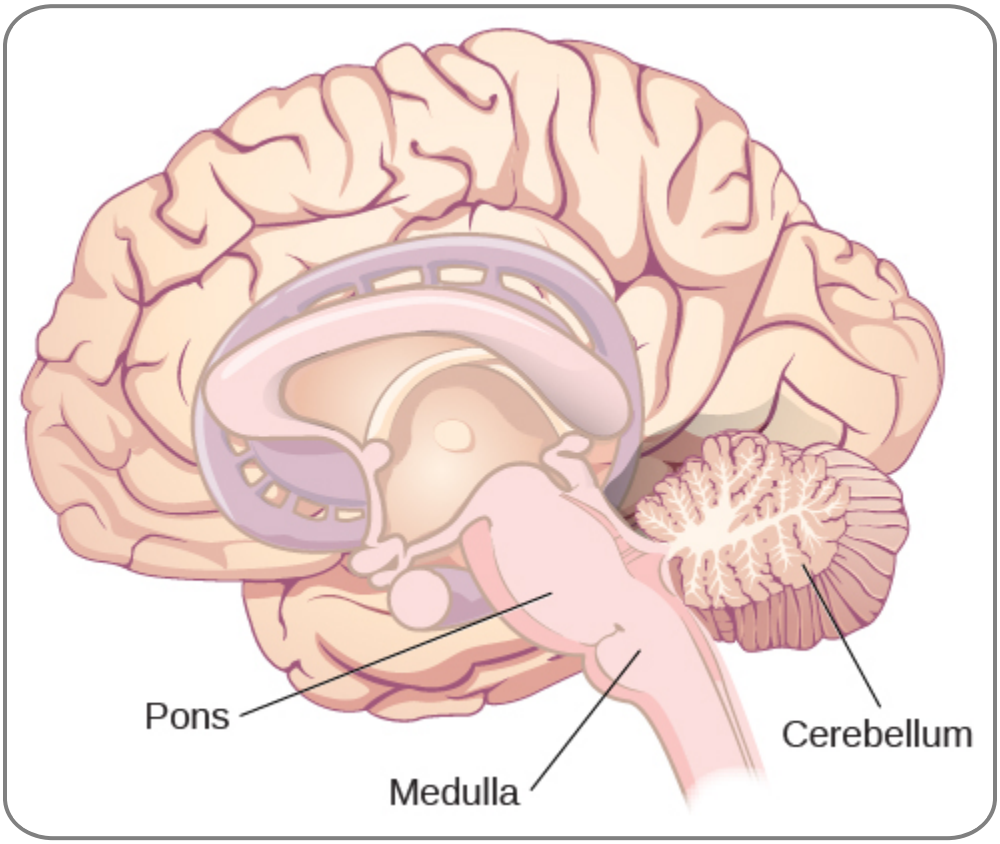

Figure 6.2.11. *The pons, medulla, and cerebellum make up the hindbrain.*

The **cerebellum** (Latin for "little brain") receives messages from muscles, tendons, joints, and structures in our ear to control balance, coordination, movement, and motor skills. The cerebellum is also thought to be an important area for processing some types of memories. In particular, procedural memory, or memory involved in learning and remembering how to perform tasks, is thought to be associated with the cerebellum. Recall that H. M. was unable to form new explicit memories, but he could learn new tasks. This is likely due to the fact that H. M.'s cerebellum remained intact.

Activity: Test Your Understanding

Drag the labels to the correct part of their corresponding part of the brain.

Quiz Text Description
This H5P question set uses a side-view (sagittal) brain diagram showing internal brain structures, including the midbrain, brainstem, and cerebellum. Learners complete drag-and-drop questions to label structures and match functions, then complete a drag-the-words summary about key midbrain and hindbrain terms.

Question 1 (Drag and Drop) – Structure labels

Descriptive text:
A sagittal brain diagram is shown with target areas on the midbrain and hindbrain. Learners drag labels to identify the following structures:

- Substantia nigra
- Ventral tegmental area (VTA)
- Medulla
- Pons
- Cerebellum

The activity places these labels onto the corresponding internal regions of the brain diagram.

Question 2 (Drag and Drop) – Matching structures to functions

Descriptive text:
Using the same sagittal brain diagram, learners drag function labels to the correct structures. The function labels include:

- Produces dopamine (used for the two dopamine-related midbrain regions: VTA and Substantia nigra)
- Controls balance
- Controls breathing & blood pressure
- Connects brain to spinal cord

These labels are matched to the midbrain/hindbrain structures shown on the diagram.

Question 3 (Drag and Drop) – Additional functions

Descriptive text:
The same sagittal brain diagram is used again. Learners drag additional function labels to the correct structures. The labels include:

- Regulates brain activity during sleep
- Regulates heart rate
- Involved with learning

- Controls balance
- Involved with addiction

These are matched to the appropriate areas, including the pons, medulla, cerebellum, and dopamine-related midbrain regions (VTA and Substantia nigra).

Question 4 (Drag the Words) – Midbrain and hindbrain summary

Descriptive text:
Learners complete a short passage by dragging key terms into blanks. The passage summarizes the functions of major midbrain and hindbrain structures. The draggable terms are:

- Reticular formation
- Substantia nigra
- Ventral tegmental area (VTA)
- Medulla
- Pons
- Cerebellum
- Brainstem

The completed text describes roles in sleep/wake regulation, arousal, dopamine production, autonomic functions (breathing/heart rate), balance, learning, and the brainstem as a combined structure.

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6.4 Cells of the Nervous System

Psychologists striving to understand the human mind may study the nervous system. Learning how the cells and organs (like the brain) function helps us understand the biological basis behind human psychology. The nervous system is composed of two basic cell types: **glial cells** (also known as glia) and neurons. Glial cells, which outnumber neurons ten to one, are traditionally thought to play a supportive role to neurons, both physically and metabolically. Glial cells 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. **Neurons**, on the other hand, serve as interconnected information processors that are essential for all of the tasks of the nervous system. 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 specialized function. A neuron's outer surface is made up of a semipermeable membrane. This membrane allows smaller molecules and molecules without an electrical charge to pass through it, while stopping larger or highly charged molecules.

Activity: Prototypical Neuron

Quiz Text Description

This H5P hotspot activity shows a labelled illustration of a multipolar neuron. The neuron's cell body (soma) and branching dendrites are on the left, and a long axon extends to the right and curves downward. The axon is covered by a segmented myelin sheath with visible nodes of Ranvier between segments. An oligodendrocyte (a glial cell) is shown associated with the myelin. At the lower right, the axon ends in terminal buttons near another neuron, and the gap between neurons is labelled as the synapse. Clicking each hotspot reveals a short explanation of the structure and its function.

Hot spot descriptions (by structure)

- **Cell membrane** – The neuron's outer boundary. It controls what enters and leaves the cell and helps maintain the electrical charge difference (resting potential) needed for nerve signalling.
- **Cell body (soma)** – The main body of the neuron. It contains the nucleus and supports the cell's basic functions and maintenance.
- **Dendrites** – Branch-like extensions that receive signals from other neurons. Inputs can be excitatory or inhibitory and combine to influence whether the neuron fires.
- **Axon** – A long extension that carries the electrical signal (action potential) away from the soma toward the end of the neuron.
- **Oligodendrocyte** – A type of glial cell in the central nervous system that helps form and maintain the myelin sheath around axons.
- **Node of Ranvier** – Small gaps between myelin segments. These gaps help the action potential travel faster along the axon.
- **Myelin sheath** – A fatty insulating covering around the axon that speeds up signal conduction.
- **Terminal buttons (axon terminals)** – The endings of the axon. They contain vesicles with neurotransmitters and release them when an action potential arrives.
- **Synapse** – The small gap between one neuron's terminal buttons and the next neuron. Neurotransmitters cross this gap to pass the signal to the next cell.

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**. 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, glial cells 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 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.

Consider This

To understand how this works, let's consider an example. 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 transmittal 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.

In healthy individuals, the neuronal signal moves rapidly down the axon to the terminal buttons, where synaptic vesicles release neurotransmitters into the synapse. The synapse is a very small space between two neurons and is an important site where communication between neurons occurs. Once neurotransmitters are released into the synapse, they travel across the small space 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.

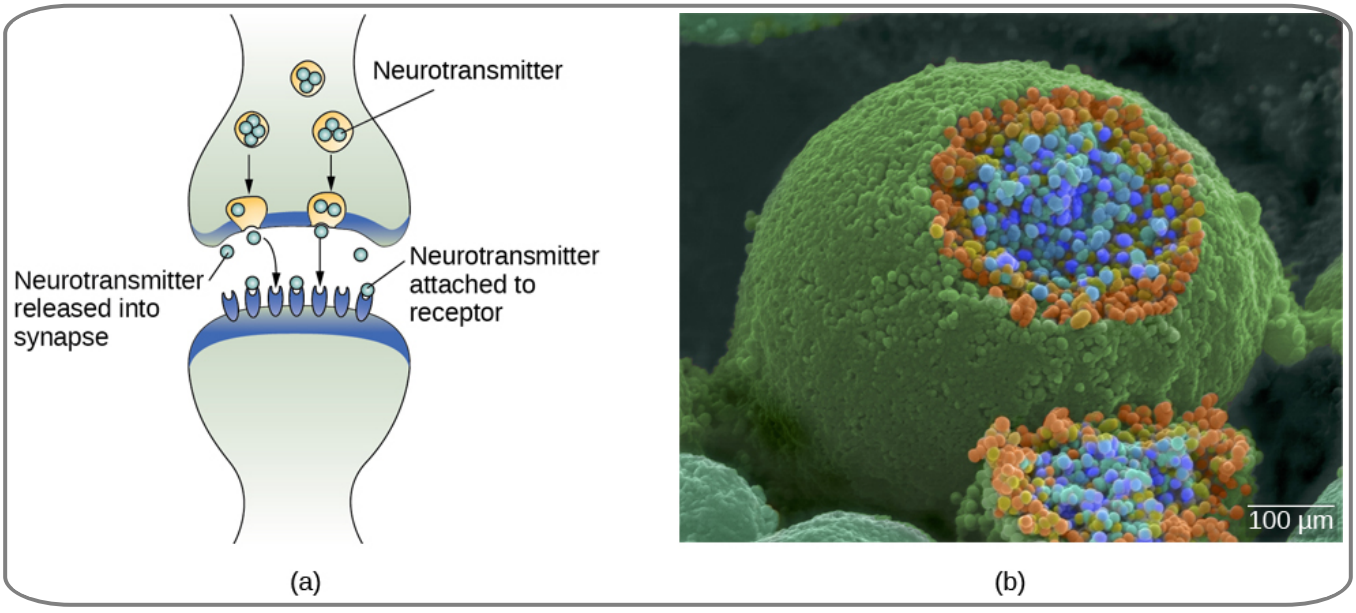

Figure 6.4.1. *(a) The synapse is the space between the terminal button of one neuron and the dendrite of another neuron. (b) In this pseudo-colored image from a scanning electron microscope, a terminal button (green) has been opened to reveal the synaptic vesicles (orange and blue) inside. Each vesicle contains about 10,000 neurotransmitter molecules. Images: b: modification of work by Tina Carvalho, NIH-NIGMS; scale-bar data from Matt Russell)*

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 begin at the neuronal membrane. The neuron exists in a fluid environment—it is surrounded by extracellular fluid and contains intracellular fluid (i.e., cytoplasm). The neuronal membrane keeps these two fluids separate, playing a critical role because the electrical signal that passes through the neuron depends on the intra- and extracellular fluids being electrically different. This difference in charge across the membrane, called the membrane potential, provides 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**. 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, and positive ions are ready to move to areas with a negative charge.

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. In addition, the inside of the cell is slightly negatively charged compared to the outside. This provides an additional force on sodium, causing it to move into the cell.

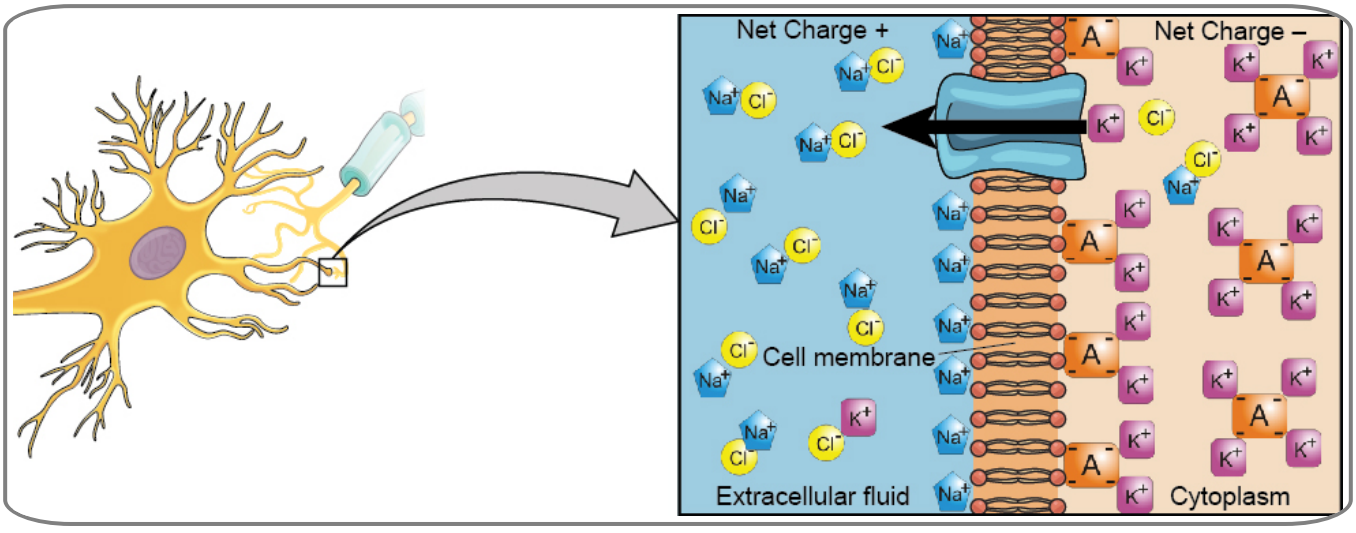

Figure 6.4.2. *At resting potential, Na+ (blue pentagons) is more highly concentrated outside the cell in the extracellular fluid (shown in blue), whereas K+ (purple squares) is more highly concentrated near the membrane in the cytoplasm or intracellular fluid. Other molecules, such as chloride ions (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.*

From this resting potential state, the neuron receives a signal and its state changes abruptly. When a neuron receives signals at the dendrites—due to neurotransmitters from an adjacent neuron binding to its recep-

tors—small pores, or gates, open on the neuronal membrane, allowing Na+ ions, propelled by both charge and concentration differences, 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, the neuron becomes active, and the action potential begins.

Many additional pores open, causing a massive influx of Na+ ions and a huge positive spike in the membrane potential, the peak action potential. At the peak of the spike, the sodium gates close and the potassium gates open. As positively charged potassium ions leave, the cell quickly begins repolarization. At first, it hyperpolarizes, becoming slightly more negative than the resting potential, and then it levels off, returning to the resting potential.

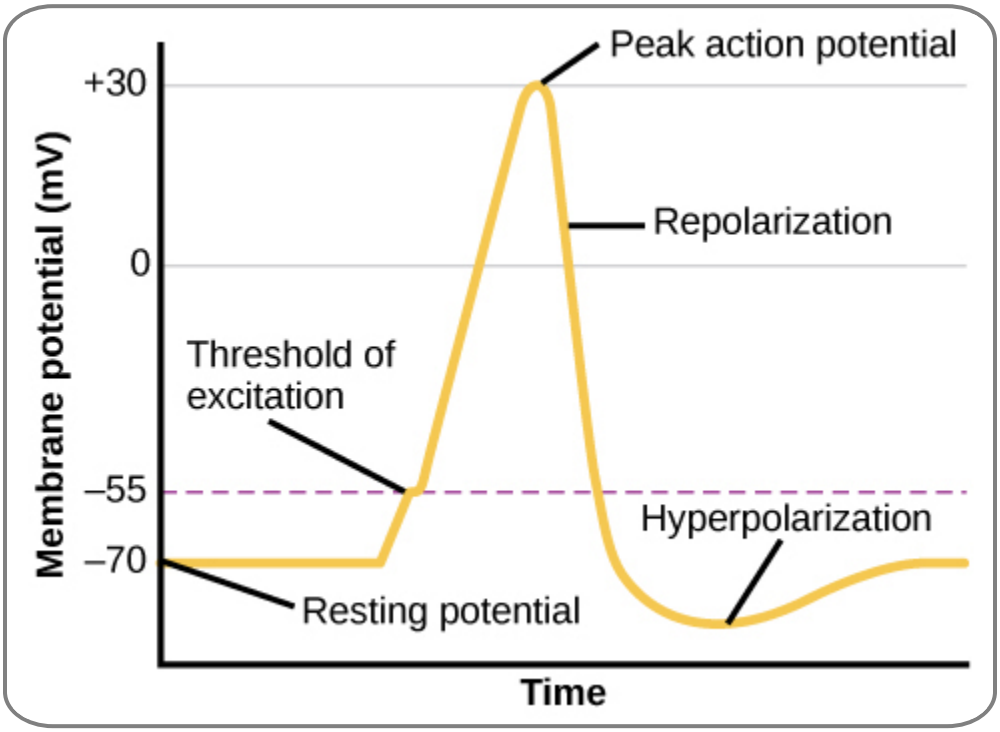

Figure 6.4.3. *During the action potential, the electrical charge across the membrane changes dramatically.*

Image Description

Line graph of an action potential over time showing changes in membrane potential (mV). The y-axis is labelled Membrane potential (mV) and the x-axis is Time. The curve begins at the resting potential of about −70 mV, rises to the threshold of excitation at about −55 mV, then rapidly depolarizes to a peak action potential near +30 mV. It then falls during repolarization, drops below resting level into hyperpolarization (undershoot), and gradually returns to about −70 mV. Key phases are labelled: resting potential, threshold of excitation, peak action potential, repolarization, and hyperpolarization..

This positive spike constitutes 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 like a wave; 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 to 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.

Because it is all or none, the action potential is recreated, or propagated, at its full strength at every point along the axon. Much like the lit fuse of a firecracker, it does not fade away as it travels down the axon. It is this all-or-none property that explains the fact that your brain perceives an injury to a distant body part like your toe as equally painful as one to your nose.

As noted earlier, when the action potential arrives at the terminal button, the synaptic vesicles release their neurotransmitters into the synapse. 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 synapse drift away, are broken down into inactive fragments, 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. 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 provide signals that no additional neurotransmitters need to be produced).

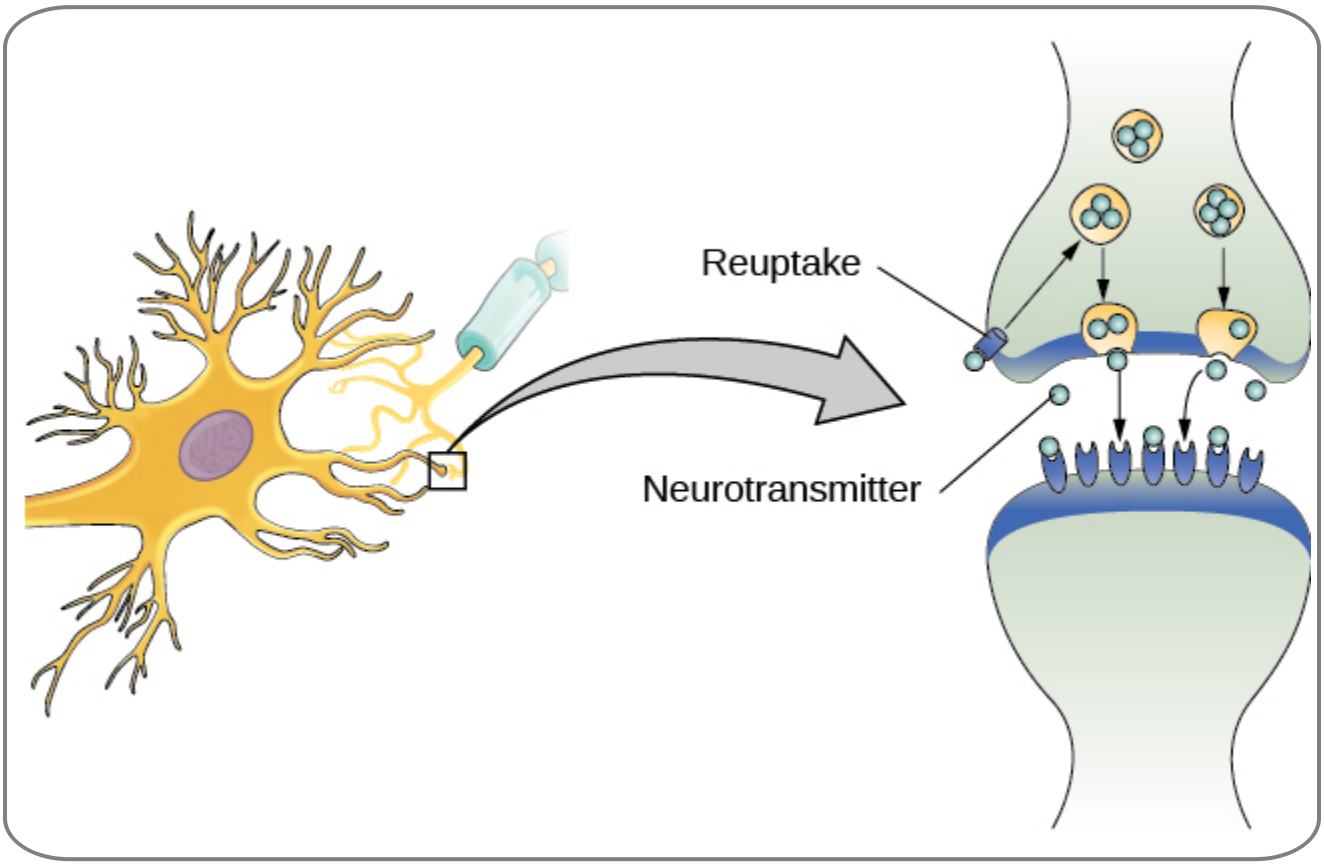

Figure 6.4.4. *Reuptake involves moving a neurotransmitter from the synapse back into the axon terminal from which it was released.*

Neuronal communication is often referred to as an electrochemical event. The movement of the action poten-

tial down the length of the axon is an electrical event, and the movement of the neurotransmitter across the synaptic space represents the chemical portion of the process.

Let's Watch

Video: "Molecular Mechanism of Synaptic Function | HHMI BioInteractive Video" by biointeractive [1:09] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube.*

Neurotransmitters and Drugs

There are several different types of neurotransmitters released by different neurons, and we can speak in broad terms about the kinds of functions associated with different neurotransmitters. Much of what psychologists know about the functions of neurotransmitters comes from research on the effects of drugs in psychological disorders. Psychologists who take a biological perspective and focus on the physiological causes of behaviour assert that psychological disorders like depression and schizophrenia are associated with imbalances in one or more neurotransmitter systems. In this perspective, psychotropic medications can help improve the symptoms associated with these disorders. Psychotropic medications are drugs that treat psychiatric symptoms by restoring neurotransmitter balance.

Major Neurotransmitters and How They Affect Behaviour

Neurotransmitter	Involved in	Potential Effect on Behaviour
Acetylcholine	Muscle action, 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)	Brain function, sleep	Decreased anxiety, decreased tension
Glutamate	Memory, learning	Increased learning, enhanced memory
Norepinephrine	Heart, intestines, alertness	Increased arousal, suppressed appetite
Serotonin	Mood, sleep	Modulated mood, suppressed appetite

Psychoactive drugs can act as agonists or antagonists for a given neurotransmitter system. **Agonists** are chemicals that mimic a neurotransmitter at the receptor site and, thus, strengthen its effects. An **antagonist**, on the other hand, blocks or impedes the normal activity of a neurotransmitter at the receptor. Agonist and antagonist drugs are prescribed to correct the specific neurotransmitter imbalances underlying a person's condition. For example, Parkinson's disease, a progressive nervous system disorder, is associated with low levels of dopamine. Therefore dopamine agonists, which mimic the effects of dopamine by binding to dopamine receptors, are one treatment strategy.

Certain symptoms of schizophrenia are associated with overactive dopamine neurotransmission. The antipsychotics used to treat these symptoms are antagonists for dopamine—they block dopamine's effects by binding its receptors without activating them. Thus, they prevent dopamine released by one neuron from signalling information to adjacent neurons.

In contrast to agonists and antagonists, which both operate by binding to receptor sites, reuptake inhibitors prevent unused neurotransmitters from being transported back to the neuron. This leaves more neurotransmitters in the synapse for a longer time, increasing its effects. Depression, which has been consistently linked with reduced serotonin levels, is commonly treated with selective serotonin reuptake inhibitors (SSRIs). By preventing reuptake, SSRIs strengthen the effect of serotonin, giving it more time to interact with serotonin receptors on dendrites. Common SSRIs on the market today include Prozac, Paxil, and Zoloft. The drug LSD is structurally very similar to serotonin, and it affects the same neurons and receptors as serotonin. Psychotropic drugs are not instant solutions for people suffering from psychological disorders. Often, an individual must take a drug for several weeks before seeing improvement, and many psychoactive drugs have significant negative side effects. Furthermore, individuals vary dramatically in how they respond to the drugs. To improve chances for success, it is not uncommon for people receiving pharmacotherapy to undergo psychological and/or behavioural therapies as well. Some research suggests that combining drug therapy with other forms of therapy tends to be more effective than any one treatment alone (for one such example, see March et al., 2007).

Activity: Test Your Understanding

Quiz Text Description

1. MultiChoice Activity

Botox is a non-surgical treatment for reducing the number of wrinkles on one's face. Specifically, a neurotoxic protein called botulinum toxin is injected into the skin, and it paralyzes the surrounding muscles. Botulinum toxin is most likely to decrease the functioning of which neurotransmitter?

a. Serotonin
b. Acetylcholine
c. Norepinephrine
d. Dopamine
e. Gamma-aminobutyric acid (GABA)

2. MultiChoice Activity

When is a neuron at its resting potential?

a. at 0mV
b. at -40mV
c. at -70mV
d. at +40mV
e. When there are the most K⁺ions outside of the neuron than inside the neuron.

3. MultiChoice Activity

The _____ of a neuron contain _____ that house neurotransmitters, the chemical messengers of the nervous system.

a. terminal buttons; transport proteins
b. axon hillock; action potentials
c. axons; terminal buttons
d. terminal buttons; synaptic vesicles
e. dendrites; synaptic vesicles

4. MultiChoice Activity

The space between two neurons is called a _____

a. receptor
b. action potential
c. vesicle
d. synapse

e. neurotransmitter

5. MultiChoice Activity

What function does the myelin sheath serve?

a. It stops the neuron from becoming infected.
b. It increaes the efficiency of the neuron and the transmission of an action potential.
c. It helps keep the neuron healthy
d. it provides food and energy to the dendrites.
e. It slows the speed of neural impulses down so the brain can process information better

6. MultiChoice Activity

Thinking of the electrical charge of a neuron, when a neuron is at the height of its action potential....

a. the inside and outside of the neuron has no charge at all
b. the inside of the neuron is more positively charged than the outside of the neuron
c. the inside of the neuron has the same charge as the outside of the neuron
d. the inside of the neuron is more negatively charged than the outside of the neuron

7. MultiChoice Activity

What are the possible ways in which a dopamine agonist drug could work?

(Note: more than one answer could be correct)

a. It can increase the amount of dopamine in the synapse
b. It can act like dopamine and bind to the dopamine receptors
c. It could bind to the post-synaptic dendritic receptor and stop dopamine from binding
d. It could stimulate the release of more dopamine
e. It could mimic (act like) the effects of dopamine
f. It can stop the reuptake of dopamine into the axon button

8. MultiChoice Activity

_____ is the neurotransmitter found at our muscles.

a. GABA
b. Dopamine
c. Gultamate
d. Actylcholine
e. Serotonin

9. MultiChoice Activity

Jingwei has trouble remembering information. Which neurotransmitter(s) might be dysregulated?

a. Glutamate
b. Serotonin
c. Beta-endorphin

d. Dopamine
e. Norepinephrine
f. GABA
g. Acetylcholine

10. MultiChoice Activity

GABA is invovled in regulating our emotional responses, especially fear and anxiety. Too little GABA is associated with an increase in feeling anxious. If Frandi were to experience prolonged anxiety, which drug would suggest she take?

a. a GABA antagonist
b. a GABA enhancer
c. a GABA agonist
d. a GABA receptor
e. a GABA activist

11. MultiChoice Activity

Alcohol has been shown to increase the function of GABA in the brain while reducing the function of glutamate. Alcohol is a

a. GABA antagonist and a glutamate agonist
b. GABA agonist and a glutamate antagonist
c. GABA agonist and a glutamate agonist
d. GABA antagonist and a glutamate antagonist

12. MultiChoice Activity

Which drug would NOT be considered an agonist?

a. Geseen, a drug that blocks the functioning of dopamine
b. All of these are agonists.
c. Pontimodal, a drug that stimulates the release of acetylcholine
d. Relaxor, a drug that acts like GABA.
e. Escetalopram, a drug that stops the terminal buttons from reuptaking serotonin into the terminal buttons.

13. MultiChoice Activity

In a neuron that is in a resting state, sodium (Na^+) is at a _____ concentration inside the cell. Potassium (K^+) is at a _____ concentration outside the cell.

a. lower; lower
b. higher; higher
c. lower; higher
d. higher; lower

Solution:

1. b. Acetylcholine
2. c. at -70mV
3. d. terminal buttons; synaptic vesicles
4. d. synapse
5. b. It increaes the efficiency of the neuron and the transmission of an action potential.
6. b. the inside of the neuron is more positively charged than the outside of the neuron
7. a. It can increase the amount of dopamine in the synapse; b. It can act like dopamine and bind to the dopamine receptors; d. It could stimulate the release of more dopamine; f. It can stop the reuptake of dopamine into the axon button;
8. d. Actylcholine
9. a. Glutamate; d. Dopamine; g. Acetylcholine;
10. c. a GABA agonist
11. b. GABA agonist and a glutamate antagonist
12. a. Geseen, a drug that blocks the functioning of dopamine
13. a. lower; lower

Adapted from “12. Cells of the Nervous System” in Psychology – H5P Edition Copyright © 2021 by Rose M. Spielman; Kathryn Dumper; William Jenkins; Arlene Lacombe; Marilyn Lovett; and Marion Perlmutter, which is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted. *Modifications: some interactives removed*.

6.5 Brain Imaging

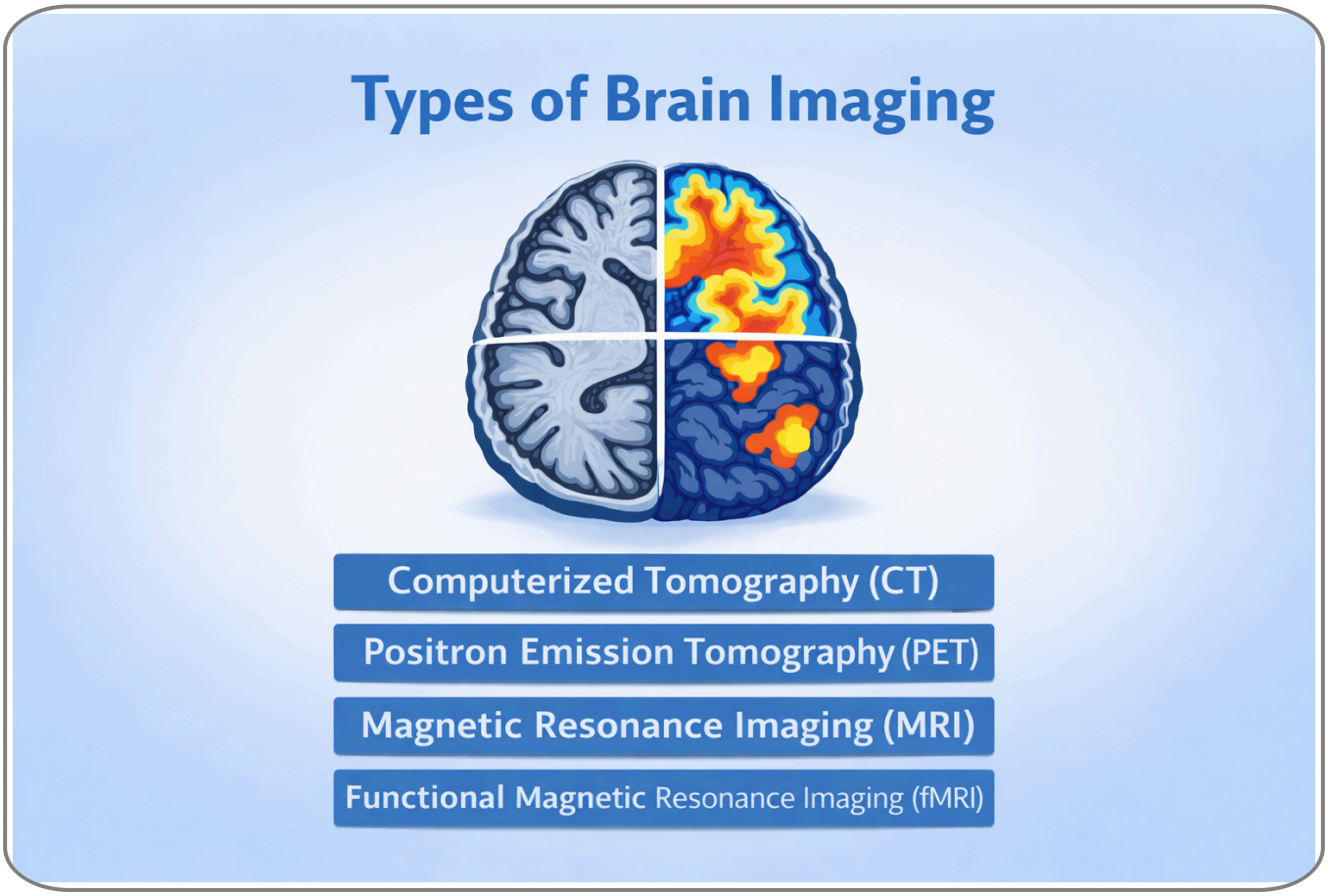

Figure 6.5.1. *Four types of brain imaging: CT, PET, MRI, and fMRI.*

You have learned how a brain injury can provide information about the functions of different parts of the brain. Increasingly, however, we are able to obtain that information using brain imaging techniques on individuals who have not suffered brain injury. In this section, we take a more in-depth look at some of the techniques that are available for imaging the brain, including techniques that rely on radiation, magnetic fields, or electrical activity within the brain.

Techniques Involving Radiation

A **computerized tomography (CT)** scan involves taking a number of X-rays of a particular section of a person's body or brain. The X-rays pass through tissues of different densities at different rates, allowing a computer to construct an overall image of the area of the body being scanned. A CT scan is often used to determine whether someone has a tumour or significant brain atrophy.

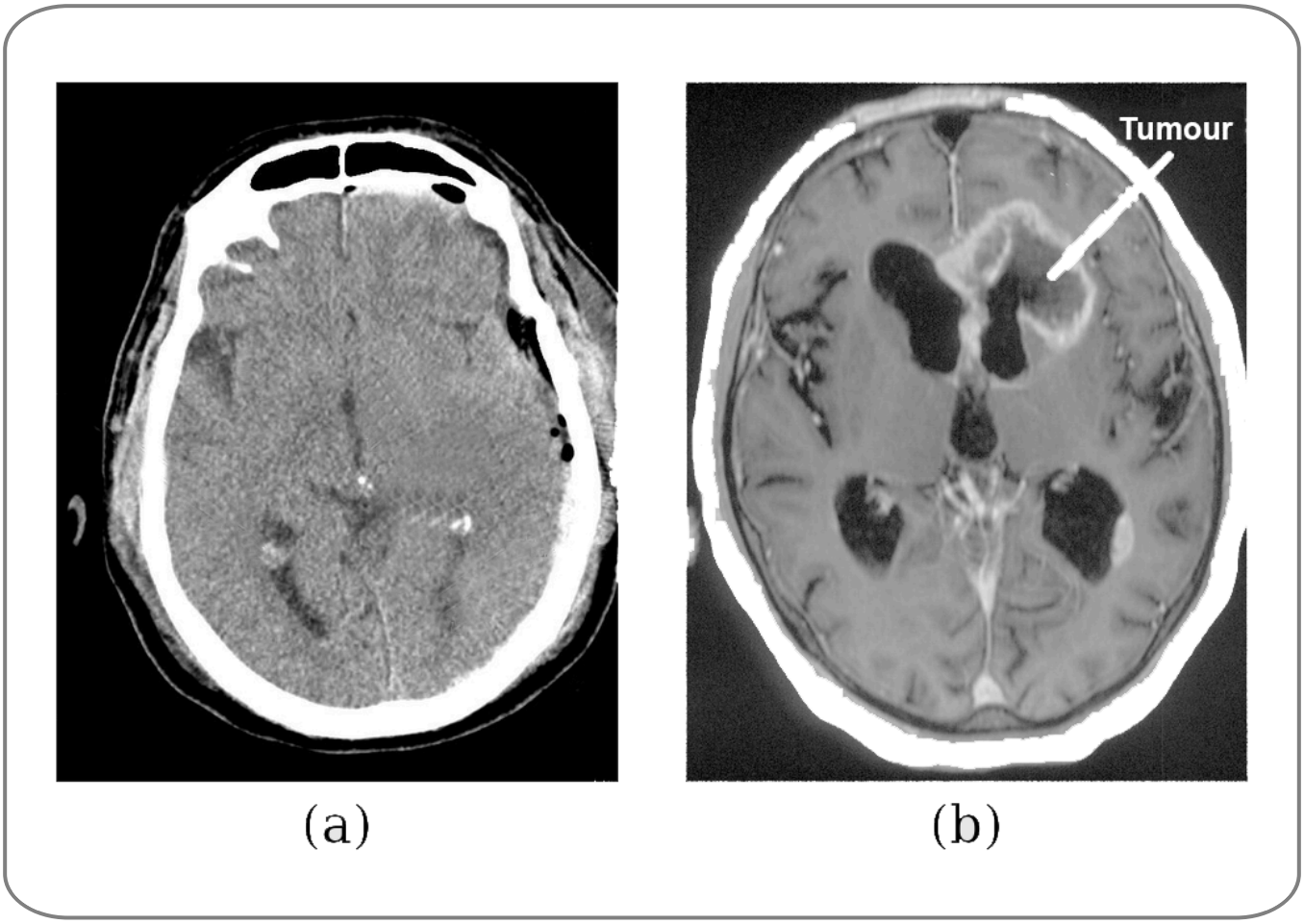

Figure 6.5.2. *A CT scan can be used to show brain tumours. (a) The image on the left shows a healthy brain, whereas (b) the image on the right indicates a brain tumour in the left frontal lobe. Images: a: "CT-scan-4th-and-3rd-ventricles," which is a modification of work by "Aceofhearts1968," Wikimedia Commons, CC BY 3.0, and b: "Frontal lobe tumour," which is a modification of work by Roland Schmitt et al, Wikimedia Commons, CC BY 2.0.*

Positron emission tomography (PET) scans create pictures of the living, active brain. An individual receiving a PET scan drinks or is injected with a mildly radioactive substance, called a tracer. Once in the bloodstream, the amount of tracer in any given region of the brain can be monitored. As brain areas become more active, more blood flows to that area. A computer monitors the movement of the tracer and creates a rough map of active and inactive areas of the brain during a given behaviour. PET scans show little detail, are unable to pinpoint events precisely in time, and require that the brain be exposed to radiation; therefore, this technique has been replaced by the fMRI as an alternative diagnostic tool. However, combined with CT, PET technology is still being used in certain contexts. For example, CT/PET scans allow better imaging of the activity of neurotransmitter receptors and open new avenues in schizophrenia research. In this hybrid CT/PET technology, CT contributes clear images of brain structures, while PET shows the brain's activity.

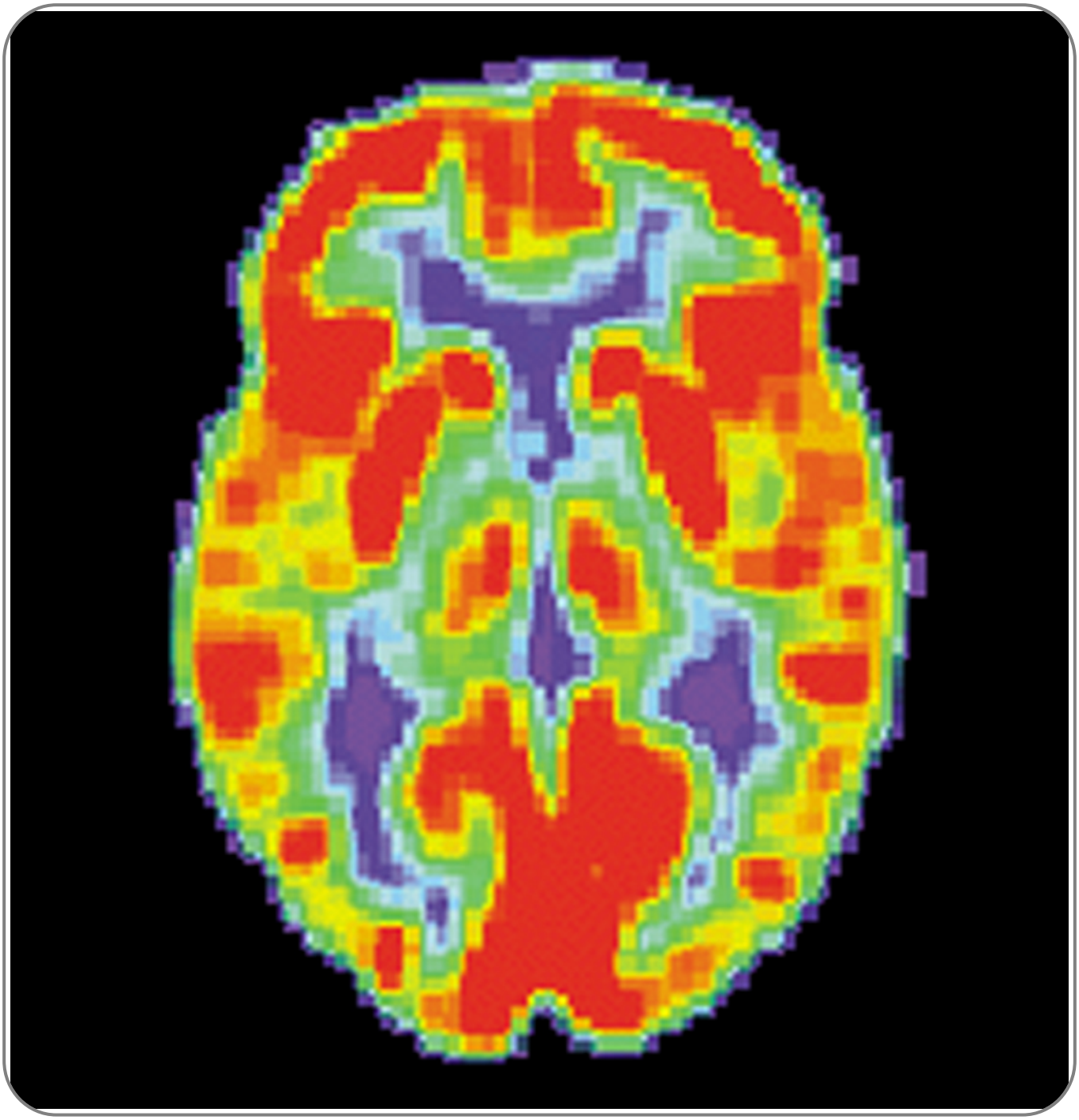

Figure 6.5.3. *A PET scan is helpful for showing activity in different parts of the brain. Image: "PET scan of a normal human brain," by Health and Human Services Department, National Institutes of Health, Wikipedia, Public Domain.*

Techniques Involving Magnetic Fields

In **magnetic resonance imaging (MRI),** a person is placed inside a machine that generates a strong magnetic field. The magnetic field causes the hydrogen atoms in the body's cells to move. When the magnetic field is

turned off, the hydrogen atoms emit electromagnetic signals as they return to their original positions. Tissues of different densities give off different signals, which a computer interprets and displays on a monitor.

A modern MRI Machine. Image: "Hybrid PET/MR diagnostic imaging system with a 3 Tesla magnetic field strength," by Tomáš Vendiš, Wikimedia Commons, CC BY-SA 4.0.

Functional magnetic resonance imaging (fMRI) operates on the same principles, but it shows changes in brain activity over time by tracking blood flow and oxygen levels. The fMRI provides more detailed images of the brain's structure, as well as better accuracy in time, than is possible in PET scans. With their high level of detail, MRI and fMRI are often used to compare the brains of healthy individuals to the brains of individuals

diagnosed with psychological disorders. This comparison helps determine what structural and functional differences exist between these populations.

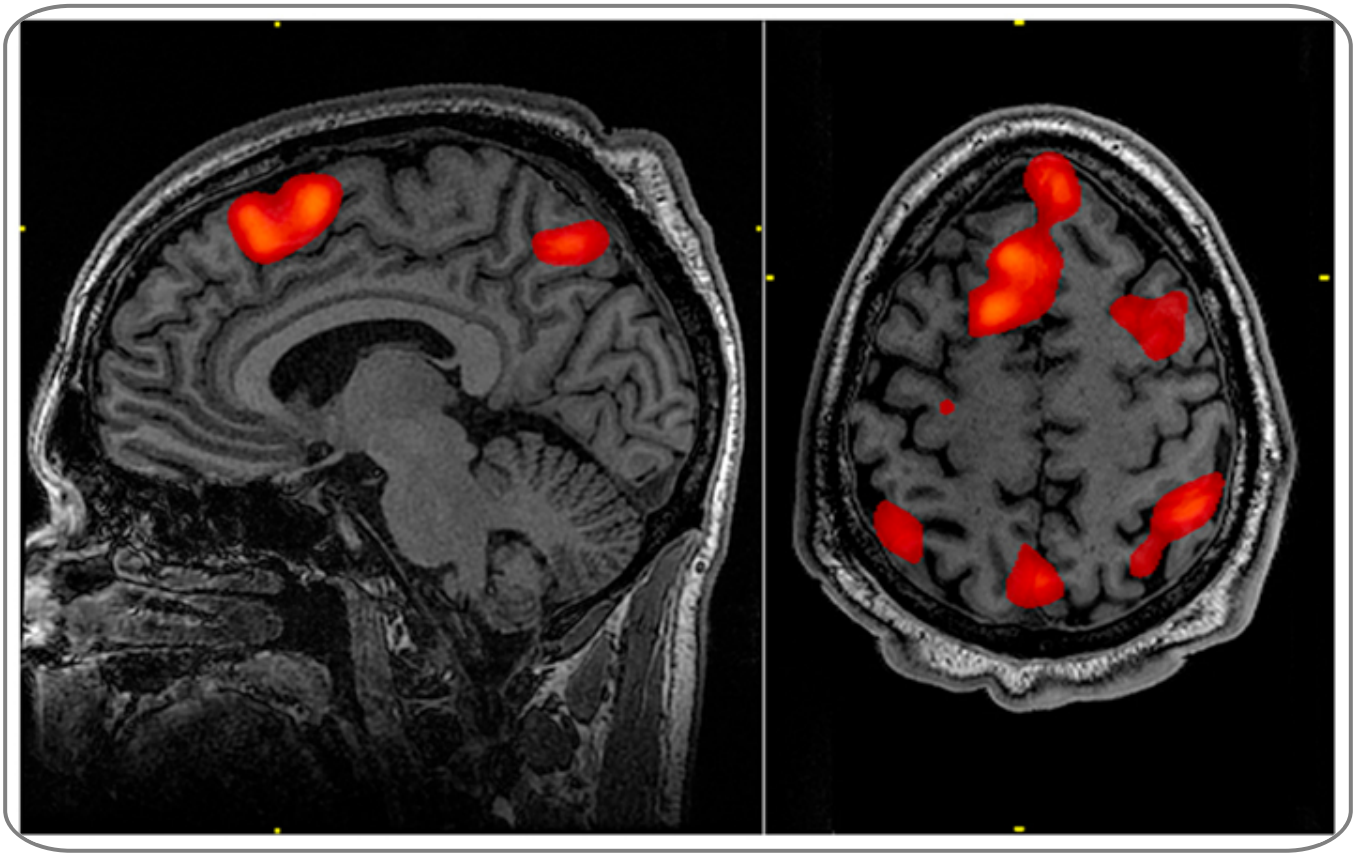

Figure 6.5.4. *An fMRI shows activity in the brain over time. This image represents a single frame from an fMRI. Image: "FMRI scan during working memory tasks," by John Graner, Wikipedia Commons, Public Domain.*

Link to Learning

Visit this virtual lab to learn more about MRI and fMRI: FMRI Functional Magnetic Resonance Imaging Lab.

Techniques Involving Electrical Activity

In some situations, it is helpful to gain an understanding of the overall activity of a person's brain, without needing information on the actual location of the activity. **Electroencephalography** (EEG) serves this purpose by providing a measure of the brain's electrical activity. An array of electrodes is placed around a person's head. The signals received by the electrodes result in a printout of the electrical activity of his or her brain, or brainwaves, showing both the frequency (number of waves per second) and amplitude (height) of the recorded brainwaves, with an accuracy within milliseconds. Such information is especially helpful to researchers studying sleep patterns among individuals with sleep disorders.

Using caps with electrodes, modern EEG research can study the precise timing of overall brain activities. Image: SMI Eye Tracking.

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OpenAI. (2026). ChatGPT (5.2) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 6.5.1: "Created an illustrated graphic depicting the four types of brain imaging."

6.6 Chapter Summary

Let's Reflect

- 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.
- 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 glean similar information by imaging brain structure and function. These techniques include CT, PET, MRI, fMRI, and EEG.
- 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 reticular formation, which is important for sleep and arousal, as well as 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.
- 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 specialized 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 synapse. Action potentials operate on the all-or-none principle and involve the movement of Na^+ and 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.

Key Terms

- **Action Potential:** an electrical signal that moves down the neuron's axon.
- **Agonist**: a drug that mimics or strengthens the effects of a neurotransmitter.
- **All-or-None**: a phenomenon that the incoming signal from another neuron is either sufficient or insufficient to reach the threshold of excitation.
- **Antagonist**: a drug that blocks or impedes the normal activity of a given neurotransmitter.
- **Amygdala**: a structure in the limbic system involved in our experience of emotion and tying emotional meaning to our memories.
- **Auditory Cortex**: a strip of cortex in the temporal lobe that is responsible for processing auditory information.
- **Autonomic Nervous System**: controls our internal organs and glands.
- **Axon**: major extension of the soma.
- **Broca's Area**: a region in the left hemisphere that is essential for language production.
- **Central Nervous System (CNS)**: brain and spinal cord.
- **Cerebellum**: a hindbrain structure that controls our balance, coordination, movement, and motor skills, and it is thought to be important in processing some types of memory.
- **Cerebral Cortex**: the surface of the brain that is associated with our highest mental capabilities.
- **Computerized Tomography (CT) Scan**: an imaging technique in which a computer coordinates and integrates multiple X-rays of a given area.
- **Corpus Callosum**: a thick band of neural fibres connecting the brain's two hemispheres.
- **Dendrite**: a branch-like extension of the soma that receives incoming signals from other neurons.
- **Electroencephalography (EEG)**: recording the electrical activity of the brain via electrodes on the scalp.
- **Fight or Flight Response**: activation of the sympathetic division of the autonomic nervous system, allowing access to energy reserves and heightened sensory capacity so that we might fight off a given threat or run away to safety.
- **Forebrain**: largest part of the brain, containing the cerebral cortex, the thalamus, and the limbic system, among other structures.
- **Frontal Lobe**: part of the cerebral cortex involved in reasoning, motor control, emotion, and language; contains motor cortex.
- **Functional Magnetic Resonance Imaging (fMRI)**: MRI that shows changes in metabolic activity over time.
- **Glial Cell**: a nervous system cell that provides physical and metabolic support to neurons, including neuronal insulation and communication, and nutrient and waste transport.
- **Gyrus**: (plural: gyri) bump or ridge on the cerebral cortex.
- **Hemisphere**: the left or right half of the brain.
- **Hindbrain**: division of the brain containing the medulla, pons, and cerebellum.
- **Hippocampus**: a structure in the temporal lobe associated with learning and memory.
- **Homeostasis**: state of equilibrium—biological conditions, such as body temperature, are maintained at optimal levels.
- **Hypothalamus**: forebrain structure that regulates sexual motivation and behavior and a number

of homeostatic processes; serves as an interface between the nervous system and the endocrine system.

- **Lateralization**: the concept that each hemisphere of the brain is associated with specialized functions.
- **Limbic System**: a collection of structures involved in processing emotion and memory.
- **Longitudinal Fissure**: a deep groove in the brain's cortex.
- **Magnetic Resonance Imaging (MRI)**: magnetic fields are used to produce a picture of the tissue being imaged.
- **Medulla**: hindbrain structure that controls automated processes like breathing, blood pressure, and heart rate.
- **Membrane Potential**: difference in charge across the neuronal membrane.
- **Midbrain**: division of the brain located between the forebrain and the hindbrain; contains the reticular formation.
- **Motor Cortex**: a strip of cortex involved in planning and coordinating movement.
- **Myelin Sheath**: a fatty substance that insulates axons.
- **Nervous System**: made up of billions of neurons and controls our thoughts, responses, and movements; divided into the central nervous system (CNS) and the peripheral nervous system (PNS).
- **Neuron**: cells in the nervous system that act as interconnected information processors, which are essential for all of the tasks of the nervous system.
- **Neurotransmitter**: a chemical messenger of the nervous system.
- **Occipital Lobe**: part of the cerebral cortex associated with visual processing; contains the primary visual cortex.
- **Parasympathetic Nervous System**: associated with routine, day-to-day operations of the body.
- **Parietal Lobe**: part of the cerebral cortex involved in processing various sensory and perceptual information; contains the primary somatosensory cortex.
- **Peripheral Nervous System (PNS)**: connects the brain and spinal cord to the muscles, organs and senses in the periphery of the body.
- **Pons**: hindbrain structure that connects the brain and spinal cord; involved in regulating brain activity during sleep.
- **Positron Emission Tomography (PET) Scan**: involves injecting individuals with a mildly radioactive substance and monitoring changes in blood flow to different regions of the brain.
- **Prefrontal Cortex**: area in the frontal lobe responsible for higher-level cognitive functioning.
- **Psychotropic Medication**: drugs that treat psychiatric symptoms by restoring neurotransmitter balance.
- **Receptor**: protein on the cell surface where neurotransmitters attach.
- **Resting Potential**: the state of readiness of a neuron membrane's potential between signals.
- **Reuptake**: the neurotransmitter is pumped back into the neuron that released it.
- **Reticular Formation**: midbrain structure important in regulating the sleep/wake cycle, arousal, alertness, and motor activity.
- **Semipermeable Membrane**: a cell membrane that allows smaller molecules or molecules without an electrical charge to pass through it, while stopping larger or highly charged molecules.
- **Soma**: cell body.
- **Somatic Nervous System**: relays sensory and motor information to and from the CNS.
- **Somatosensory Cortex**: essential for processing sensory information from across the body, such as touch, temperature, and pain.

- **Substantia Nigra**: midbrain structure where dopamine is produced; involved in control of movement.
- **Sulcus**: (plural: sulci) depressions or grooves in the cerebral cortex.
- **Sympathetic Nervous System**: involved in stress-related activities and functions.
- **Synapse**: a small gap between two neurons where communication occurs.
- **Synaptic Vesicle**: storage site for neurotransmitters.
- **Temporal Lobe**: part of the cerebral cortex associated with hearing, memory, emotion, and some aspects of language; contains the primary auditory cortex.
- **Terminal Button**: axon terminal containing synaptic vesicles.
- **Thalamus**: sensory relay for the brain.
- **Threshold of Excitation**: level of charge in the membrane that causes the neuron to become active.
- **Ventral Tegmental Area (VTA)**: midbrain structure where dopamine is produced: associated with mood, reward, and addiction.
- **Wernicke's Area**: important for speech comprehension.

Questions for Further Discussion

Critical Thinking Questions

1. What are the implications of compromised immune function as a result of exposure to chronic stress?
   Answer
   Chronic stress can lead to increased susceptibility to bacterial and viral infections, and potentially an increased risk of cancer. Ultimately, this could be a vicious cycle with stress leading to increased risk of disease, disease states leading to increased stress and so on.
2. Cocaine has two effects on synaptic transmission: it impairs reuptake of dopamine and it causes more dopamine to be released into the synapse. Would cocaine be classified as an agonist or antagonist? Why?
   Answer
   As a reuptake inhibitor, cocaine blocks the normal activity of dopamine at the receptor. The function causing more dopamine to be released into the synapse is agonist because it mimics and strengthens the effect of the neurotransmitter. Cocaine would be considered an agonist because by preventing the enzymatic degradation of the neurotransmitters, it increases the potential time that these neurotransmitters might be active in the synapse.
3. Drugs such as lidocaine and novocaine act as Na+ channel blockers. In other words, they prevent sodium from moving across the neuronal membrane. Why would this particular effect make these drugs such effective local anesthetics?
   Answer
   The action potential is initiated by an influx of Na+ into the neuron. If this process is prevented, then no action potentials in neurons in a given area will occur. Therefore, any painful stimuli would not result in action potentials carrying that information to the brain.

Personal Application Question

1. Have you or someone you know ever been prescribed a psychotropic medication? If so, what side effects were associated with the treatment?
2. Hopefully, you do not face real physical threats from potential predators on a daily basis. However, you probably have your fair share of stress. What situations are your most common sources of stress? What can you do to try to minimize the negative consequences of these particular stressors in your life?
3. You read about H. M.'s memory deficits following the bilateral removal of his hippocampus and amygdala. Have you encountered a character in a book, television program, or movie that suffered memory deficits? How was that character similar to and different from H. M.?

Activity: Let's Review

Parts of the Nervous System Review

Quiz Text Description

1. MultiChoice Activity

Our ability to make our legs move as we walk across the room is controlled by the _____ nervous system.

a. somatic
b. autonomic
c. sympathetic
d. parasympathetic

2. MultiChoice Activity

If your _____ is activated, you will feel relatively at ease.

a. somatic nervous system
b. spinal cord
c. parasympathetic nervous system
d. sympathetic nervous system

3. MultiChoice Activity

The central nervous system is comprised of _____.

a. brain and spinal cord
b. somatic and autonomic nervous systems
c. sympathetic and parasympathetic nervous systems
d. organs and glands

4. MultiChoice Activity

Sympathetic activation is associated with _____.

[**Note:** More than one answer may be correct]

a. storage of glucose in the liver
b. pupil dilation
c. increased heart rate
d. All of these are correct

Solution:

1. a. somatic
2. c. parasympathetic nervous system
3. a. brain and spinal cord
4. b. pupil dilation; c. increased heart rate;

The Brain and Spinal Cord Review

Quiz Text Description

1. MultiChoice Activity

The _____ is a sensory relay station where all sensory information, except for smell, goes before being sent to other areas of the brain for further processing.

a. hypothalamus
b. hippocampus
c. thalamus
d. amygdala

2. MultiChoice Activity

Damage to the _____ disrupts one's ability to comprehend language, but it leaves one's ability to produce words intact.

a. occipital lobe
b. Wernicke's Area
c. amygdala
d. Broca's Area

3. MultiChoice Activity

A(n) _____ uses magnetic fields to create pictures of a given tissue.

a. EEG
b. CT scan
c. PET scan
d. MRI

4. MultiChoice Activity

Which of the following is **not** a structure of the forebrain?

a. hippocampus
b. amygdala
c. substantia nigra

d. thalamus

Parts of the Nervous System Review

Quiz Text Description

1. MultiChoice Activity

The _____ receive(s) incoming signals from other neurons.

a. soma
b. myelin sheath
c. terminal buttons
d. dendrites

2. MultiChoice Activity

A(n) _____ facilitates or mimics the activity of a given neurotransmitter system.

a. agonist
b. axon
c. antagonist
d. SSRI

3. MultiChoice Activity

Multiple sclerosis involves a breakdown of the _____.

a. synaptic vesicles
b. myelin sheath
c. dendrites
d. soma

4. MultiChoice Activity

An action potential involves Na^+ moving _____ the cell and K^+ moving _____ the cell.

a. outside; inside
b. outside; outside
c. inside; outside
d. inside; inside

Solution:

1. d. dendrites
2. a. agonist
3. b. myelin sheath
4. c. inside; outside

Let's Reflect, *Questions for Further Discussion*, and *Activities* sections adapted from "13. Parts of the Nervous System," "14. The Brain and Spinal Cord," and "13. Cells of the Nervous System," in Psychology – H5P Edition Copyright © 2021 by Rose M. Spielman; Kathryn Dumper; William Jenkins; Arlene Lacombe; Marilyn Lovett; and Marion Perlmutter is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted.

CHAPTER 7: STATES OF CONSCIOUSNESS

Chapter Overview

7.0 Learning Objectives
7.1 Consciousness Defined
7.2 Consciousness and Biological Rhythms
7.3 Other States of Consciousness
7.4 Chapter Summary

7.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Define consciousness and distinguish between high and low conscious states.
2. Explain the relationship between consciousness and bias.
3. Explain how circadian rhythms are involved in regulating the sleep-wake cycle, and how circadian cycles can be disrupted.
4. Discuss the concept of sleep debt.
5. Distinguish between popular portrayals of hypnosis and how it is currently used therapeutically.
6. Describe trance states and the experience of dissociation.
7. Identify potential applications of meditation.
8. Explain how different categories of psychoactive drugs (hallucinogens, stimulants, depressants) impact consciousness.

Chapter Overview

In this chapter, we will differentiate between high and low states of consciousness. We will explore the relationship between consciousness and bias. Next, we will consider sleep and the consequences of not getting enough of it! Finally, we will explore other states of consciousness, including hypnosis, trances, and meditative states. Finally, we will discover how consciousness can be altered by the use of psychoactive drugs.

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7.1 Consciousness Defined

Consider This

Have you ever had a fellow motorist stop beside you at a red light, singing his brains out, or picking his nose, or otherwise behaving in ways he might not normally do in public?

There is something about being alone in a car that encourages people to zone out and forget that others can see them. Although these little lapses of attention are amusing for the rest of us, they are also instructive when it comes to the topic of consciousness.

Image: "ohhhhh," by Joshua Ommen, Flickr, CC BY-NC-SA 2.0.

Consciousness is a term meant to indicate awareness. It includes awareness of the self, of bodily sensations, of thoughts and of the environment. In English, we use the opposite word **"unconscious**" to indicate senselessness or a barrier to awareness, as in the case of "Theresa fell off the ladder and hit her head, knocking herself unconscious." And yet, psychological theory and research suggest that consciousness and unconsciousness are more complicated than falling off a ladder. That is, consciousness is more than just being "on" or "off." For instance, Sigmund Freud (1856 – 1939)—a psychological theorist—understood that even while we are awake, many things lie outside the realm of our conscious awareness (like being in the car and forgetting the rest of the world can see into your windows). In response to this notion, Freud introduced the concept of the "subconscious" (Freud, 2001) and proposed that some of our memories and even our basic motivations are not always accessible to our conscious minds.

Upon reflection, it is easy to see how slippery a topic consciousness is. For example, are people conscious when they are daydreaming? What about when they are drunk? In this module, we will describe several levels of consciousness and then discuss altered states of consciousness such as hypnosis and sleep.

Levels of Awareness

Figure 7.1.1. *Human awareness*

In 1957, a marketing researcher inserted the words "Eat Popcorn" onto one frame of a film being shown all across the United States. And although that frame was only projected onto the movie screen for 1/24th of a second—a speed too fast to be perceived by conscious awareness—the researcher reported an increase in popcorn sales by nearly 60%. Almost immediately, all forms of "subliminal messaging" were regulated in the US and banned in countries such as Australia and the United Kingdom. Even though it was later shown that the researcher had made up the data (he hadn't even inserted the words into the film), this fear about influences on our subconscious persists. At its heart, this issue pits various levels of awareness against one another. On the one hand, we have the "low awareness" of subtle, even subliminal influences. On the other hand, there is you—the conscious thinking, feeling you, which includes all that you are currently aware of, even reading this sentence. However, when we consider these different levels of awareness separately, we can better understand how they operate.

Low Awareness

You are constantly receiving and evaluating sensory information. Although each moment has too many sights, smells, and sounds for them all to be consciously considered, our brains are nonetheless processing all that information.

Here's an Example

Have you ever been at a party, overwhelmed by all the people and conversation, when out of nowhere you hear your name called? Even though you have no idea what else the person is saying, you are somehow conscious of your name (for more on this, "the cocktail party effect," see Noba's Module on Attention). So, even though you may not be aware of various stimuli in your environment, your brain is paying closer attention than you think.

Similar to a reflex (like jumping when startled), some **cues**, or significant sensory information, will automatically elicit a response from us even though we never consciously perceive it. For example, Öhman and Soares (1994) measured subtle variations in sweating of participants with a fear of snakes. The researchers flashed pictures of different objects (e.g., mushrooms, flowers, and most importantly, snakes) on a screen in front of them, but did so at speeds that left the participant clueless as to what they had actually seen. However, when snake pictures were flashed, these participants started sweating more (i.e., a sign of fear), even though they had no idea what they'd just viewed!

Although our brains perceive some stimuli without our conscious awareness, do they really affect our subsequent thoughts and behaviours? In a landmark study, Bargh et al. (1996) had participants solve a word search puzzle where the answers pertained to words about the elderly (e.g., "old," "grandma") or something random (e.g., "notebook," "tomato"). Afterward, the researchers secretly measured how fast the participants walked down the hallway exiting the experiment. And although none of the participants were aware of a theme to the answers, those who had solved a puzzle with elderly words (vs. those with other types of words) walked more slowly down the hallway!

Let's Focus: Priming Studies and Replication

If the results of priming studies sound too fantastic to be believed, you are not alone in your skepticism. Recently, many studies in psychology—including many priming studies—have come under scrutiny because they do not"replicate."This means that when later researchers have attempted to recreate certain studies, they have not always gotten the same— or even similar—results. Non-replication does not suggest that the original researchers "faked" the results, but that there may have been flaws in the original sampling or research methods. Fortunately, researchers are very aware of the problem of non-replication and have taken steps to address the issue. For an in-depth exploration of the so-called "replication crisis" in psychology, please see the Noba module on that topic.

This effect is called **priming** (i.e., readily "activating" certain concepts and associations from one's memory) has been found in a number of other studies. For example, priming people by having them drink from a warm

glass (vs. a cold one) resulted in behaving more "warmly" toward others (Williams & Bargh, 2008). Although all of these influences occur beneath one's conscious awareness, they still have a significant effect on one's subsequent thoughts and behaviours.

In the last two decades, researchers have made advances in studying aspects of psychology that exist beyond conscious awareness. As you can understand, it is difficult to use self-reports and surveys to ask people about motives or beliefs that they, themselves, might not even be aware of! One way of sidestepping this difficulty can be found in the **implicit associations test**, or IAT (Greenwald et al., 1998). This research method uses computers to assess people's reaction times to various stimuli and is a very difficult test to fake because it records automatic reactions that occur in milliseconds. For instance, to shed light on deeply held biases, the IAT might present photographs of European American faces and Asian faces while asking research participants to click buttons indicating either "good" or "bad" as quickly as possible. Even if the participant clicks "good" for every face shown, the IAT can still pick up tiny delays in responding. Delays are associated with more mental effort needed to process information. When information is processed quickly—as in the example of White faces being judged as "good"—it can be contrasted with slower processing—as in the example of Asian faces being judged as "good"—and the difference in processing speed is reflective of bias. In this regard, the IAT has been used for investigating stereotypes (Nosek et al., 2002) as well as self-esteem (Greenwald & Farnham, 2000). This method can help uncover non-conscious biases as well as those that we are motivated to suppress.

An actual screenshot from an IAT (Implicit Association Test) that a person might take to test their own mental representations of various cognitive constructs. In this particular case, this is an item testing an individual's unconscious reaction towards members of various ethnic groups. Image: by Anthony Greenwald from Project Implicit.

High Awareness

Just because we may be influenced by these "invisible" factors, it doesn't mean we are helplessly controlled by them. The other side of the awareness continuum is known as **"high awareness."** This includes effortful attention and careful decision-making. For example, when you listen to a funny story on a date, or consider which class schedule would be preferable, or complete a complex math problem, you are engaging a state of consciousness that allows you to be highly aware of and focused on particular details in your environment.

Meditation has been practiced for centuries in religious contexts. In the past 50 years, it has become increasingly popular as a secular practice. Scientific studies have linked meditation to lower stress and higher well-being. Image: "kids may2014-0227-2," by Indrek Torilo, Flickr, CC BY-NC 2.0.

Mindfulness is a state of higher consciousness that includes an awareness of the thoughts passing through one's head. For example, have you ever snapped at someone in frustration, only to take a moment and reflect on why you responded so aggressively? This more effortful consideration of your thoughts could be described as an expansion of your conscious awareness as you take the time to consider the possible influences on your thoughts. Research has shown that when you engage in this more careful consideration, you are less persuaded by irrelevant yet biasing influences, like the presence of a celebrity in an advertisement (Petty &

Cacioppo, 1986). Higher awareness is also associated with recognizing when you're using a stereotype, rather than fairly evaluating another person (Gilbert & Hixon, 1991).

Humans alternate between low and high thinking states. That is, we shift between focused attention and a less attentive default state, and we have neural networks for both (Raichle, 2015). Interestingly, the less we pay attention, the more likely we are to be influenced by non-conscious stimuli (Chaiken, 1980). Although these subtle influences may affect us, we can use our higher conscious awareness to protect against external influences. In what's known as the **Flexible Correction Model** (Wegener & Petty, 1997), people who are aware that their thoughts or behaviour are being influenced by an undue, outside source can correct their attitude against the bias. For example, you might be aware that you are influenced by the mention of specific political parties. If you were motivated to consider a government policy, you can take your own biases into account to attempt to consider the policy in a fair way (on its own merits rather than being attached to a certain party).

Here's an Example

To help make the relationship between lower and higher consciousness clearer, imagine the brain is like a journey down a river. In low awareness, you simply float on a small rubber raft and let the currents push you. It's not very difficult to just drift along, but you also don't have total control. Higher states of consciousness are more like travelling in a canoe. In this scenario, you have a paddle and can steer, but it requires more effort. This analogy applies to many states of consciousness, but not all. What about other states, such as sleeping, daydreaming, or hypnosis? How are these related to our conscious awareness?

Table 7.1: States of Consciousness

Awareness	Costs	Benifits
Low Awareness	Influenced by subtle factors	Saves mental effort
High Awareness	Uses mental effort	Can overcome some biases

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OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 7.1.1. "Create an illustration graphic depicting the two levels of human awareness."

7.2 Consciousness and Biological Rhythms

Biological Rhythms

are internal rhythms of biological activity. A woman's menstrual cycle is an example of a biological rhythm—a recurring, cyclical pattern of bodily changes. One complete menstrual cycle takes about 28 days—a lunar month—but many biological cycles are much shorter. For example, body temperature fluctuates cyclically over a 24-hour period. Alertness is associated with higher body temperatures, and sleepiness with lower body temperatures.

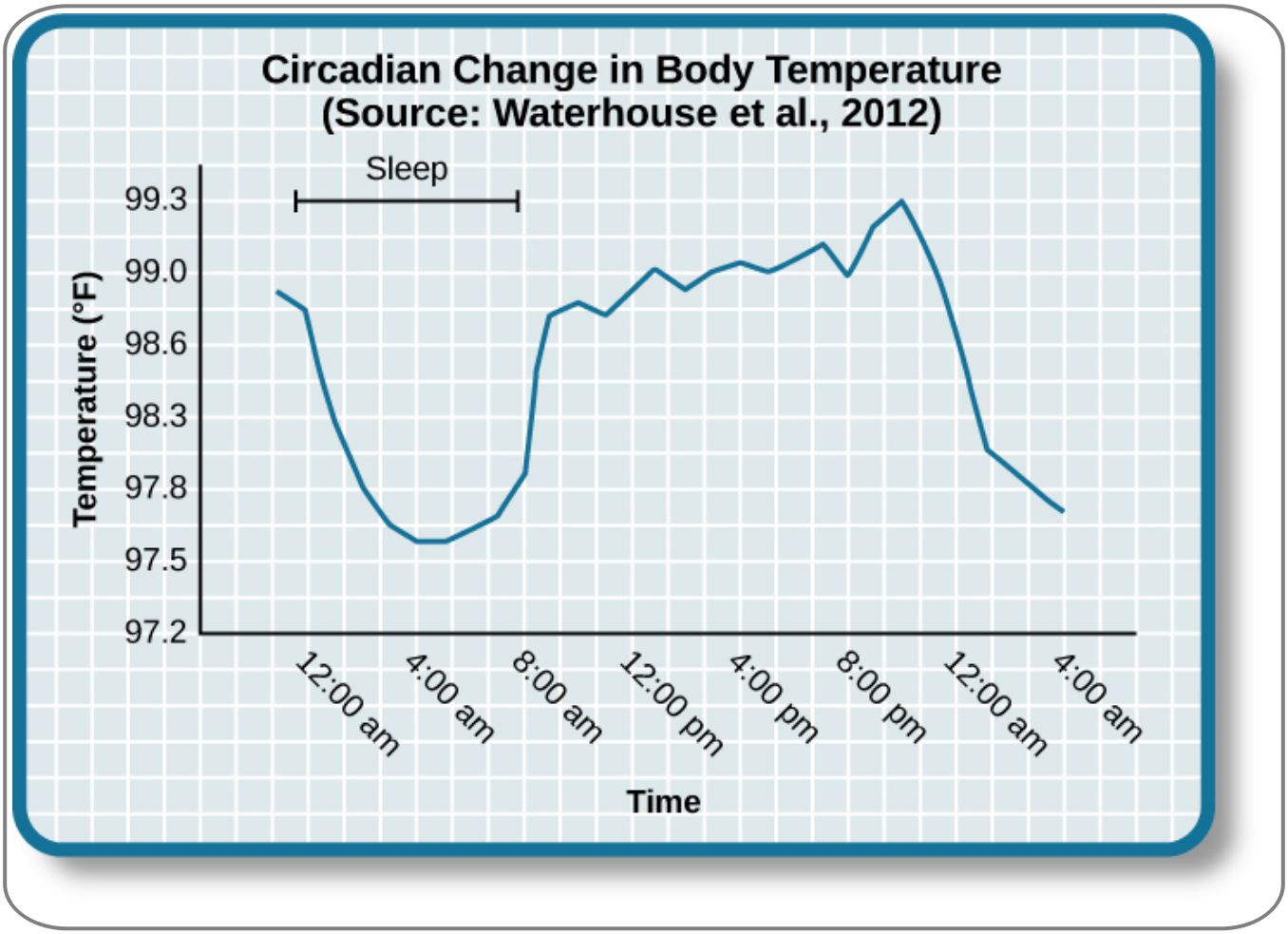

Figure 7.2.1 *This chart illustrates the circadian change in body temperature over 28 hours in a group of eight young men. Body temperature rises throughout the waking day, peaking in the afternoon, and falls during sleep, with the lowest point occurring during the very early morning hours. Image: Psychology – H5P Edition; Spielman et al., 2021.*

Image Description

Line graph titled "Circadian Change in Body Temperature (Source: Waterhouse et al., 2012)." The y-axis shows

body temperature in degrees Fahrenheit from about 97.2°F to 99.3°F, and the x-axis shows time across a 24-hour period from 12:00 a.m. to 4:00 a.m. the next day. A bracket labelled “Sleep” spans roughly midnight to 8:00 a.m. Body temperature drops during sleep from about 98.8°F to a low near 97.6°F around 4:00–5:00 a.m., then rises sharply after waking. It stays near 98.8°F to 99.1°F through the day, peaks around 99.3°F in the evening, and then declines again after midnight to about 97.7°F by 4:00 a.m.

This pattern of temperature fluctuation, which repeats every day, is one example of a circadian rhythm. A circadian rhythm is a biological rhythm that takes place over a period of about 24 hours. Our sleep-wake cycle, which is linked to our environment’s natural light-dark cycle, is perhaps the most obvious example of a circadian rhythm, but we also have daily fluctuations in heart rate, blood pressure, blood sugar, and body temperature. Some circadian rhythms play a role in changes in our state of consciousness.

If we have biological rhythms, then is there some sort of biological clock? In the brain, the hypothalamus, which lies above the pituitary gland, is a main center of homeostasis. Homeostasis is the tendency to maintain a balance, or optimal level, within a biological system.

The brain’s clock mechanism is located in an area of the hypothalamus known as the suprachiasmatic nucleus (SCN). The axons of light-sensitive neurons in the retina provide information to the SCN based on the amount of light present, allowing this internal clock to be synchronized with the outside world (Klein et al., 1991; Welsh et al., 2010).

Functions of Sleep and Dreams

Dreams are, arguably, the most interesting aspect of sleep. Throughout history dreams have been given special importance because of their unique, almost mystical nature. They have been thought to be predictions of the future, hints of hidden aspects of the self, important lessons about how to live life, or opportunities to engage in impossible deeds like flying. There are several competing theories of why humans dream. One is that it is our nonconscious attempt to make sense of our daily experiences and learning. Another, popularized by Freud, is that dreams represent taboo or troublesome wishes or desires. Regardless of the specific reason we know a few facts about dreams: all humans dream, we dream at every stage of sleep, but dreams during REM sleep are especially vivid. One under-explored area of dream research is the possible social functions of dreams: we often share our dreams with others and use them for entertainment value.

Sleep serves many functions, one of which is to give us a period of mental and physical restoration. Children generally need more sleep than adults since they are developing. It is so vital, in fact, that a lack of sleep is associated with a wide range of problems. People who do not receive adequate sleep are more irritable, have slower reaction times, have more difficulty sustaining attention, and make poorer decisions. Interestingly, this is an issue relevant to the lives of college students. In one highly cited study, researchers found that 1 in 5 students took more than 30 minutes to fall asleep at night, 1 in 10 occasionally took sleep medications, and more than half reported being “mostly tired” in the mornings (Buboltz et al, 2001).

Stages of Sleep

Sleep is not a uniform state of being. Instead, sleep is composed of several different stages that can be differentiated from one another by the patterns of brain wave activity that occur during each stage. These changes in brain wave activity can be visualized using EEG and are distinguished from one another by both the frequency and amplitude of brain waves. Sleep can be divided into two different general phases: REM sleep and non-REM (NREM) sleep. **Rapid eye movement (REM)** sleep is characterized by darting movements of the eyes under closed eyelids. Brain waves during REM sleep appear very similar to brain waves during wakefulness. In

contrast, **non-REM (NREM)** sleep is subdivided into four stages distinguished from each other and from wakefulness by characteristic patterns of brain waves. The first four stages of sleep are NREM sleep, while the fifth and final stage of sleep is REM sleep.

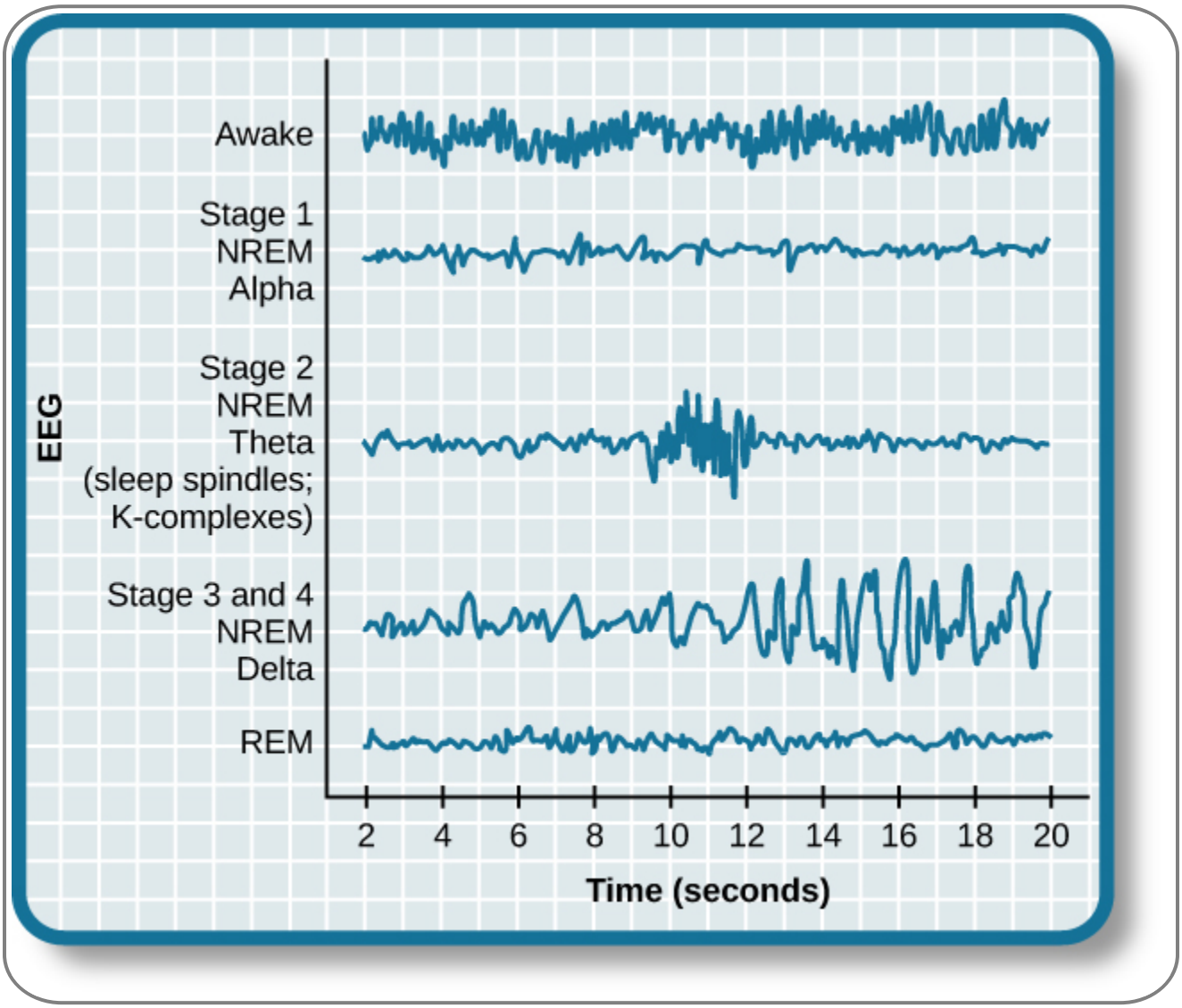

Figure 7.2.2 *Brainwave activity changes dramatically across the different stages of sleep. Image: Psychology – H5P Edition,; Spielman et al., 2021.*

Image Description

Line graph comparing EEG activity across states of wakefulness and sleep over 20 seconds. From top to bottom, the traces are labelled Awake, Stage 1 NREM Alpha, Stage 2 NREM Theta (with sleep spindles and K-complexes), Stage 3 and 4 NREM Delta, and REM. Awake shows fast, irregular, low-amplitude waves. Stage 1 shows slightly slower, lower-amplitude waves. Stage 2 shows mostly low-amplitude waves with a brief burst of sleep spindles and K-complex activity around 10–12 seconds. Stages 3 and 4 show slow, high-amplitude delta waves. REM shows low-amplitude, irregular activity similar to wakefulness. The vertical axis is labelled EEG, and the horizontal axis is labelled Time (seconds).

Problems with Circadian Rhythms

Generally, and for most people, our circadian cycles are aligned with the outside world. For example, most people sleep during the night and are awake during the day. One important regulator of sleep-wake cycles is the hormone **melatonin**. The **pineal gland**, an endocrine structure located inside the brain that releases melatonin, is thought to be involved in the regulation of various biological rhythms and of the immune system during sleep (Hardeland, Pandi-Perumal, & Cardinali, 2006). Melatonin release is stimulated by darkness and inhibited by light.

There are individual differences with regard to our sleep-wake cycle. For instance, some people would say they are morning people, while others would consider themselves to be night owls. These individual differences in circadian patterns of activity are known as a person's chronotype, and research demonstrates that morning larks and night owls differ with regard to sleep regulation (Taillard et al., 2003). **Sleep regulation** refers to the brain's control of switching between sleep and wakefulness as well as coordinating this cycle with the outside world.

Let's Watch

Watch this brief video describing circadian rhythms and how they affect

Video: "Reprogramming Our Circadian Rhythms for the Modern World" by Big Think [3:30] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube*.

Disruptions of Normal Sleep

Whether lark, owl, or somewhere in between, there are situations in which a person's circadian clock gets out of synchrony with the external environment. One way that this happens involves traveling across multiple time zones. When we do this, we often experience jet lag. **Jet lag** is a collection of symptoms that results from the mismatch between our internal circadian cycles and our environment. These symptoms include fatigue, sluggishness, irritability, and insomnia (i.e., a consistent difficulty in falling or staying asleep for at least three nights a week over a month's time) (Roth, 2007).

Individuals who do rotating shift work are also likely to experience disruptions in circadian cycles. **Rotating shift work** refers to a work schedule that changes from early to late on a daily or weekly basis. For example, a person may work from 7:00 a.m. to 3:00 p.m. on Monday, 3:00 a.m. to 11:00 a.m. on Tuesday, and 11:00 a.m. to 7:00 p.m. on Wednesday. In such instances, the individual's schedule changes so frequently that it becomes difficult for a normal circadian rhythm to be maintained. This often results in sleeping problems, and it can lead to signs of depression and anxiety. These kinds of schedules are common for individuals working in health care professions and service industries, and they are associated with persistent feelings of exhaustion and agitation that can make someone more prone to making mistakes on the job (Gold et al., 1992; Presser, 1995).

Here's an Example

Rotating shift work has pervasive effects on the lives and experiences of individuals engaged in that kind of work, which is clearly illustrated in stories reported in a qualitative study that researched the experiences of middle-aged nurses who worked rotating shifts (West et al., 2009). Several of the nurses interviewed commented that their work schedules affected their relationships with their families. One of the nurses said,

If you've had a partner who does work regular job, 9 to 5 office hours . . . the ability to spend time, good time with them when you're not feeling absolutely exhausted . . . that would be one of the problems that I've encountered. (West et al., 2009, p. 114)

While disruptions in circadian rhythms can have negative consequences, there are things we can do to help us realign our biological clocks with the external environment. Some of these approaches, such as using a bright light as shown in, have been shown to alleviate some of the problems experienced by individuals suffering from jet lag or from the consequences of rotating shift work. Because the biological clock is driven by light, exposure to bright light during working shifts and dark exposure when not working can help combat insomnia and symptoms of anxiety and depression (Huang et al., 2013).

Let's Watch

Watch this video to hear tips on how to overcome jet lag:

Video: "6 Tips To Beat Jet Lag" by Greg and Mitch [5:07] is licensed under the Standard YouTube License.*Transcript and closed captions available on YouTube.*

Insufficient Sleep

When people have difficulty getting sleep due to their work or the demands of day-to-day life, they accumulate a **sleep debt**. A person with a sleep debt does not get sufficient sleep on a chronic basis. The consequences of sleep debt include decreased levels of alertness and mental efficiency. Interestingly, since the advent of electric light, the amount of sleep that people get has declined. While we certainly welcome the convenience of having the darkness lit up, we also suffer the consequences of reduced amounts of sleep because we are more active during the nighttime hours than our ancestors were. As a result, many of us sleep less than 7–8 hours a night and accrue a sleep debt. While there is tremendous variation in any given individual's sleep needs, the National Sleep Foundation (n.d.) cites research to estimate that newborns require the

most sleep (between 12 and 18 hours a night) and that this amount declines to just 7–9 hours by the time we are adults.

If you lie down to take a nap and fall asleep very easily, chances are you may have sleep debt. Given that college students are notorious for suffering from significant sleep debt (Hicks et al., 2001; Hicks et al., 1992; Miller et al., 2010), chances are you and your classmates deal with sleep debt-related issues on a regular basis. Shows recommended amounts of sleep at different ages.

Sleep Needs at Different Ages

Age	Nightly Sleep Needs
0–3 months	12–18 hours
3 months–1 year	14–15 hours
1–3 years	12–14 hours
3–5 years	11–13 hours
5–10 years	10–11 hours
10–18 years	8–10 hours
18 and older	7–9 hours

Sleep debt and sleep deprivation have significant negative psychological and physiological consequences. As mentioned earlier, lack of sleep can result in decreased mental alertness and cognitive function. In addition, sleep deprivation often results in depression-like symptoms. These effects can occur as a function of accumulated sleep debt or in response to more acute periods of sleep deprivation. It may surprise you to know that sleep deprivation is associated with obesity, increased blood pressure, increased levels of stress hormones, and reduced immune functioning (Banks & Dinges, 2007). A sleep-deprived individual generally will fall asleep more quickly than if she were not sleep-deprived. Some sleep-deprived individuals have difficulty staying awake when they stop moving (for example, sitting and watching television or driving a car). That is why individuals suffering from sleep deprivation can also put themselves and others at risk when they put themselves behind the wheel of a car or work with dangerous machinery. Some research suggests that sleep deprivation affects cognitive and motor function as much as, if not more than, alcohol intoxication (Williamson & Feyer, 2000).

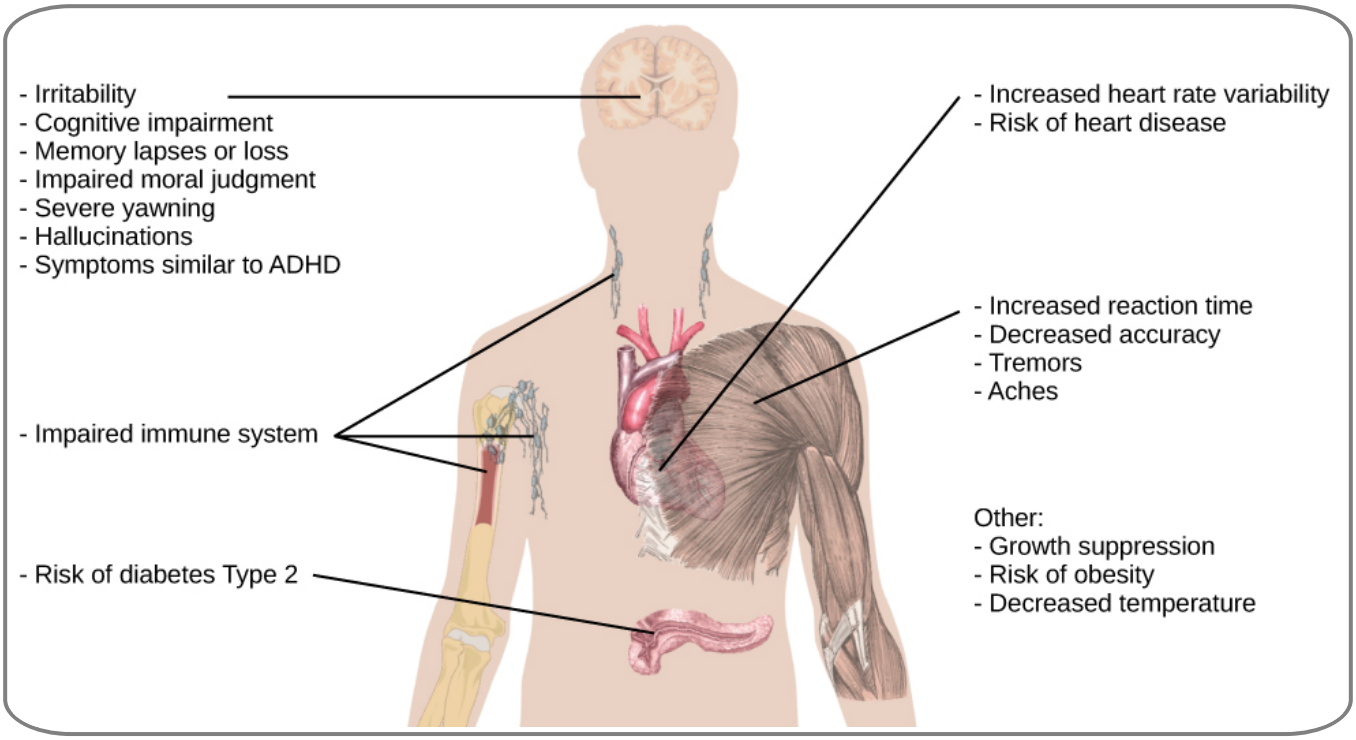

Figure 7.2.3. *This figure illustrates some of the negative consequences of sleep deprivation. While cognitive deficits may be the most obvious, many body systems are negatively impacted by a lack of sleep. Image: "Effects of sleep deprivation," by Mikael Häggström, Wikimedia Commons, CC0 1.0.*

Image Description

Enter Text Here

The amount of sleep we get varies across the lifespan. When we are very young, we spend up to 16 hours a day sleeping. As we grow older, we sleep less. In fact, a meta-analysis, which is a study that combines the results of many related studies, conducted within the last decade, indicates that by the time we are 65 years old, we average fewer than 7 hours of sleep per day (Ohayon et al., 20024). As the amount of time we sleep varies over our lifespan, presumably the sleep debt would adjust accordingly.

Activity: Test Your Understanding

Quiz Text Description

1. MultiChoice Activity

Which structure in the brain releases melatonin?

a. The hypothalamus
b. The pineal gland
c. The suprachiasmatic nucleus
d. The thalamus
e. The pituitary gland

2. MultiChoice Activity

Who is most likely to have their pineal gland stimulated?

a. Grant who, while training for space flight, is placed in a sensory deprivation tank
b. Tiffany who is on her 5th online meeting of the day.
c. Biyu who is playing a soccer match at 12pm.
d. Aoife who is watching the sun set from the top of a hill.
e. Farouk who is on his phone while in bed at 3am.

3. MultiChoice Activity

Some people prefer to stay up late whereas other people prefer to get up early. What describes a person's natural tendency to sleep at certain times of the day?

a. circadian rhythm
b. morning lark
c. chronotype
d. night owl
e. sleep regulation

4. MultiChoice Activity

Which of the following best describes jet lag?

a. When there is a mismatch between a person's internal environment clock and an external clock.
b. When there is a match between a person's internal body clock and the external environment.
c. The drag that airplanes experience when flying through the air.
d. When a person's circadian rhtym is out of sync for more than 2 weeks.
e. When there is a mismatch between a person's internal body clock and the external environment after traveling across several time zones.

5. MultiChoice Activity

Who is most likely to suffer from depression and/or anxiety?

a. Katarina, an anesthesiologist, who has a surgery scheduled for 9pm on Monday, 7am on Tuesday, 7am on Wednesday, 6pm on Thursday, and is on call for Friday and Saturday nights.
b. Simon, a musician, who works from 9am to 7pm on week days.
c. Kayli, a professor who finds that she does her best work from 9pm to 3am, and sleeps from 4am to 12pm.
d. Navraj who is a boardgame enthusiast and enjoys designing boardgames late into the night.
e. Jiwon who works only on night shifts on a boat at sea.

6. MultiChoice Activity

Who can be described as being in sleep debt?

a. Kayli, a mother to a one year old who refuses to sleep past 4am in the morning.
b. Channing who stayed up late into the night cramming for an exam.
c. Mary who falls asleep on the couch at 8pm, gets up at 11pm and sleeps the rest of the night in bed.
d. Feroze who has started going to sleep an hour later than normal, but also wakes up an hour later.
e. Tom who falls asleep two hours earlier than normal and sleeps two hours later than usual.

Solution:

1. b. The pineal gland
2. a. Grant who, while training for space flight, is placed in a sensory deprivation tank
3. c. chronotype
4. e. When there is a mismatch between a person's internal body clock and the external environment after traveling across several time zones.
5. a. Katarina, an anesthesiologist, who has a surgery scheduled for 9pm on Monday, 7am on Tuesday, 7am on Wednesday, 6pm on Thursday, and is on call for Friday and Saturday nights.
6. a. Kayli, a mother to a one year old who refuses to sleep past 4am in the morning.

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7.3 Other States of Consciousness

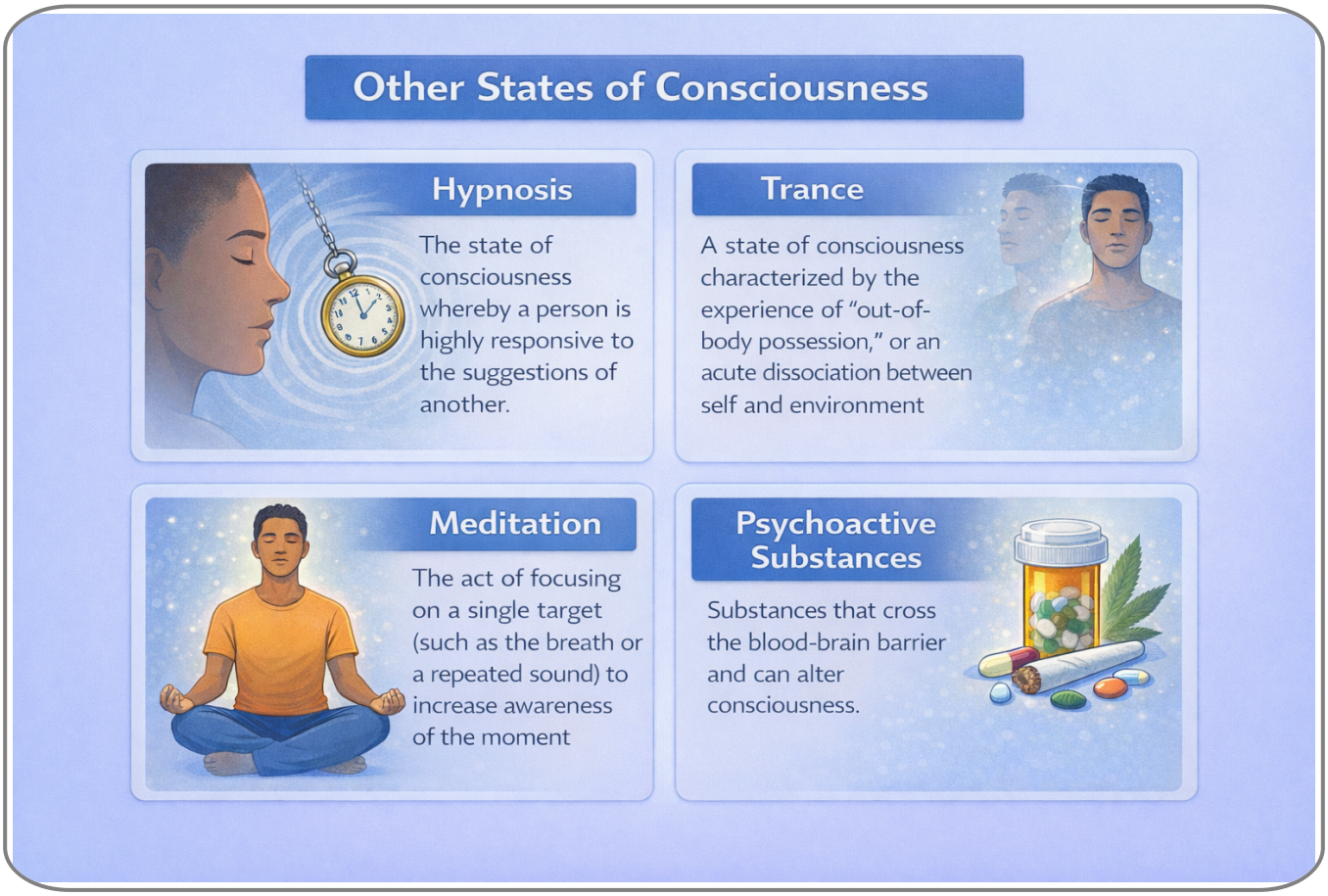

Figure 7.3.1 *States of consciousness defined.*

Image Description

Infographic titled "Other States of Consciousness" on a light blue gradient background. Four illustrated panels define different altered states of consciousness. The top left panel, "Hypnosis," shows a person in profile beside a swinging pocket watch and defines hypnosis as the state of consciousness whereby a person is highly responsive to the suggestions of another. The top right panel, "Trance," shows a person with a faded second image behind them and defines trance as a state of consciousness characterized by the experience of out-of-body possession, or an acute dissociation between self and environment. The bottom left panel, "Meditation," shows a person sitting cross-legged and defines meditation as the act of focusing on a single target, such as the breath or a repeated sound, to increase awareness of the moment. The bottom right panel, "Psychoactive Substances," shows pills, a prescription bottle, and a cannabis leaf and defines psychoactive substances as substances that cross the blood-brain barrier and can alter consciousness.

Consider This: Hypnosis

If you've ever watched a stage hypnotist perform, it may paint a misleading portrait of this state of consciousness. The hypnotized people on stage, for example, appear to be in a state similar to sleep. However, as the hypnotist continues with the show, you would recognize some profound differences between sleep and hypnosis. Namely, when you're asleep, hearing the word "strawberry" doesn't make you flap your arms like a chicken. In stage performances, the hypnotized participants appear to be highly suggestible, to the point that they are seemingly under the hypnotist's control. Such performances are entertaining but have a way of sensationalizing the true nature of hypnotic states.

People being hypnotized on stage. Image: New Media Expo, CC BY-NC-SA 2.0.

Hypnosis is an actual, documented phenomenon—one that has been studied and debated for over 200 years (Pekala et al., 2010). Franz Mesmer (1734 – 1815) is often credited as among the first people to "discover" hypnosis, which he used to treat members of elite society who were experiencing psychological distress. It is from Mesmer's name that we get the English word "mesmerize," meaning "to entrance or transfix a person's attention." Mesmer attributed the effect of hypnosis to "animal magnetism," a supposed universal force (similar to gravity) that operates through all human bodies. Even at the time, such an account of hypnosis was not scientifically supported, and Mesmer himself was frequently the center of controversy.

Over the years, researchers have proposed that **hypnosis** is a mental state characterized by reduced peripheral awareness and increased focus on a singular stimulus, which results in an enhanced susceptibility to suggestion (Kihlstrom, 2003). For example, the hypnotist will usually induce hypnosis by getting the person to pay attention only to the hypnotist's voice. As the individual focuses more and more on that, s/he begins to forget the context of the setting and responds to the hypnotist's suggestions as if they were his or her own. Some people are naturally more suggestible, and therefore more "hypnotizable" than are others, and this is especially true for those who score high in empathy (Wickramasekera II & Szlyk, 2003). One common "trick" of stage hypnotists is to discard volunteers who are less suggestible than others.

Dissociation is the separation of one's awareness from everything besides what one is centrally focused on. For example, if you've ever been daydreaming in class, you were likely so caught up in the fantasy that you didn't hear a word the teacher said. During hypnosis, this dissociation becomes even more extreme. That is, a person concentrates so much on the words of the hypnotist that s/he loses perspective of the rest of the world around them. As a consequence of dissociation, a person is less effortful and less self-conscious in consideration of their own thoughts and behaviours. Similar to low awareness states, where one often acts on the first thought that comes to mind, so, too, in hypnosis does the individual simply follow the first thought that comes to mind, i.e., the hypnotist's suggestion. Still, just because one is more susceptible to suggestion under hypnosis, it doesn't mean they will do anything that's ordered. To be hypnotized, you must first *want* to be hypno-

tized (i.e., you can't be hypnotized against your will; Lynn & Kirsh, 2006), and once you are hypnotized, you won't do anything you wouldn't also do while in a more natural state of consciousness (Lynn et al., 1990).

Today, **hypnotherapy** is still used in a variety of formats, and it has evolved from Mesmer's early tinkering with the concept. Modern hypnotherapy often uses a combination of relaxation, suggestion, motivation and expectancies to create a desired mental or behavioral state. Although there is mixed evidence on whether hypnotherapy can help with addiction reduction (e.g., quitting smoking; Abbot et al., 1998) there is some evidence that it can be successful in treating sufferers of acute and chronic pain (Ewin, 1978; Syrjala et al., 1992). For example, one study examined the treatment of burn patients with either hypnotherapy, pseudo-hypnosis (i.e., a placebo condition), or no treatment at all. Afterward, even though people in the placebo condition experienced a 16% decrease in pain, those in the actual hypnosis condition experienced a reduction of nearly 50% (Patterson et al., 1996). Thus, even though hypnosis may be sensationalized for television and movies, its ability to disassociate a person from their environment (or their pain) in conjunction with increased suggestibility to a clinician's recommendations (e.g., "you will feel less anxiety about your chronic pain") is a documented practice with actual medical benefits.

Trance States

Now, similar to hypnotic states, **trance states** also involve a dissociation of the self; however, people in a trance state are said to have less voluntary control over their behaviors and actions. Trance states often occur in religious ceremonies, where the person believes he or she is "possessed" by an otherworldly being or force. While in trance, people report anecdotal accounts of a "higher consciousness" or communion with a greater power. However, the body of research investigating this phenomenon tends to reject the claim that these experiences constitute an "altered state of consciousness."

Most researchers today describe both hypnosis and trance states as "subjective" alterations of consciousness, not an actually distinct or evolved form (Kirsch & Lynn, 1995). Just like you feel different when you're in a state of deep relaxation, so, too, are hypnotic and trance states simply shifts from the standard conscious experience. Researchers contend that even though both hypnotic and trance states appear and feel wildly different than the normal human experience, they can be explained by standard socio-cognitive factors like imagination, expectation, and the interpretation of the situation.

Meditation

Meditation is the act of focusing on a single target (such as the breath or a repeated sound) to increase awareness of the moment. While hypnosis is generally achieved through the interaction of a therapist and the person being treated, an individual can perform meditation alone. Often, however, people wishing to learn to meditate receive some training in techniques to achieve a meditative state. A meditative state, as shown by EEG recordings of newly-practicing meditators, is not an altered state of consciousness per se; however, patterns of brain waves exhibited by expert meditators may represent a unique state of consciousness (Fell et al., 2010).

Although there are a number of different techniques in use, the central feature of all meditation is clearing the mind in order to achieve a state of relaxed awareness and focus (Chen et al., 2013; Lang et al., 2012). Mindfulness meditation has recently become popular. In the variation of meditation, the meditator's attention is focused on some internal process or an external object (Fell et al., 2010).

Meditative techniques have their roots in religious practices, but their use has grown in popularity among practitioners of alternative medicine. Research indicates that meditation may help reduce blood pressure, and

the American Heart Association suggests that meditation might be used in conjunction with more traditional treatments as a way to manage hypertension, although there is not sufficient data for a recommendation to be made (Brook et al., 2013). Like hypnosis, meditation also shows promise in stress management, sleep quality (Caldwell et al., 2010), treatment of mood and anxiety disorders (Chen et al., 2013; Freeman et al., 2010; Vøllestad et al., 2012), and pain management (Reiner et al., 2013).

(a) This is a statue of a meditating Buddha, representing one of the many religious traditions of which meditation plays a part. (b) People practicing meditation may experience an alternate state of consciousness. Images: (a)"Kamakura Buddha Daibutsu front 1885" by Dirk Beyer, Wikimedia Commons, CC BY-SA 3.0; (b): "Meditate," by Caleb Roenigk, Flickr, CC BY 2.0. Modification of work by authors.

Feeling Stressed?

Think meditation might help? This instructional video teaches how to use Buddhist meditation techniques to alleviate stress: Easy Meditation for Beginners – How to do a normal Third Eye Meditation. Watch this video to describe the results of a brain imaging study in individuals who underwent specific mindfulness-meditative techniques: Scans show mindfulness meditation brain boost.

Psychoactive Drugs

Consider This

On April 16, 1943, Albert Hoffman—a Swiss chemist working in a pharmaceutical company—accidentally ingested a newly synthesized drug. The drug—lysergic acid diethylamide (LSD)—turned out to be a powerful hallucinogen. Hoffman went home and later reported the effects of the drug, describing them as seeing the world through a "warped mirror" and experiencing visions of "extraordinary shapes with intense, kaleidoscopic play of colours." Hoffman had discovered what members of many traditional cultures around the world already knew: there are substances that, when ingested, can have a powerful effect on perception and on consciousness.

Drugs operate on human physiology in a variety of ways, and researchers and medical doctors tend to classify drugs according to their effects. Here we will briefly cover 3 categories of drugs: hallucinogens, depressants, and stimulants.

1. Hallucinogens

It is possible that hallucinogens are the substance that has, historically, been used the most widely. Traditional societies have used plant-based hallucinogens such as peyote, ebene, and psilocybin mushrooms in a wide range of religious ceremonies. **Hallucinogens** are substances that alter a person's perceptions, often by creating visions or hallucinations that are not real. There are a wide range of hallucinogens, and many are used as recreational substances in industrialized societies. Common examples include marijuana, LSD, and MDMA (also known as "ecstasy"). Marijuana is the dried flowers of the hemp plant and is often smoked to produce **euphoria**. The active ingredient in marijuana is called THC and can produce distortions in the perception of time, create a sense of rambling, unrelated thoughts, and is sometimes associated with increased hunger or excessive laughter. The use and possession of marijuana is illegal in most places, but this appears to be a trend that is changing. Uruguay, Bangladesh, and several of the United States have recently legalized marijuana. This may be due, in part, to changing public attitudes or to the fact that marijuana is increasingly used for medical purposes such as the management of nausea or treating glaucoma. In 2018, Canada's Cannabis Act came into effect, legalizing the sale of recreational cannabis.

2. Depressants

Depressants are substances that, as their name suggests, slow down the body's physiology and mental processes. Alcohol is the most widely used depressant. Alcohol's effects include the reduction of inhibition, meaning that intoxicated people are more likely to act in ways they would otherwise be reluctant to. Alcohol's psychological effects are the result of it increasing the neurotransmitter GABA. There are also physical effects, such as loss of balance and coordination, and these stem from the way that alcohol

interferes with the coordination of the visual and motor systems of the brain. Despite the fact that alcohol is so widely accepted in many cultures, it is also associated with a variety of dangers. First, alcohol is toxic, meaning that it acts like a poison because it is possible to drink more alcohol than the body can effectively remove from the bloodstream. When a person's **blood alcohol content (BAC)** reaches .3 to .4% there is a serious risk of death. Second, the lack of judgment and physical control associated with alcohol is associated with more risk-taking behaviour or dangerous behaviour such as drunk driving. Finally, alcohol is addictive and heavy drinkers often experience significant interference with their ability to work effectively or in their close relationships.

Other common depressants include opiates (also called "narcotics"), which are substances synthesized from the poppy flower. Opiates stimulate endorphin production in the brain, and because of this, they are often used as painkillers by medical professionals. Unfortunately, because opiates such as OxyContin so reliably produce euphoria, they are increasingly used—illegally—as recreational substances.

3. Stimulants

Stimulants are substances that "speed up" the body's physiological and mental processes. Two commonly used stimulants are caffeine—the drug found in coffee and tea—and nicotine, the active drug in cigarettes and other tobacco products. These substances are both legal and relatively inexpensive, leading to their widespread use. Many people are attracted to stimulants because they feel more alert when under the influence of these drugs. As with any drug, there are health risks associated with consumption. For example, excessive consumption of these types of stimulants can result in anxiety, headaches, and insomnia. Similarly, smoking cigarettes—the most common means of ingesting nicotine—is associated with higher risks of cancer. For instance, among heavy smokers, 90% of lung cancer is directly attributable to smoking (Stewart & Kleihues, 2003).

There are other stimulants, such as cocaine and methamphetamine (also known as "crystal meth" or "ice"), that are illegal substances that are commonly used. These substances act by blocking "reuptake" of dopamine in the brain. This means that the brain does not naturally clear out the dopamine and that it builds up in the synapse, creating euphoria and alertness. As the effects wear off, it stimulates strong cravings for more of the drug.

Activity: Lets Review

Quiz Text Description

1. MultiChoice Activity

_____ is most effective in individuals that are very open to the power of suggestion.

a. cognitive therapy
b. meditation
c. mindful awareness
d. hypnosis

2. MultiChoice Activity

_____ has its roots in religious practice.

a. meditation
b. behavioral therapy
c. hypnosis
d. cognitive therapy

3. MultiChoice Activity

Meditation may be helpful in _____.

a. both pain management and stress control
b. treating the flu
c. pain management
d. stress control

Solution:

1. d. hypnosis
2. a. meditation
3. a. both pain management and stress control

The sections *Hypnosis, Trance States, and Psychoactive Drugs* were adapted from States of Consciousness by Robert Biswas-Diener and Jake Teeny, which is licensed under a Creative Commons Attribution-Non-Commercial-ShareAlike 4.0 International License. *Modifications: Added the Cannabis Act (2018) and omitted other phrasing.*

The section *Meditation* was adapted from "Other States of Consciousness" in Psychology – H5P Edition Copy-

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OpenAI. (2026). ChatGPT (5.2) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 7.3.1: “Create an illustration graphic depicting the following 4 states of consciousness: Hypnosis, Trance, Meditation, and Psychoactive Substances.”

7.4 Chapter Summary

Let's Reflect

In this chapter, we learned about consciousness as a range of awareness rather than a simple on-or-off state. We explored how people moved between lower-awareness states, in which subtle cues, priming, and unconscious biases could shape thoughts and behaviour, and higher-awareness states, in which mindfulness, focused attention, and deliberate reflection could help people think more carefully and challenge bias. The chapter also explained how biological rhythms, especially circadian rhythms regulated by the brain and influenced by light, shaped the sleep–wake cycle. By examining REM and non-REM sleep, sleep debt, jet lag, and rotating shift work, we saw that sleep was essential for restoration, attention, decision-making, mood, and overall physical health.

The chapter also introduced other states of consciousness, including hypnosis, trance, meditation, and drug-induced changes in awareness. We learned that hypnosis was often misunderstood in popular culture and could have therapeutic uses, especially in pain management, while trance and meditation involved shifts in attention, focus, and dissociation. Finally, the discussion of psychoactive substances showed how hallucinogens, depressants, and stimulants could alter perception, mood, and behaviour in different ways, sometimes with serious risks. Overall, the chapter encouraged us to reflect on how consciousness was shaped by both internal processes and external influences, and how understanding these states could help us make more informed choices about health, behaviour, and well-being.

Key Terms

- **Biological Rhythm**: internal cycle of biological activity.
- **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.
- **Circadian Rhythm**: a biological rhythm that occurs over approximately 24 hours.
- **Consciousness**: the awareness or deliberate perception of a stimulus.
- **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).
- **Depressants**: a class of drugs that slow down the body's physiological and mental processes.
- **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.
- **Euphoria**: an intense feeling of pleasure, excitement, or happiness.
- **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).
- **Hallucinogens**: substances that, when ingested, alter a person's perceptions, often by creating hallucinations that are not real or distorting their perceptions of time.
- **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.
- **Hypnotherapy**: the use of hypnotic techniques such as relaxation and suggestion to help engineer desirable change, such as lower pain or quitting smoking.
- **Implicit Associations Test**: a computer reaction time test that 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.
- **Jet Lag**: a collection of symptoms brought on by travel from one time zone to another that results from the mismatch between our internal circadian cycles and our environment.
- **Meditation**: clearing the mind in order to achieve a state of relaxed awareness and focus.
- **Melatonin**: a hormone secreted by the endocrine gland that serves as an important regulator of the sleep-wake cycle.
- **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?).
- **Non-REM (NREM)**: a period of sleep outside periods of rapid eye movement (REM) sleep.
- **Pineal Gland**: an endocrine structure located inside the brain that releases melatonin.
- **Priming**: the activation of certain thoughts or feelings that make them easier to think of and act upon.
- **Rapid Eye Movement (REM) Sleep**: a period of sleep characterized by brain waves very similar to

those during wakefulness and by darting movements of the eyes under closed eyelids.

- **Rotating Shift Work**: a work schedule that changes from early to late on a daily or weekly basis.
- **Sleep Debt**: result of insufficient sleep on a chronic basis.
- **Sleep Regulation**: the brain's control of switching between sleep and wakefulness as well as coordinating this cycle with the outside world.
- **Stimulants**: a class of drugs that speed up the body's physiological and mental processes.
- **Suprachiasmatic Nucleus (SCN)**: area of the hypothalamus in which the body's biological clock is located.
- **Trance**: 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.

Questions for Further Discussion

Personal Application Questions

1. We experience shifts in our circadian clocks in the fall and spring of each year with time changes associated with daylight saving time. Is springing ahead or falling back easier for you to adjust to, and why do you think that is?
2. What do you do to adjust to the differences in your daily schedule throughout the week? Are you running a sleep debt when daylight saving time begins or ends?
3. Have you (or someone you know) ever experienced significant periods of sleep deprivation because of simple insomnia, high levels of stress, or as a side effect from a medication? What were the consequences of missing out on sleep?
4. Many people experiment with some sort of psychoactive substance at some point in their lives. Why do you think people are motivated to use substances that alter consciousness?
5. Under what circumstances would you be willing to consider hypnosis and/or meditation as a treatment option? What kind of information would you need before you made a decision to use these techniques?

Critical Thinking Questions

1. Healthcare professionals often work rotating shifts. Why is this problematic? What can be done to deal with potential problems?
2. If theories that assert sleep is necessary for restoration and recovery from daily energetic demands are correct, what do you predict about the relationship that would exist between individuals' total sleep duration and their level of activity?

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

Which statement best defines consciousness?

a. An inability to respond to outside events.
b. Awareness of the self, bodily sensations, thoughts, and the environment.
c. A set of reflexes with no awareness involved.
d. A permanent state of deep sleep.

2. MultiChoice Activity

In psychology, priming refers to:

a. A treatment used only for chronic pain.
b. A stage of REM sleep.
c. A hormone released by the pineal gland.
d. The activation of thoughts or associations that can influence later thinking or behaviour.

3. MultiChoice Activity

The Implicit Association Test (IAT) is designed to measure:

a. Automatic associations that may reflect unconscious bias.
b. Blood alcohol content.
c. A person's hypnotic depth.
d. Brain waves during REM sleep.

4. MultiChoice Activity

Which example best reflects a high-awareness state?

a. Zoning out and drifting through a task with little attention.
b. Carefully evaluating a message instead of being swayed by an irrelevant celebrity endorsement.
c. Reacting to a subtle cue without realizing it.
d. Automatically relying on a stereotype.

5. MultiChoice Activity

According to the Flexible Correction Model, people can:

a. Be hypnotized even when they do not want to be.
b. Eliminate their need for sleep through concentration.
c. Avoid all unconscious processing entirely.

d. Adjust their judgments when they realize outside influences may be biasing them.

6. MultiChoice Activity

A circadian rhythm is a biological rhythm that:

a. Occurs every 90 minutes only during REM sleep.
b. Occurs over a period of about 24 hours.
c. Occurs only during adolescence.
d. Occurs only once a month.

7. MultiChoice Activity

The suprachiasmatic nucleus (SCN) primarily functions as the brain's:

a. Internal clock that helps regulate the sleep-wake cycle.
b. Storage site for long-term memories.
c. Pleasure centre responsible for euphoria.
d. Main centre for language production.

8. MultiChoice Activity

REM sleep is especially associated with:

a. A complete absence of dreams.
b. Vivid dreaming and brain activity that resembles wakefulness.
c. A state in which the brain is more inactive than in all NREM stages.
d. No eye movement at all.

9. MultiChoice Activity

Sleep debt refers to:

a. Temporary alertness after consuming caffeine.
b. A fear of falling asleep.
c. Sleeping too deeply during REM sleep.
d. A chronic pattern of getting insufficient sleep.

10. MultiChoice Activity

Why is rotating shift work often problematic?

a. It guarantees more REM sleep than a regular schedule.
b. It affects only physical health and not attention or mood.
c. It can disrupt circadian rhythms and increase exhaustion, mood problems, and mistakes.
d. It prevents melatonin from ever being released again.

11. MultiChoice Activity

Which statement about hypnosis is most accurate?

a. It forces people to do absolutely anything they are told.
b. It is identical to ordinary sleep.
c. It involves focused attention and increased suggestibility, but a person cannot be hypnotized against their will.
d. It has no documented therapeutic use.

12. MultiChoice Activity

Compared with hypnosis, trance states are described as involving:

a. Complete unconsciousness with no awareness at all.
b. Only the effects of stimulant drugs.
c. More logical reasoning and careful decision-making.
d. Less voluntary control and a strong dissociation from the surrounding environment.

13. MultiChoice Activity

Meditation is best defined as:

a. Focusing on a single target in order to increase awareness of the present moment.
b. Reducing oxygen to the brain to induce sleep.
c. Repeating advertising slogans to influence memory.
d. A drug-induced state caused by hallucinogens.

14. MultiChoice Activity

Which category of psychoactive substances is most directly associated with altered perceptions and hallucinations?

a. Depressants.
b. Hormones.
c. Hallucinogens.
d. Stimulants.

15. MultiChoice Activity

Caffeine and nicotine are best classified as:

a. Hallucinogens.
b. Opiates.
c. Stimulants.
d. Depressants.

Solution:

1. b. Awareness of the self, bodily sensations, thoughts, and the environment.
2. d. The activation of thoughts or associations that can influence later thinking or behaviour.
3. a. Automatic associations that may reflect unconscious bias.
4. b. Carefully evaluating a message instead of being swayed by an irrelevant celebrity endorsement.

5. d. Adjust their judgments when they realize outside influences may be biasing them.
6. b. Occurs over a period of about 24 hours.
7. a. Internal clock that helps regulate the sleep-wake cycle.
8. b. Vivid dreaming and brain activity that resembles wakefulness.
9. d. A chronic pattern of getting insufficient sleep.
10. c. It can disrupt circadian rhythms and increase exhaustion, mood problems, and mistakes.
11. c. It involves focused attention and increased suggestibility, but a person cannot be hypnotized against their will.
12. d. Less voluntary control and a strong dissociation from the surrounding environment.
13. a. Focusing on a single target in order to increase awareness of the present moment.
14. c. Hallucinogens.
15. c. Stimulants.

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OpenAI. (2026). ChatGPT. [Large language model]. https://chat.openai.com/chat
Prompts

Let's Reflect Prompt: *"Create a chapter summary for the attached file entitled "Chapter 7: States of Consciousness."*

CHAPTER 8: LEARNING

Chapter Overview

8.0 Learning Objectives
8.1 Learning Defined
8.2 Classical Conditioning
8.3 Classical Conditioning: Effects on Behaviour
8.4 Operant Conditioning
8.5 Operant Conditioning: Types and Schedules of Reinforcement
8.6 Observational Learning
8.7 Chapter Summary

8.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Explain how learned behaviours are different from instincts and reflexes.
2. Define learning.
3. Identify three basic forms of learning: classical conditioning, operant conditioning, and observational learning.
4. Analyze how behaviours in everyday life can be understood in relation to principles of learning.

Chapter Overview

In this chapter, we will define learning. We will differentiate learning from reflexes and instinctual behaviours. Next, we will explore three theories of learning – learning through association (classical conditioning), learning through consequences (operant conditioning), and learning through observing others' behaviour (observational learning) – and how each perspective can help us explain behaviour in everyday life.

Learning Outcomes 1 to 3 adapted from "Learning" in Psychology – H5P Edition Copyright © 2021 by Rose M. Spielman; Kathryn Dumper; William Jenkins; Arlene Lacombe; Marilyn Lovett; and Marion Perlmutter, which is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted.

8.1 Learning Defined

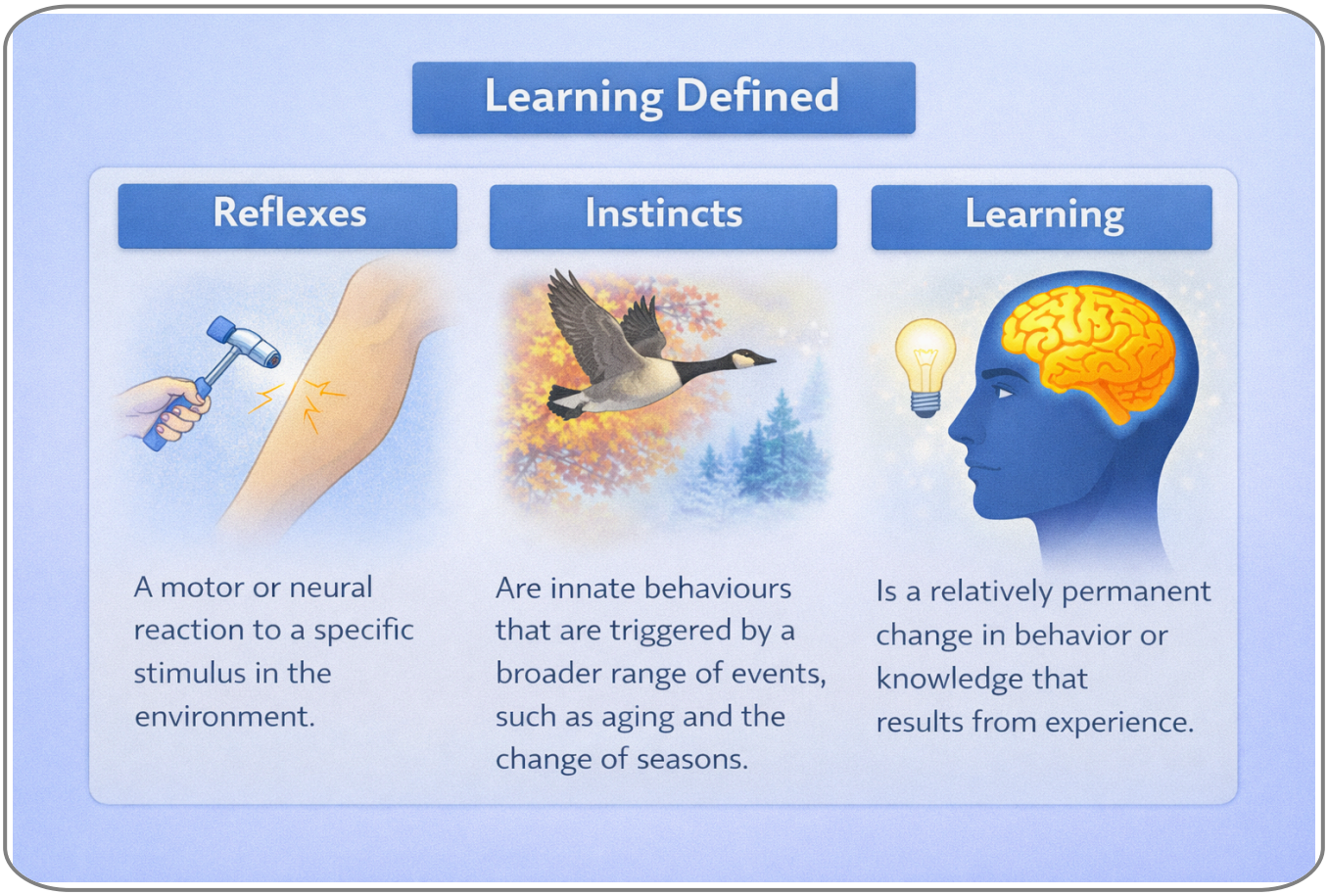

Figure 8.1.1 *Learning Defined.*

Image Description

Infographic titled “Learning Defined” on a light blue gradient background. Three side-by-side panels explain reflexes, instincts, and learning. The “Reflexes” panel shows a reflex hammer striking a bent knee and defines reflexes as a motor or neural reaction to a specific stimulus in the environment. The “Instincts” panel shows a flying goose with seasonal imagery in the background and defines instincts as innate behaviours triggered by a broader range of events, such as aging and the change of seasons. The “Learning” panel shows a human profile with a glowing brain and a lightbulb, and defines learning as a relatively permanent change in behavior or knowledge that results from experience.

Reflexes

Birds build nests and migrate as winter approaches. Infants suckle at their mother’s breast. Dogs shake water off their wet fur. Salmon swim upstream to spawn, and spiders spin intricate webs. What do these seemingly unrelated behaviours have in common? They are all *unlearned* behaviours. Both instincts and reflexes are innate behaviours that organisms are born with. **Reflexes** are motor or neural reactions 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 centers of the central nervous system (e.g., the spinal cord and the medulla).

Instincts

In contrast, **instincts** are innate behaviours that are triggered by a broader range of events, such as aging 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 centers.

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.

Learning

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 (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.

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 will 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, whose more extreme adherents once insisted that behaviours are triggered by the environment with no intervening thought.

Activity: Test Your Understanding

Quiz Text Description

1. MultiChoice Activity

A baby rooting or grasping when the palm of their hand is touched are examples of

a. observational learning
b. learned behaviour
c. reflexes
d. instincts
e. operant conditioning

2. MultiChoice Activity

Mother turtles lay their eggs in holes that they dig in the sand on beaches. After laying the eggs, the mother tutle covers them in sand and then heads back to the sea. When the babies hatch, the babies dig their way out of the sand and head towards the sea. The babies hatching and moving towards the sea is an example of

a. operant conditioning
b. a reflex
c. an instinct
d. observational learning
e. latent learning

3. MultiChoice Activity

Mother turtles lay their eggs in holes that they dig in the sand on beaches. After laying the eggs, the mother tutle covers them in sand and then heads back to the sea. When the babies hatch, the babies dig their way out of the sand and head towards the sea. The behaviour of the mother turtle is an example of

a. observational learning
b. latent learning
c. operant conditioning
d. an instinct
e. a reflex

4. MultiChoice Activity

Instincts and reflexes have what in common?

a. They both involve learning

b. They both occur only in animals and not in humans
c. They both chiefly rely on the primitive centres of the brain to enact the behaviour.
d. They are behaviours that do not have to be learned
e. They are both triggered by broader events (like the change of the season)

5. MultiChoice Activity

Which have the following is an example of a learned behaviour?

a. A newborn baby, when held in such a way that their feet touch the ground, they will begin to step like they are walking.
b. A dog sits down when instructed to "sit".
c. Birds migrating before the winter season.
d. A newborn goat within a very short time of being born is able to stand up and walk around.
e. You put your hand on a hot surface and immediately draw it back without thinking.

Solution:

1. c. reflexes
2. c. an instinct
3. d. an instinct
4. d. They are behaviours that do not have to be learned
5. b. A dog sits down when instructed to "sit".

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OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 8.1.1. "Create an illustration graphic depicting the three types of learning; include the following provided definitions."

8.2 Classical Conditioning

Consider This

Although Ivan Pavlov won a Nobel Prize for studying digestion, he is much more famous for something else: working with a dog, a bell, and a bowl of saliva. Many people are familiar with the classic study of "Pavlov's dog," but rarely do they understand the significance of its discovery. In fact, Pavlov's work helps explain why some people get anxious just looking at a crowded bus, why the sound of a morning alarm is so hated, and even why we swear off certain foods we've only tried once. Classical (or Pavlovian) conditioning is one of the fundamental ways we learn about the world around us. But it is far more than just a theory of learning; it is also arguably a theory of identity. For, once you understand classical conditioning, you'll recognize that your favorite music, clothes, even a political candidate, might all be a result of the same process that makes a dog drool at the sound of a bell.

Around the turn of the 20th century, scientists who were interested in understanding the behaviour of animals and humans began to appreciate the importance of two very basic forms of learning. One, which was first studied by the Russian physiologist Ivan Pavlov, is known as **classical, or Pavlovian conditioning.** In his famous experiment, Pavlov rang a bell and then gave a dog some food. After repeating this pairing multiple times, the dog eventually treated the bell as a signal for food and began salivating in anticipation of the treat. This kind of result has been reproduced in the lab using a wide range of signals (e.g., tones, light, tastes, settings) paired with many different events besides food (e.g., drugs, shocks, illness; see below).

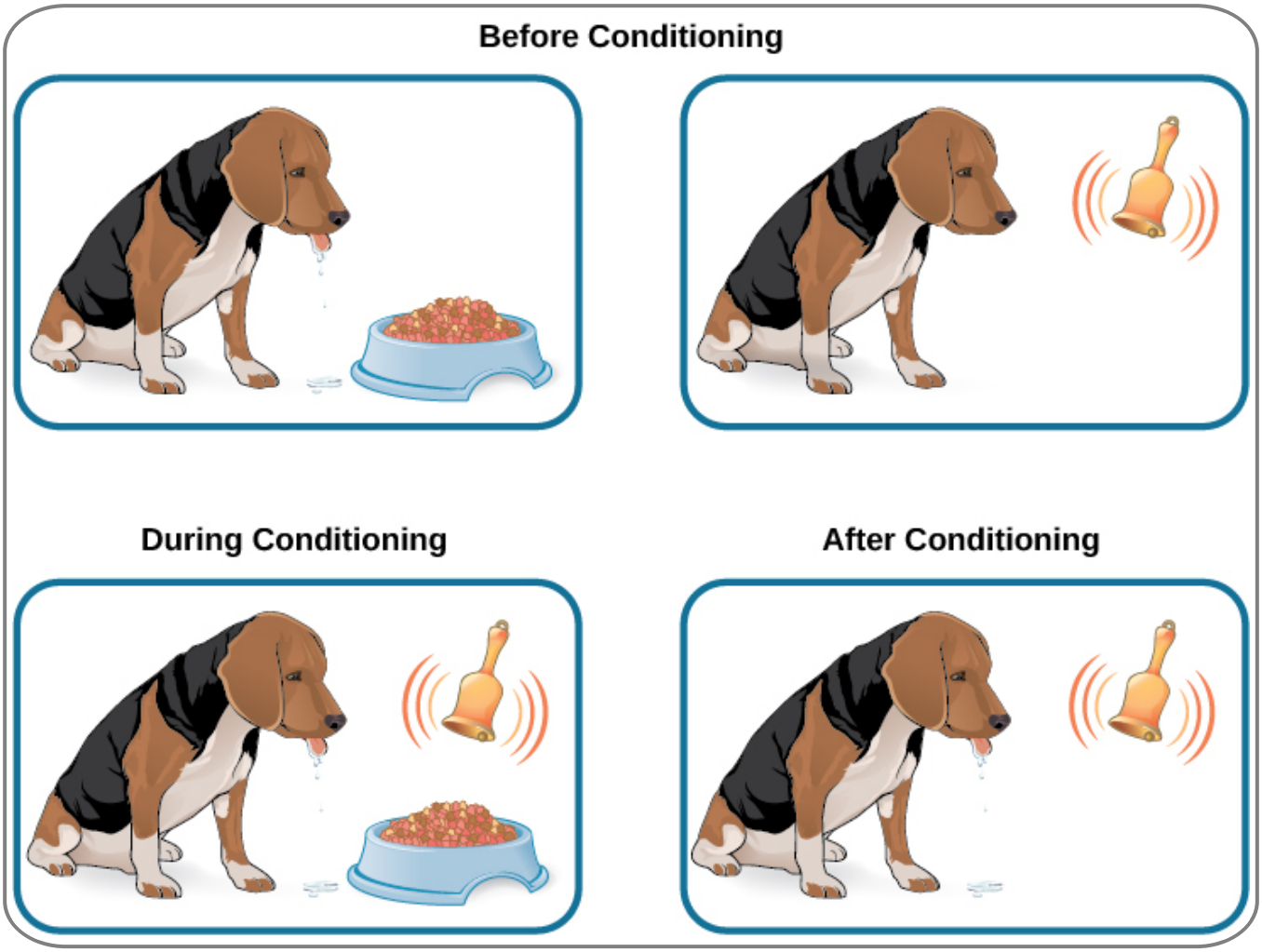

Figure 8.2.1 *Before conditioning, an unconditioned stimulus (food) produces an unconditioned response (salivation), and a neutral stimulus (bell) does not produce a response. During conditioning, the unconditioned stimulus (food) is presented repeatedly just after the presentation of the neutral stimulus (bell). After conditioning, the neutral stimulus alone produces a conditioned response (salivation), thus becoming a conditioned stimulus. Image: A project created by ISKME. Classical Conditioning, CC BY-NC-SA 4.0..*

We now believe that this same learning process is engaged, for example, when humans associate a drug they've taken with the environment in which they've taken it; when they associate a stimulus (e.g., a symbol for vacation, like a big beach towel) with an emotional event (like a burst of happiness); and when they associate the flavor of a food with getting food poisoning. Although classical conditioning may seem "old" or "too simple" a theory, it is still widely studied today for at least two reasons: First, it is a straightforward test of associative learning that can be used to study other, more complex behaviours. Second, because classical conditioning is always occurring in our lives, its effects on behaviour have important implications for understanding normal and disordered behaviour in humans.

In a general way, classical conditioning occurs whenever neutral stimuli are associated with psychologically significant events. With food poisoning, for example, although having fish for dinner may not normally be something to be concerned about (i.e., a "neutral stimulus"), if it causes you to get sick, you will now likely associate that neutral stimulus (the fish) with the psychologically significant event of getting sick. These paired events are often described using terms that can be applied to any situation.

The dog food in Pavlov's experiment is called the **unconditioned stimulus (US)** because it elicits an **unconditioned response (UR)**. That is, without any kind of "training" or "teaching," the stimulus produces a natural or instinctual reaction. In Pavlov's case, the food (US) automatically makes the dog drool (UR). Other examples of unconditioned stimuli include loud noises (US) that startle us (UR), or a hot shower (US) that produces pleasure (UR).

On the other hand, a conditioned stimulus produces a conditioned response. A **conditioned stimulus (CS)** is a signal that has no importance to the organism until it is paired with something that does have importance. For example, in Pavlov's experiment, the bell is the conditioned stimulus. Before the dog has learned to associate the bell (CS) with the presence of food (US), hearing the bell means nothing to the dog. However, after multiple pairings of the bell with the presentation of food, the dog starts to drool at the sound of the bell. This drooling in response to the bell is the **conditioned response (CR)**. Although it can be confusing, the conditioned response is almost always the same as the unconditioned response. However, it is called the conditioned response because it is conditional on (or, depends on) being paired with the conditioned stimulus (e.g., the bell). To help make this clearer, consider becoming really hungry when you see the logo for a fast-food restaurant. There's a good chance you'll start salivating. Although it is the actual eating of the food (US) that normally produces the salivation (UR), simply seeing the restaurant's logo (CS) can trigger the same reaction (CR).

Here's an Example

Another example you are probably very familiar with involves your alarm clock. If you're like most people, waking up early usually makes you unhappy. In this case, waking up early (US) produces a natural sensation of grumpiness (UR). Rather than waking up early on your own, though, you likely have an alarm clock that plays a tone to wake you. Before setting your alarm to that particular tone, let's imagine you had neutral feelings about it (i.e., the tone had no prior meaning for you). However, now that you use it to wake up every morning, you psychologically "pair" that tone (CS) with your feelings of grumpiness in the morning (UR).

After enough pairings, this tone (CS) will automatically produce your natural response of grumpiness (CR). Thus, this linkage between the unconditioned stimulus (US; waking up early) and the conditioned stimulus (CS; the tone) is so strong that the unconditioned response (UR; being grumpy) will become a conditioned response (CR; e.g., hearing the tone at any point in the day—whether waking up or walking down the street—will make you grumpy). Modern studies of classical conditioning use a very wide range of CSs and USs and measure a wide range of conditioned responses.

Erasing Classical Learning

After conditioning, the response to the CS can be eliminated if the CS is presented repeatedly without the US. This effect is called **extinction**, and the response is said to become "extinguished." For example, if Pavlov kept ringing the bell but never gave the dog any food afterward, eventually the dog's CR (drooling) would no longer happen when it heard the CS (the bell), because the bell would no longer be a predictor of food. Extinction is important for many reasons. For one thing, it is the basis for many therapies that clinical psychologists use to

eliminate maladaptive and unwanted behaviours. Take the example of a person who has a debilitating fear of spiders: one approach might include systematic exposure to spiders. Whereas, initially the person has a CR (e.g., extreme fear) every time s/he sees the CS (e.g., the spider), after repeatedly being shown pictures of spiders in neutral conditions, pretty soon the CS no longer predicts the CR (i.e., the person doesn't have the fear reaction when seeing spiders, having learned that spiders no longer serve as a "cue" for that fear). Here, repeated exposure to spiders without an aversive consequence causes extinction.

Psychologists must accept one important fact about extinction, however: it does not necessarily destroy the original learning (see Bouton, 2004). For example, imagine you strongly associate the smell of chalkboards with the agony of middle school detention. Now imagine that, after years of encountering chalkboards, the smell of them no longer recalls the agony of detention (an example of extinction). However, one day, after entering a new building for the first time, you suddenly catch a whiff of a chalkboard and WHAM!, the agony of detention returns. This is called **spontaneous recovery**: following a lapse in exposure to the CS after extinction has occurred, sometimes re-exposure to the CS (e.g., the smell of chalkboards) can evoke the CR again (e.g., the agony of detention).

Another related phenomenon is the **renewal effect**: After extinction, if the CS is tested in a new **context**, such as a different room or location, the CR can also return. In the chalkboard example, the action of entering a new building—where you don't expect to smell chalkboards—suddenly renews the sensations associated with detention. These effects have been interpreted to suggest that extinction *inhibits* rather than erases the learned behaviour, and this inhibition is mainly expressed in the context in which it is learned (see "context" in the Key Terms section at the end of the chapter).

This does not mean that extinction is a bad treatment for behaviour disorders. Instead, clinicians can increase their effectiveness by using basic research on learning to help defeat these relapse effects (see Craske et al., 2008). For example, conducting extinction therapies in contexts where patients might be most vulnerable to relapsing (e.g., at work), might be a good strategy for enhancing the therapy's success.

Stimulus Discrimination and Stimulus Generalization

Acquisition and extinction involve the strengthening and weakening, respectively, of a learned association. Two other learning processes—stimulus discrimination and stimulus generalization—are involved in distinguishing which stimuli will trigger the learned association. 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, Tiger, the cat, discriminated between the sound of the can opener and the sound of the electric mixer. When the electric mixer is going, Tiger is not about to be fed, so she does not come running to the kitchen looking for food.

On the other hand, when an organism demonstrates the conditioned response to stimuli that are similar to the condition stimulus, it is called stimulus generalization, 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, Tiger may come running after hearing its sound. But if you do not feed her following the electric mixer sound, and you continue to feed her consistently after the electric can opener sound, she will quickly learn to discriminate between the two sounds (provided they are sufficiently dissimilar that she can tell them apart).

Sometimes, classical conditioning can lead to habituation. Habituation occurs when we learn not to respond to a stimulus that is presented repeatedly without change. As the stimulus occurs over and over, we learn not to focus our attention on it. For example, imagine that your neighbour or roommate constantly has the television blaring. This background noise is distracting and makes it difficult for you to focus when you're studying. However, over time, you become accustomed to the stimulus of the television noise, and eventually you hardly notice it any longer.

The sections *Classical Conditioning* and *Erasing Classical Conditioning* are excerpted from "Two Types of Conditioning," and "Erasing Classical Conditioning," in "Conditioning and Learning" by Mark E. Bouton, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

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8.3 Classical Conditioning: Effects on Behaviour

Consider This

A classical CS (e.g., the bell) does not merely elicit a simple, unitary reflex. Pavlov emphasized salivation because that was the only response he measured. But his bell almost certainly elicited a whole *system* of responses that functioned to get the organism ready for the upcoming US (food) (see Timberlake, 2001). For example, in addition to salivation, CSs (such as the bell) that signal that food is near also elicit the secretion of gastric acid, pancreatic enzymes, and insulin (which gets blood glucose into cells). All of these responses prepare the body for digestion. Additionally, the CS elicits approach behaviour and a state of excitement. And presenting a CS for food can also cause animals whose stomachs are full to eat more food if it is available. In fact, food CSs are so prevalent in modern society that humans are likewise inclined to eat or feel hungry in response to cues associated with food, such as the sound of a bag of potato chips opening, the sight of a well-known logo (e.g., Coca-Cola), or the feel of the couch in front of the television.

Classical conditioning is also involved in other aspects of eating. Flavours associated with certain nutrients (such as sugar or fat) can become preferred without arousing any awareness of the pairing. For example, protein is a US that your body automatically craves more of once you start to consume it (UR): since proteins are highly concentrated in meat, the flavor of meat becomes a CS (or cue, that proteins are on the way), which perpetuates the cycle of craving for yet more meat (this automatic bodily reaction now a CR).

In a similar way, flavours associated with stomach pain or illness become avoided and *dis*liked. For example, a person who gets sick after drinking too much tequila may acquire a profound dislike of the taste and odour of tequila—a phenomenon called **taste aversion conditioning**. The fact that flavours are often associated with so many consequences of eating is important for animals (including rats and humans) that are frequently exposed to new foods. And it is clinically relevant. For example, drugs used in chemotherapy often make cancer patients sick. As a consequence, patients often acquire aversions to foods eaten just before treatment, or even aversions to such things as the waiting room of the chemotherapy clinic itself (see Bernstein, 1991; Scalera & Bavieri, 2009).

In a similar way, flavours associated with stomach pain or illness become avoided and *dis*liked. For example, a person who gets sick after drinking too much tequila may acquire a profound dislike of the taste and odour of tequila—a phenomenon called **taste aversion conditioning**. The fact that flavours are often associated with so many consequences of eating is important for animals (including rats and humans) that are frequently exposed to new foods. And it is clinically relevant. For example, drugs used in chemotherapy often make cancer patients sick. As a consequence, patients often acquire aversions to foods eaten just before treatment, or

even aversions to such things as the waiting room of the chemotherapy clinic itself (see Bernstein, 1991; Scalera & Bavieri, 2009).

Classical conditioning occurs with a variety of significant events. 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 (see Mineka & Zinbarg, 2006). Here, rather than a physical response (like drooling), the CS triggers an emotion.

Another interesting effect of classical conditioning can occur when we ingest drugs. That is, when a drug is taken, it can be associated with the cues that are present at the same time (e.g., rooms, odours, drug paraphernalia). In this regard, if someone associates a particular smell with the sensation induced by the drug, whenever that person smells the same odour afterward, it may cue responses (physical and/or emotional) related to taking the drug itself. But drug cues have an even more interesting property: They elicit responses that often "compensate" for the upcoming effect of the drug (see Siegel, 1989). For example, morphine itself suppresses pain; however, if someone is used to taking morphine, a cue that signals the "drug is coming soon" can actually make the person more sensitive to pain. Because the person knows a pain suppressant will soon be administered, the body becomes more sensitive, anticipating that "the drug will soon take care of it." Remarkably, such **conditioned compensatory responses** in turn decrease the impact of the drug on the body because the body has become more sensitive to pain.

This conditioned compensatory response has many implications. For instance, a drug user will be most "tolerant" to the drug in the presence of cues that have been associated with it (because such cues elicit compensatory responses). As a result, overdose is usually not due to an increase in dosage, but to taking the drug in a new place without the familiar cues, which would have otherwise allowed the user to tolerate the drug (see Siegel et al., 1982). Conditioned compensatory responses (which include heightened pain sensitivity and decreased body temperature, among others) might also cause discomfort, thus motivating the drug user to continue usage of the drug to reduce them. This is one of several ways classical conditioning might be a factor in drug addiction and dependence.

A final effect of classical cues is that they motivate ongoing operant behaviour (see Balleine, 2005). For example, if a rat has learned via operant conditioning that pressing a lever will give it a drug, in the presence of cues that signal the "drug is coming soon" (like the sound of the lever squeaking), the rat will work harder to press the lever than if those cues weren't present (i.e., there is no squeaking lever sound). Similarly, in the presence of food-associated cues (e.g., smells), a rat (or an overeater) will work harder for food. And finally, even in the presence of negative cues (like something that signals fear), a rat, a human, or any other organism will work harder to avoid those situations that might lead to trauma. Classical CSs thus have many effects that can contribute to significant behavioural phenomena.

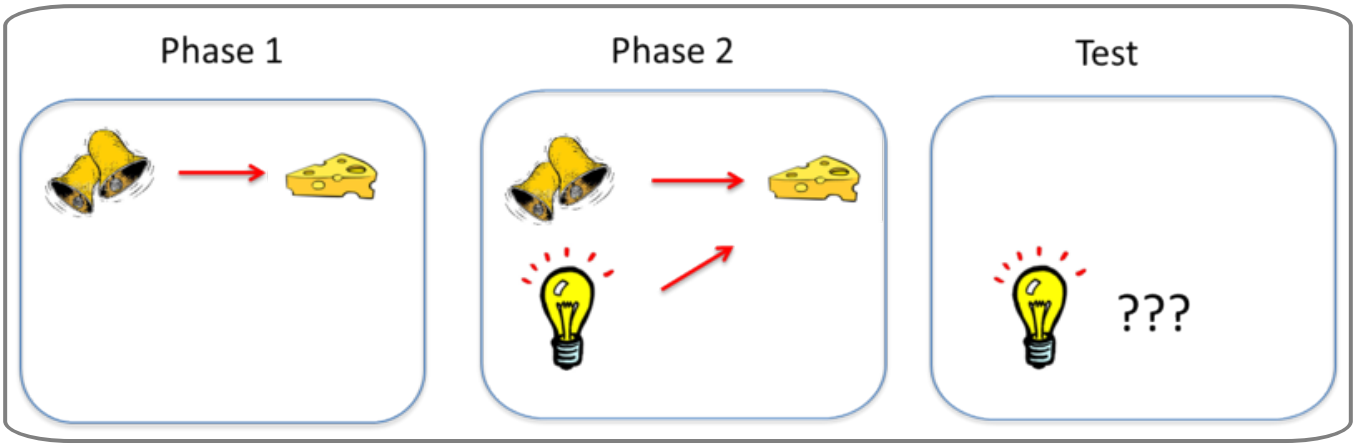

Figure 8.3.1 *Classical Cues. Image by Bernard W. Balleine*

Image Description

Three-panel diagram illustrating phases of classical conditioning. In the first panel, a bell points by a red arrow to a piece of cheese. In the second panel, the bell and a light bulb both point toward the cheese, showing the bell paired with an additional cue. In the third panel, only the light bulb remains, indicating the cue is presented on its own.

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8.4 Operant Conditioning

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 with its consequence. 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 her trainer blows a whistle. The consequence is that she gets a fish.

Classical and Operant Conditioning Compared

Table 8.4.1

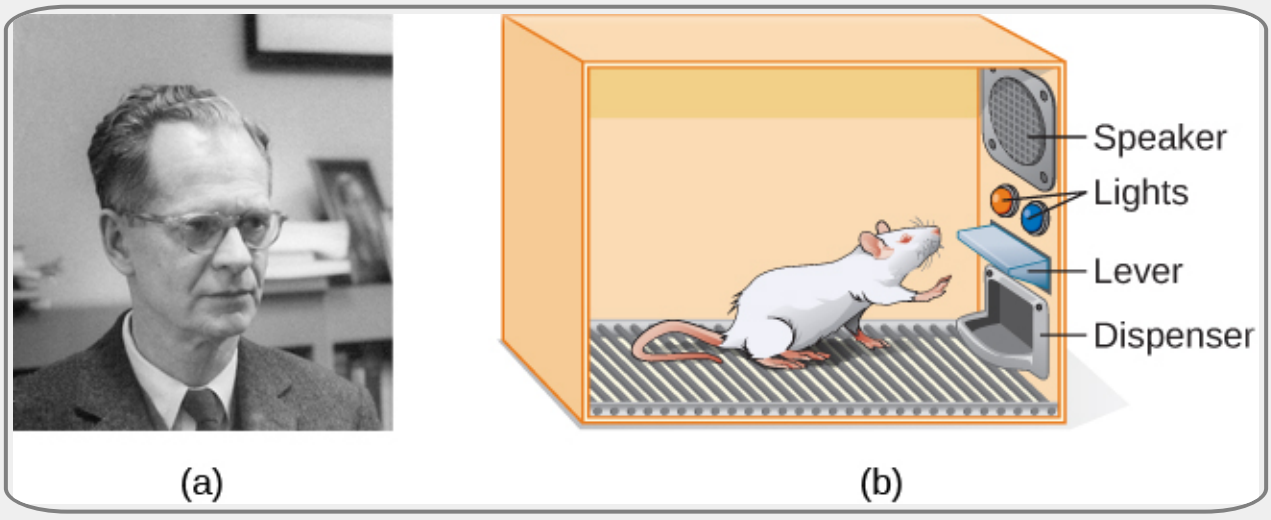
Type	Classical Conditioning	Operant Conditioning
Conditioning approach	An unconditioned stimulus (such as food) is paired with a neutral stimulus (such as a bell). The neutral stimulus eventually becomes the conditioned stimulus, eliciting the conditioned response (salivation).	The target behaviour is followed by reinforcement or punishment to either strengthen or weaken it, thereby increasing the likelihood that the learner will 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.

Consider This

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". A Skinner box contains a lever (for rats) or a 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.



B. F. Skinner is famous for his research on operant conditioning. (b) Modified versions of the operant conditioning chamber, or Skinner box, are still widely used in research settings today. Image: "B.F. Skinner at the Harvard Psychology Department," modification of work by "Silly rabbit," Wikimedia Commons, CC BY 3.0.

Link to Learning

Watch this brief video clip to learn more about operant conditioning: Skinner is interviewed, and operant conditioning of pigeons is demonstrated: Operant Conditioning.

Reinforcement and Punishment

In discussing operant conditioning, we use several everyday words—positive, negative, reinforcement, and punishment—in a specialized 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.

Positive and Negative Reinforcement and Punishment

Table 8.4.2

Type	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.

Here's an Example

You tell your five-year-old son, Jerome, that if he cleans his room, he will get a toy. Jerome quickly cleans his room because he wants 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 paychecks 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 behavior. 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 an aversive 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.

Consider This

Punishment, especially when it is immediate, is one way to decrease undesirable behaviour. For example, imagine your four-year-old son, Brandon, hit his younger brother. You have Brandon write 100 times, "I will not hit my brother" (positive punishment). Chances are he 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 of using physical punishment on children.

First, punishment may teach fear. Brandon may become fearful of the street, but he also may become fearful of the person who delivered the punishment—you, his 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 Brenda when you are angry with her for her misbehaviour, she might start hitting her 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 her 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:

Step 1

Reinforce any response that resembles the desired behaviour.

Step 2

Then reinforce the response that more closely resembles the desired behaviour. You will no longer reinforce the previously reinforced response.

Step 3

Next, begin to reinforce the response that even more closely resembles the desired behaviour.

Step 4

Continue to reinforce closer and closer approximations of the desired behaviour.
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.

Link to Learning
Here is a brief video of Skinner's pigeons playing ping pong: BF Skinner Foundation – Pigeon Ping Pong Clip.

Here's an Example

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

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8.5 Operant Conditioning: Types and Schedules of Reinforcement

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 daughter Sydney, it was the promise of a toy if she cleaned her room. How about Joaquin, the soccer player? If you gave Joaquin a piece of candy every time he made 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 Joaquin 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 are also 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 the 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.

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 he sits, you give him a treat. Timing is important here: you will be most successful if you present the reinforcer immediately after he sits, so that he can make an association between the target behavior (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. 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 the 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 8.4.3

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 Facebook
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. With a variable interval reinforcement schedule, the person or animal gets the reinforcement based on varying amounts of time, which are unpredictable. With a fixed ratio reinforcement schedule, there is a set number of responses that must occur before the behaviour is rewarded. 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. 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. 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.

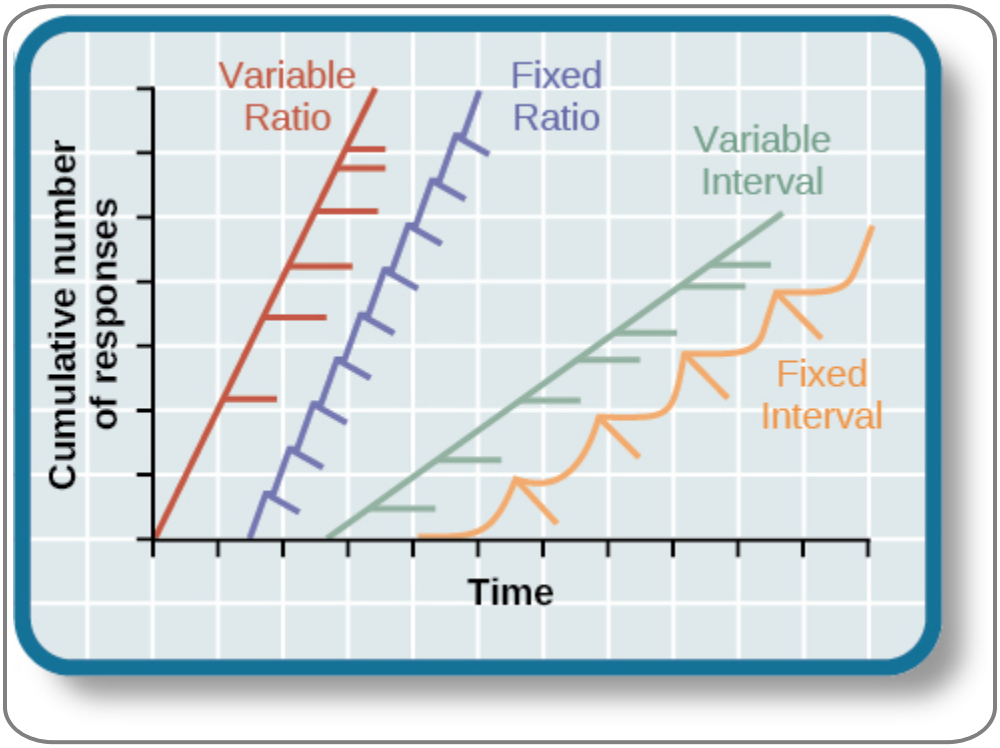

Figure 8.4.1 *The four reinforcement schedules yield different response patterns. The variable ratio schedule is unpredictable and yields high and steady response rates, with little if any pause after reinforcement. A fixed ratio schedule is predictable and produces a high response rate, with a short 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.*

Activity: Test Your Understanding

Quiz Text Description

1. MultiChoice Activity

People enjoy getting messages from their friends on their smartphones. Not every notification, however, is a message from one's friends. It is difficult to predict when a notification will be from one's friends compared to another app sending information through. What type of reinforcement schedule does this represent?

a. Fixed interval
b. Variable interval
c. Variable ratio
d. Fixed ratio

2. MultiChoice Activity

Skinner reinforced a random behaviour in a pigeon using a timer. Every 10 seconds, Skinner would release a food reward for the bird to eat. The pigeon believed that whatever behaviour it had performed when the food pellet was released was the behaviour it needed to do to get the food. The pigeon would repeat that behaviour for the 10 seconds until the next pellet was released (thus reinforcing the behaviour). What type of reinforcement schedule does this represent?

a. Fixed interval
b. Variable ratio
c. Variable interval
d. Fixed ratio

3. MultiChoice Activity

Berry pickers are often paid for how many berries they pick in a day. The more berries they pick, the more money they are paid. What type of reinforcement schedule does this represent?

a. Variable ratio
b. Variable interval
c. Fixed interval
d. Fixed ratio

4. MultiChoice Activity

Radiologists are often paid a certain amount of money for each scan that they read. Technology has increased the number of scans that a radiologist can read in a day. As such, radiologists are paid more money nowadays than they were several years ago. What type of reinforcement does this represent?

a. Fixed interval
b. Variable interval
c. Fixed ratio
d. Variable ratio

5. MultiChoice Activity

Dario works at a coffee shop. Dario soon learns that every customer he serves leaves him a tip regardless of the quality of his service. As such, Dario tries to serve as many customers as he can each hour. What type of reinforcement schedule does this represent?

a. Fixed ratio
b. Fixed interval
c. Variable ratio
d. Variable interval

6. MultiChoice Activity

A theme park in France has recruited crows to pick up trash to help keep the theme park clean (a true story). The theme park managers have trained the crows by rewarding them with food when they bring back trash. Imagine that the number of trash pieces the crows need to bring before they get a reward changes throughout the day. What type of reinforcement schedule does this represent?

a. Variable interval
b. Fixed interval
c. Fixed ratio
d. Variable ratio

7. MultiChoice Activity

Dario works at a coffee shop. He is paid an hourly wage and his wage does not depend on the number of customers he serves. What type of reinforcement schedule does this represent?

a. Variable ratio
b. Fixed interval
c. Variable interval
d. Fixed ratio

8. MultiChoice Activity

Anais likes to go shopping for records. She goes to a record fair where there are thousands of records. After searching through 15 records, she finds one that she really likes. She searches through another 50 records before finding another that she really likes. She looks through 250 records before finding one that she likes and then another 2 records before finding one that she likes. What type of reinforcement schedule does this represent?

a. Fixed ratio
b. Variable ratio
c. Variable interval

d. Fixed interval

9. MultiChoice Activity

Tara goes bird watching at the Reifel Bird Sanctuary just outside of Vancouver, Canada. She looks through her binoculars from one of the bird-watching huts. She sees birds throughout the day, but is unable to predict when she will see them. This is an example of:

a. a variable ratio reinforcement schedule
b. a fixed interval reinforcement schedule
c. positive punishment
d. a variable interval reinforcement schedule
e. a fixed ratio reinforcement schedule

Solution:

1. c. Variable ratio
2. a. Fixed interval
3. d. Fixed ratio
4. c. Fixed ratio
5. a. Fixed ratio
6. d. Variable ratio
7. b. Fixed interval
8. b. Variable ratio
9. d. a variable interval reinforcement schedule

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8.6 Observational Learning

Not all forms of learning are accounted for entirely by classical and operant conditioning. Imagine a child walking up to a group of children playing a game on the playground. The game looks fun, but it is new and unfamiliar. Rather than joining the game immediately, the child opts to sit back and watch the other children play a round or two. Observing the others, the child takes note of the ways in which they behave while playing the game. By watching the behaviour of the other kids, the child can figure out the rules of the game and even some strategies for doing well at the game. This is called **observational learning**.

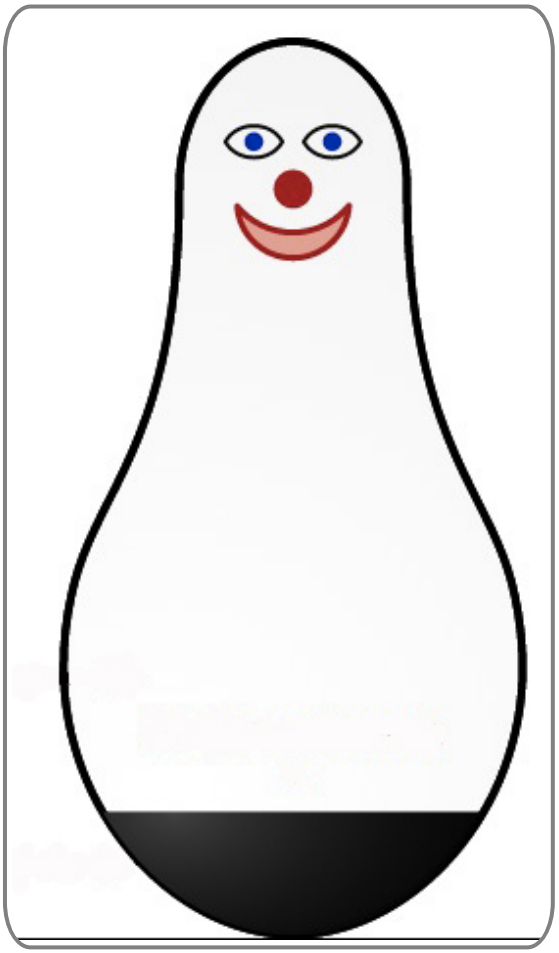
Children observe a social model (an experienced chess player) to learn the rules and strategies of the game of chess. Image "Chess Players" by David R. Tribble, Wikimedia Commons, CC BY-SA 3.0.

Observational learning is a component of Albert Bandura's **Social Learning Theory** (Bandura, 1977), which posits that individuals can learn novel responses via observation of key others' behaviours. Observational learning does not necessarily require reinforcement, but instead hinges on the presence of others, referred to as **social models**. Social models are typically of higher status or authority compared to the observer, examples of which include parents, teachers, and police officers. In the example above, the children who already know how to play the game could be thought of as being authorities—and are therefore social models—even though they are the same age as the observer. By observing how the social models behave, an individual is able to learn how to act in a certain situation. Other examples of observational learning might include a child learning to place her napkin in her lap by watching her parents at the dinner table, or a customer learning where to find the ketchup and mustard after observing other customers at a hot dog stand.

Bandura theorizes that the observational learning process consists of four parts. The first is *attention*—as, quite simply, one must pay attention to what s/he is observing in order to learn. The second part is *retention*: to learn, one must be able to retain the behavior s/he is observing in memory. The third part of observational learning, *initiation*, acknowledges that the learner must be able to execute (or initiate) the learned behaviour. Lastly, the observer must possess the *motivation* to engage in observational learning. In our vignette, the child must want to learn how to play the game in order to properly engage in observational learning.

Researchers have conducted countless experiments designed to explore observational learning, the most famous of which is Albert Bandura's "Bobo Doll Experiment."

While reinforcement was not required to elicit the children's behaviour in Bandura's first experiment, it is important to acknowledge that consequences do play a role within observational learning. A future adaptation of this study (Bandura et al., 1963) demonstrated that children in the aggression group showed less aggressive behaviour if they witnessed the adult model receive punishment for aggressing against Bobo. Bandura referred to this process as **vicarious reinforcement**, as the children did not experience the reinforcement or punishment directly, yet were still influenced by observing it.



An example of a Bobo doll. Modification of the image: "Bobo doll" by Sémhur, Wikimedia Commons, CC-BY-SA-3.0.

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8.7 Chapter Summary

Let's Reflect

In this chapter, we have learned that instincts and reflexes are innate behaviours—they occur naturally and do not involve learning. In contrast, learning is a change in behaviour or knowledge that results from experience. There are three main types of learning: classical conditioning, operant conditioning, and observational learning. Both classical and operant conditioning are forms of associative learning where associations are made between events that occur together. Observational learning is just as it sounds: learning by observing others.

Key Terms

- **Associative Learning**: a form of learning that involves connecting certain stimuli or events that occur together in the environment (classical and operant conditioning).
- **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 behavioural phenomenon and as a method to study simple associative learning. Same as Pavlovian conditioning.
- **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.
- **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."
- **Continuous Reinforcement**: rewarding a behaviour every time it occurs.
- **Extinction**: a decrease in the strength of a learned behaviour that occurs when the conditioned stimulus is presented without the unconditioned stimulus (in classical conditioning) or when the behaviour 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). Behaviours that have been reduced in strength through extinction are said to be "extinguished."
- **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.
- **Fixed Interval Reinforcement Schedule**: behaviour is rewarded after a set amount of time.
- **Fixed Ratio Reinforcement Schedule**: a set number of responses must occur before a behaviour is rewarded.
- **Habituation**: when we learn not to respond to a stimulus that is presented repeatedly without change.
- **Instinct**: unlearned knowledge involving complex patterns of behaviour; instincts are thought to be more prevalent in lower animals than in humans.
- **Law of Effect**: behaviour that is followed by consequences satisfying to the organism will be

repeated, and behaviours that are followed by unpleasant consequences will be discouraged.

- **Learning**: a change in behaviour or knowledge that is the result of experience.
- **Negative Punishment**: taking away a pleasant stimulus to decrease or stop a behaviour.
- **Negative Reinforcement**: taking away an undesirable stimulus to increase a behaviour.
- **Observational Learning**: learning by observing the behaviour of others.
- **Operant Conditioning**: a form of learning in which the stimulus or experience happens after the behaviour is demonstrated.
- **Partial Reinforcement**: rewarding behaviour only some of the time.
- **Positive Punishment**: adding an undesirable stimulus to stop or decrease a behaviour.
- **Positive Reinforcement**: adding a desirable stimulus to increase a behaviour.
- **Primary Reinforcer**: has innate reinforcing qualities (e.g., food, water, shelter, sex).
- **Punishment**: implementation of a consequence in order to decrease a behaviour.
- **Reflex**: an unlearned, automatic response by an organism to a stimulus in the environment.
- **Reinforcement**: implementation of a consequence in order to increase a behaviour.
- **Renewal Effect**: recovery of an extinguished response that occurs when the context is changed after extinction. Especially strong when the change of context involves a return to the context in which conditioning originally occurred. Can occur after extinction in either classical or instrumental conditioning.
- **Secondary Reinforcer**: has no inherent value unto itself and only has reinforcing qualities when linked with something else (e.g., money, gold stars, poker chips).
- **Shaping**: rewarding successive approximations toward a target behaviour.
- **Social Learning Theory**: the theory that people can learn new responses and behaviours by observing the behaviour of others.
- **Social Models**: authorities that are the targets for observation and who model behaviours.
- **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.
- **Stimulus Discrimination**: the ability to respond differently to similar stimuli.
- **Stimulus Generalization**: demonstrating the conditioned response to stimuli that are similar to the conditioned stimulus.
- **Taste Aversion 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.
- **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.
- **Variable Interval Reinforcement Schedule**: behaviour is rewarded after unpredictable amounts of time have passed.
- **Variable Ratio Reinforcement Schedule**: the number of responses differs before a behaviour is rewarded.
- **Vicarious Reinforcement**: learning that occurs by observing the reinforcement or punishment of another person.

Questions for Further Discussion

Critical Thinking Questions

1. Compare and contrast classical and operant conditioning. How are they alike? How do they differ?
   Answer
   Both classical and operant conditioning involve learning by association. In classical conditioning, responses are involuntary and automatic; however, responses are voluntary and learned in operant conditioning. In classical conditioning, the event that drives the behaviour (the stimulus) comes before the behaviour; in operant conditioning, the event that drives the behaviour (the consequence) comes after the behavior. Also, whereas classical conditioning involves an organism forming an association between an involuntary (reflexive) response and a stimulus, operant conditioning involves an organism forming an association between a voluntary behaviour and a consequence.
2. What is the difference between a reflex and a learned behaviour?
   Answer
   A reflex is a behaviour that humans are born knowing how to do, such as sucking or blushing; these behaviours happen automatically in response to stimuli in the environment. Learned behaviours are things that humans are not born knowing how to do, such as swimming and surfing. Learned behaviours are not automatic; they occur as a result of practice or repeated experience in a situation.
3. What is a Skinner box, and what is its purpose?
   Answer
   A Skinner box is an operant conditioning chamber used to train animals such as rats and pigeons to perform certain behaviours, like pressing a lever. When the animals perform the desired behaviour, they receive a reward: food or water.
4. What is the difference between negative reinforcement and punishment?
   Answer
   In negative reinforcement, you are taking away an undesirable stimulus in order to increase the frequency of a certain behaviour (e.g., buckling your seat belt stops the annoying beeping sound in your car and increases the likelihood that you will wear your seatbelt). Punishment is designed to reduce a behaviour (e.g., you scold your child for running into the street in order to decrease the unsafe behaviour)
5. What is shaping, and how would you use shaping to teach a dog to roll over?
   Answer
   Shaping is an operant conditioning method in which you reward closer and closer approximations of the desired behaviour. If you want to teach your dog to roll over, you might reward him first when he sits, then when he lies down, and then when he lies down and rolls onto his back. Finally, you would reward him only when he completes the entire sequence: lying down, rolling onto his back, and then continuing to roll over to his other side.

Personal Application Questions

1. What is your personal definition of learning? How do your ideas about learning compare with the definition of learning presented in this text?
2. What kinds of things have you learned through the process of classical conditioning? Operant conditioning? How did you learn them?
3. Explain the difference between negative reinforcement and punishment, and provide several examples of each based on your own experiences.
4. Think of a behaviour that you have that you would like to change. How could you use behaviour modification, specifically positive reinforcement, to change your behaviour? What is your positive reinforcer?
5. With regard to social learning, do you think people learn violence from observing violence in movies? Why or why not?
6. What do you think you have learned through social learning? Who are your social models?

Activity: Let's Review

Learning Review

Quiz Text Description

1. MultiChoice Activity

Which of the following is an example of a reflex that occurs at some point in the development of a human being?

a. teen socializing
b. child riding a bike
c. infant sucking on a nipple
d. toddler walking

2. MultiChoice Activity

Learning is best defined as a relatively permanent change in behavior that _____.

a. is found only in humans
b. occurs by observing others
c. is innate
d. occurs as a result of experience

3. MultiChoice Activity

Two forms of associative learning are _____ and _____.

a. operant conditioning; observational learning
b. classical conditioning; Pavlovian conditioning
c. classical conditioning; operant conditioning
d. operant conditioning; learning conditioning

4. MultiChoice Activity

In _____ the stimulus or experience occurs before the behavior and then gets paired with the behavior.

a. operant conditioning
b. classical conditioning
c. observational learning
d. associative learning

Solution:

1. c. infant sucking on a nipple
2. d. occurs as a result of experience
3. c. classical conditioning; operant conditioning
4. b. classical conditioning

Classical Conditioning Review

Quiz Text Description

1. DragText Activity

- We often feel happy when we buy something that we want. For example, when we buy food, we often feel excited after buying the food but before we eat it. In this example
    - Money is the _____
    - Food is the _____
    - The feeling of enjoyment / excitement brought on by food is the _____

Possible answers:

- unconditioned response
- unconditioned stimulus
- conditioned stimulus

2. DragText Activity

- We are classically conditioned to our phones. Every time you receive a text from your friend, your phone vibrates.
    - Receiving a text from your friend is the _____
    - Feeling excited when your phone vibrates is the _____
    - The phone vibrating is the _____

Possible answers:

- conditioned response
- unconditioned stimulus
- conditioned stimulus

3. DragText Activity

- Children in school often hear a bell ringing which signifies the end of class. The bell that rings for recess is one that gives students joy.
    - The feeling of joy when the bell rings is the _____
    - Recess (and playing with one's friends) is the _____

- The bell ringing which elicits the feeling of joy is the _____

Possible answers:

- conditioned response
- unconditioned stimulus
- conditioned stimulus

4. DragText Activity

- We often eat at the same time each day. Some days we do not feel hungry (because we may have eaten recently), but then look at the clock, see that it is the time that we usually eat, and we feel hungry.
    - An empty stomach is the _____
    - The clock on the wall telling the time is the _____
    - The feeling of hunger after looking at the clock on the wall is the _____

Possible answers:

- unconditioned stimulus
- conditioned response
- conditioned stimulus

5. DragText Activity

- You sit down to write a final exam. You bring a flask with water in it to the exam. You write the final exam and it is very difficult and you start to feel very anxious. One day later, you sit down to study for your next final exam, and when you place your flask on the desk, you start to feel anxious again.
    - The feeling of anxiety experienced during a difficult exam is the _____
    - The difficult exam is the _____
    - The flask with water is the _____

Possible answers:

- unconditioned stimulus
- conditioned stimulus
- unconditioned response

6. DragText Activity

- Onacona has a pet dog at home. His dog is always excitedly waiting at the door for him when he comes home from university. Onacona wanted to see when his dog comes to the door to see him. Onacona sets up a web cam inside his house, pointed at the door. When reviewing the recording, he sees that his dog runs to the door, wagging their tail when the dog hears the gate squeek open.
    - What is the unconditioned stimulus? _____

    - What is the unconditioned response? _____
    - What is the conditioned stimulus? _____
    - What is the conditioned response? _____

Possible answers:

- The dog's excitement
- The dog's excitement
- The squeeky gate
- Onacona

7. DragText Activity

- A new meme is making the rounds. The meme consists of really bad jokes that make you cringe. In the centre of the meme is a picture of a cat winking. The jokes appear in two lines above and below the cat. After reading through some of the memes, you see the pink cat, and you start cringing. Some examples of this meme can be found here: https://imgur.com/a/9O9h6jO

    - The unconditioned response is _____
    - The conditioned stimulus is _____
    - The unconditioned stimulus is _____
    - The conditioned response is _____

Possible answers:

- cringing
- cringing
- the bad jokes
- the cat

8. DragText Activity

- You meet your friends at the beach during the holidays. Night time comes, you light a fire underneath the stars, and you are happy and relaxed. One of your friends puts on a new song from your favourite musician. It is a week later, and you listen to that song again, and you get the same feeling of happiness and relaxation that you did when you were around the fire. It is now two weeks later, and you listen to that song again, and you get the same feeling of happiness and relaxation that you did when you were around the fire.

    - What is the unconditioned stimulus? _____
    - What is the unconditioned response? _____
    - What is the conditioned stimulus? _____
    - What is the conditioned response? _____

Possible answers:

- feeling happy and relaxed
- the new song
- holidays with friends

- feeling happy and relaxed

Solutions:

1. We often feel happy when we buy something that we want. For example, when we buy food, we often feel excited after buying the food but before we eat it. In this example
    - Money is the ***conditioned stimulus***
    - Food is the ***unconditioned stimulus***
    - The feeling of enjoyment / excitement brought on by food is the ***unconditioned response***
2. We are classically conditioned to our phones. Every time you receive a text from your friend, your phone vibrates.
    - Receiving a text from your friend is the ***unconditioned stimulus***
    - Feeling excited when your phone vibrates is the ***conditioned response***
    - The phone vibrating is the ***conditioned stimulus***
3. Children in school often hear a bell ringing, which signifies the end of class. The bell that rings for recess is one that gives students joy.
    - The feeling of joy when the bell rings is the ***conditioned response***
    - Recess (and playing with one's friends) is the ***unconditioned stimulus***
    - The bell ringing which elicits the feeling of joy is the ***conditioned stimulus***
4. We often eat at the same time each day. Some days we do not feel hungry (because we may have eaten recently), but then look at the clock, see that it is the time that we usually eat, and we feel hungry.
    - An empty stomach is the ***unconditioned stimulus***
    - The clock on the wall telling the time is the ***conditioned stimulus***
    - The feeling of hunger after looking at the clock on the wall is the ***conditioned response***
5. You sit down to write a final exam. You bring a flask with water in it to the exam. You write the final exam, and it is very difficult, and you start to feel very anxious. One day later, you sit down to study for your next final exam, and when you place your flask on the desk, you start to feel anxious again.
    - The feeling of anxiety experienced during a difficult exam is the ***unconditioned response***
    - The difficult exam is the ***unconditioned stimulus***
    - The flask with water is the ***conditioned stimulus***
6. Onacona has a pet dog at home. His dog is always excitedly waiting at the door for him when he comes home from university. Onacona wanted to see when his dog comes to the door to see him. Onacona sets up a webcam inside his house, pointed at the door. When reviewing the recording, he sees that his dog runs to the door, wagging their tail when the dog hears the gate squeek open.
    - What is the unconditioned stimulus? ***Onacona***
    - What is the unconditioned response? ***The dog's excitement***

- What is the conditioned stimulus? ***The squeeky gate***
- What is the conditioned response? ***The dog's excitement***

7. A new meme is making the rounds. The meme consists of really bad jokes that make you cringe. In the centre of the meme is a picture of a cat winking. The jokes appear in two lines above and below the cat. After reading through some of the memes, you see the pink cat, and you start cringing. Some examples of this meme can be found here***cringing***

    - The conditioned stimulus is ***the cat***
    - The unconditioned stimulus is ***the bad jokes***
    - The conditioned response is ***cringing***

8. You meet your friends at the beach during the holidays. Nighttime comes, you light a fire underneath the stars, and you are happy and relaxed. One of your friends puts on a new song from your favourite musician. It is a week later, and you listen to that song again, and you get the same feeling of happiness and relaxation that you did when you were around the fire. It is now two weeks later, and you listen to that song again, and you get the same feeling of happiness and relaxation that you did when you were around the fire.

    - What is the unconditioned stimulus? ***holidays with friends***
    - What is the unconditioned response? ***feeling happy and relaxed***
    - What is the conditioned stimulus? ***the new song***
    - What is the conditioned response? ***feeling happy and relaxed***

Quiz Text Description

1. MultiChoice Activity

Alejandra drank a lot of peppermint tea when she was studying. She always found that she was able to concentrate better when she had a cup of peppermint tea. This association became so strong that when she was struggling to get her work done, she would make herself a cup of peppermint tea, and she would be able to concentrate well again. As such, Alejandra had classically conditioned peppermint tea with the ability to concentrate well.

One day, Alejandra goes to make herself a cup of peppermint tea only to discover that she is out of peppermint tea. She makes herself a cup of basil tea, which is similar in flavour to peppermint tea.

Alejandra finds that the Basil tea helps her to concentrate again, but she does not concentrate as well as when she drinks peppermint tea.

The fact that she is not able to study as well when drinking Basil tea compared to peppermint tea is evidence of

a. extinction
b. a variable ratio reinforcement schedule
c. higher-order conditioning

d. generalization
e. discrimination
f. a fixed ratio reinforcement schedule

2. MultiChoice Activity

Alejandra drank a lot of peppermint tea when she was studying. She always found that she was able to concentrate better when she had a cup of peppermint tea. This association became so strong that when she was struggling to get her work done, she would make herself a cup of peppermint tea, and she would be able to concentrate well again. As such, Alejandra had classically conditioned peppermint tea with the ability to concentrate well.

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Alejandra finds that the Basil tea helps her to concentrate again, but she does not concentrate as well as when she drinks peppermint tea.

The fact that the Basil tea helped Alejandra study better is evidence of

a. extinction
b. discrimination
c. higher-order conditioning
d. a variable ratio reinforcement schedule
e. generalization
f. a fixed ratio reinforcement schedule

3. MultiChoice Activity

You meet your friends at the beach during the holidays. Night time comes, you light a fire underneath the stars, and you are happy and relaxed. One of your friends puts on a new song from your favourite band and you listen to it with your friends a few times over the course of the night. Now, every time you listen to the new song, you feel happy and relaxed.

Now, imagine that you find a sale at the supermarket and you buy 50 cans of soda. Every time you listen to the new song that makes you happy, you happen to be drinking a can of soda. After a while, when you drink the soda without listening to the song, you feel the same sense of happiness and relaxation.

Which process has taken place here?

a. stimulus discrimination
b. extinction
c. second-order conditioning
d. stimulus generalization
e. spontaneous recovery

Solution:

1. e. discrimination
2. e. generalization

3. c. second-order conditioning

Operant Conditioning Review

Quiz Text Description

1. MultiChoice Activity

_____ is when you take away a pleasant stimulus to stop a behavior.

a. positive punishment
b. negative reinforcement
c. negative punishment
d. positive reinforcement

2. MultiChoice Activity

Which of the following is *not* an example of a primary reinforcer?

a. sex
b. water
c. food
d. money

3. MultiChoice Activity

Rewarding successive approximations toward a target behavior is _____.

a. negative reinforcement
b. shaping
c. positive reinforcement
d. extinction

4. MultiChoice Activity

Slot machines reward gamblers with money according to which reinforcement schedule?

a. variable interval
b. fixed interval
c. variable ratio
d. fixed ratio

Solution:

1. b. negative reinforcement
2. d. money

3. b. shaping
4. c. variable ratio

Observational Learning Review

Quiz Text Description

1. MultiChoice Activity

The person who performs a behavior that serves as an example is called a _____.

a. model
b. teacher
c. instructor
d. coach

2. MultiChoice Activity

In Bandura's Bobo doll study, when the children who watched the aggressive model were placed in a room with the doll and other toys, they _____.

a. played nicely with the doll
b. kicked and threw the doll
c. played with tinker toys
d. ignored the doll

3. MultiChoice Activity

Which is the correct order of steps in the modeling process?

a. attention, motivation, retention, reproduction
b. motivation, attention, reproduction, retention
c. motivation, attention, retention, reproduction
d. attention, retention, reproduction, motivation

4. MultiChoice Activity

Who proposed observational learning?

a. John Watson
b. F. Skinner
c. Ivan Pavlov
d. Albert Bandura

Solution:

1. a. model
2. b. kicked and threw the doll
3. d. attention, retention, reproduction, motivation
4. d. Albert Bandura

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CHAPTER 9: MOTIVATION AND EMOTION

Chapter Overview

9.0 Learning Objectives
9.1 Motivation
9.2 Theories of Motivation
9.3 Emotions Defined
9.4 Theories of Emotions
9.5 Chapter Summary

9.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Define motivation.
2. Distinguish between intrinsic and extrinsic motivation.
3. Explain theories of motivation.
4. Define emotion.
5. Differentiate between emotions and mood.
6. Describe the role that limbic structures play in emotional processing.
7. Identify the major theories of emotion.

Chapter Overview

In this chapter, we will explore issues relating to both motivation and emotion. We will begin with a discussion of several theories that have been proposed to explain motivation and why we engage in a given behaviour. You will learn about the physiological needs that drive some human behaviours, as well as the importance of our social experiences in influencing our actions. This chapter will close with a discussion of emotion. You will learn about several theories that have been proposed to explain how emotion occurs, the biological underpinnings of emotion, and the universality of emotions.

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9.1 Motivation

Why do we do the things we do? What motivations underlie our behaviours? **Motivation** describes the wants or needs that direct behaviour toward a goal.

In addition to biological motives, motivations can be **intrinsic** (arising from internal factors) or **extrinsic** (arising from external factors). Intrinsically motivated behaviours are performed because of the sense of personal satisfaction that they bring, while extrinsically motivated behaviours are performed in order to receive something from others.

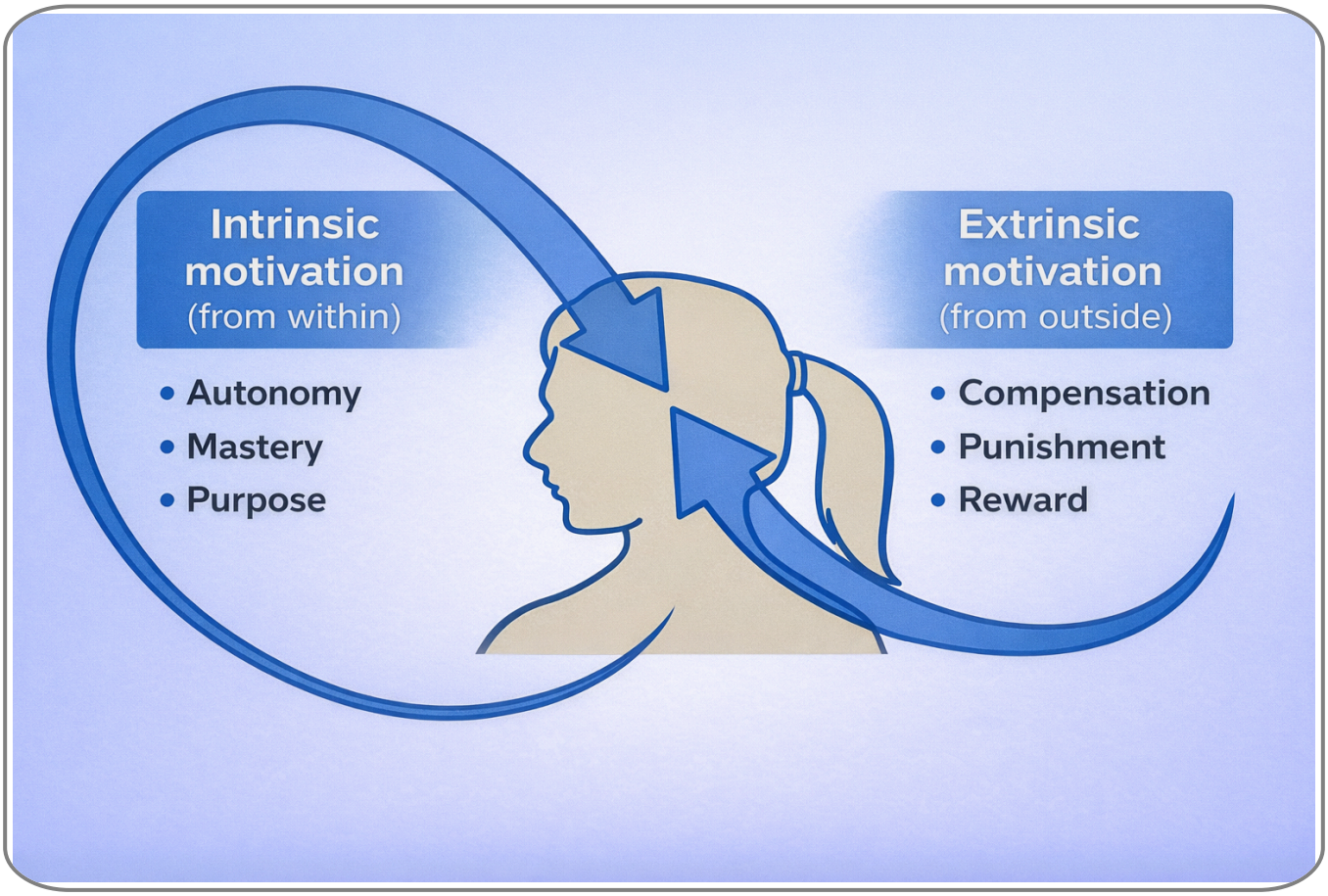

Figure 9.1.1. *Intrinsic motivation comes from within the individual, while extrinsic motivation comes from outside the individual. Modification of work originally by Spielman et al. in Psychology – H5P Edition.*

Here's an Example

Think about why you are currently in college. Are you here because you enjoy learning and want to pursue an education to make yourself a more well-rounded individual? If so, then you are intrinsically motivated. However, if you are here because you want to get a college degree to make yourself more marketable for a high-paying career or to satisfy the demands of your parents, then your motivation is more extrinsic in nature.

In reality, our motivations are often a mix of both intrinsic and extrinsic factors, but the nature of the mix of these factors might change over time (often in ways that seem counterintuitive). There is an old adage: "Choose a job that you love, and you will never have to work a day in your life," meaning that if you enjoy your occupation, work doesn't seem like… well, work. Some research suggests that this isn't necessarily the case (Daniel & Esser, 1980; Deci, 1972; Deci et al.,1999). According to this research, receiving some sort of extrinsic reinforcement (i.e., getting paid) for engaging in behaviours that we enjoy leads to those behaviours being thought of as work, no longer providing that same enjoyment. As a result, we might spend less time engaging in these reclassified behaviours in the absence of any extrinsic reinforcement. This is called the **overjustification effect**—intrinsic motivation is diminished when extrinsic motivation is given. This can lead to extinguishing the intrinsic motivation and creating a dependence on extrinsic rewards for continued performance (Deci et al., 1999). Other studies suggest that intrinsic motivation may not be so vulnerable to the effects of extrinsic reinforcements, and in fact, reinforcements such as verbal praise might actually increase intrinsic motivation (Arnold, 1976; Cameron & Pierce, 1994).

These apparent discrepancies in the researchers' findings may be understood by considering several factors. For one, physical reinforcement (such as money) and verbal reinforcement (such as praise) may affect an individual in very different ways. In fact, tangible rewards (i.e., money) tend to have more negative effects on intrinsic motivation than do intangible rewards (i.e., praise). Furthermore, the expectation of the extrinsic motivator by an individual is crucial: If the person expects to receive an extrinsic reward, then intrinsic motivation for the task tends to be reduced. If, however, there is no such expectation, and the extrinsic motivation is presented as a surprise, then intrinsic motivation for the task tends to persist (Deci et al., 1999).

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In educational settings, students are more likely to experience intrinsic motivation to learn when they feel a sense of belonging and respect in the classroom. This internalization can be enhanced if the evaluative aspects of the classroom are de-emphasized and if students feel that they exercise some control over the learning environment. Furthermore, providing students with activities that are challenging, yet doable, along with a

rationale for engaging in various learning activities, can enhance intrinsic motivation for those tasks (Niemiec & Ryan, 2009).

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OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

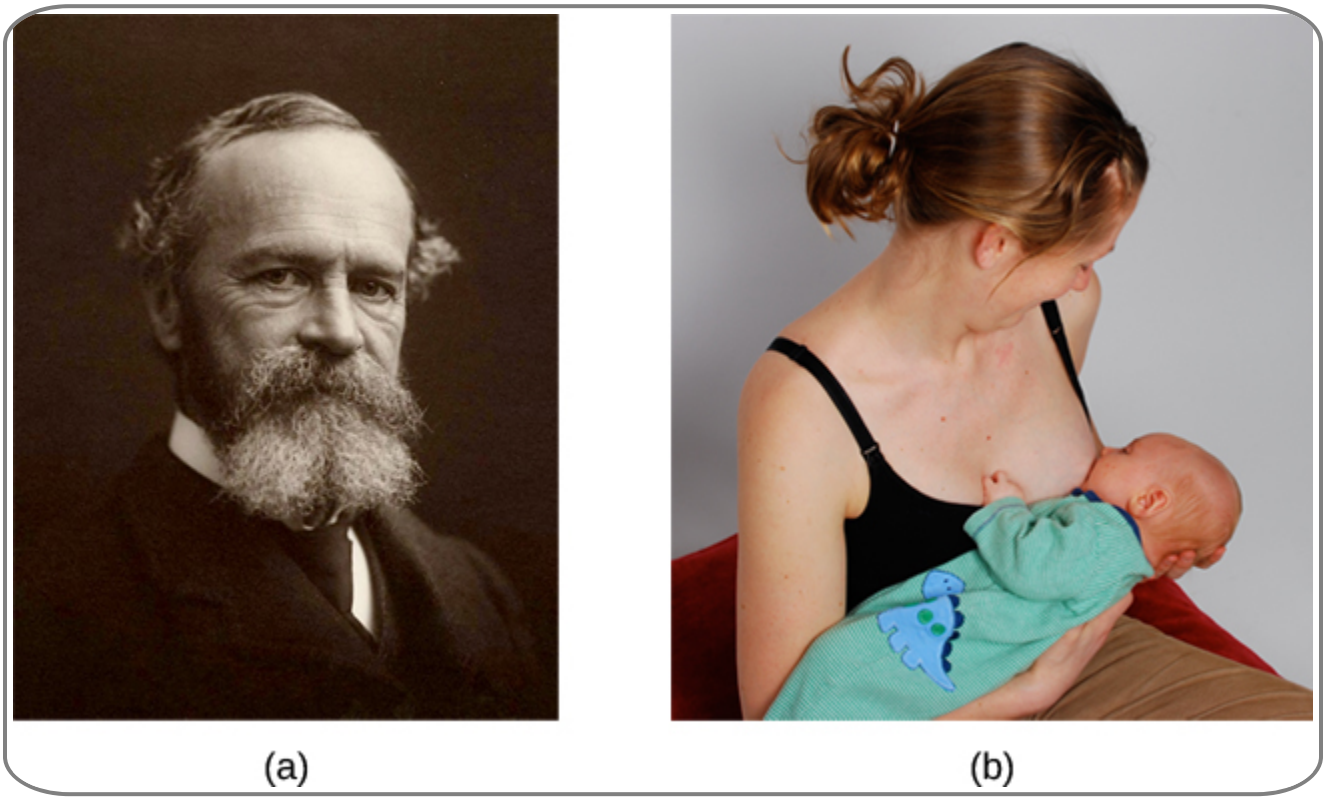
Figure 9.1.1. “Reproduce the attached image exactly, but use the attached light blue background already and the hex code provided. Increase the resolution to 1024×786 as well.”

9.2 Theories of Motivation

Figure 9.2.1. *Theories of Motivation: Instinct Theory, Drive Theory, Arousal Theory, Self-efficacy and Social Motives, and Maslow's Hierarchy of Needs.*

Instinct Theory

William James (1842–1910) was an important contributor to early research into motivation, and he is often referred to as the father of psychology in the United States. James theorized that behaviour was driven by a number of instincts, which aid survival. 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 mother's protection of her 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 of the undeniable role of learning in shaping all sorts of human behaviour. In fact, as early as the 1900s, some instinctive behaviours were experimentally demonstrated to result from associative learning (Faris, 1921).



(a) William James proposed the instinct theory of motivation, asserting that behaviour is driven by instincts. (b) In humans, instincts may include behaviours such as an infant's rooting for a nipple and sucking. Image: modification of "William James," Wikipedia, Public Domain, and "Mothering Touch," by Al van Akker, Flickr, CC BY 2.0.

Drive Theory

Another early theory of motivation proposed that the maintenance of homeostasis is particularly important in directing behaviour. You may recall from your earlier reading that **homeostasis** is the tendency to maintain a balance, or optimal level, within a biological system. In a body system, a control center (which is often part of the brain) receives input from receptors (which are often complexes of neurons). The control center directs effectors (which may be other neurons) to correct any imbalance detected by the control center.

According to the **drive theory of motivation**, deviations from homeostasis create physiological needs. These needs result in psychological drive states that direct behaviour to meet the need and, ultimately, bring the system back to homeostasis.

Here's an Example

If it's been a while since you ate, your blood sugar levels will drop below normal. This low blood sugar will induce a physiological need and a corresponding drive state (i.e., hunger) that will direct you to seek out and consume food. Eating will eliminate the hunger, and, ultimately, your blood sugar levels will return to normal.

Interestingly, drive theory also emphasizes the role that habits play in the type of behavioural response in which we engage. A habit is a pattern of behaviour in which we regularly engage. Once we have engaged in a behaviour that successfully reduces a drive, we are more likely to engage in that behaviour whenever faced with that drive in the future (Graham & Weiner, 1996).

Hunger and subsequent eating are the result of complex physiological processes that maintain homeostasis. Images: "left": modification of "Big bite" by Gracie and Viv, Flickr, CC BY 2.0; "center": modification of work by Steven Depolo; "right": modification of "old lady with sirih" by Monica Renata, Flickr, CC BY 2.0.

Arousal Theory

Extensions of drive theory take into account levels of arousal as potential motivators. As you recall from your study of learning, these theories assert that there is an optimal level of arousal that we all try to maintain. If we are underaroused, we become bored and will seek out some sort of stimulation. On the other hand, if we are overaroused, we will engage in behaviors to reduce our arousal (Berlyne, 1960).

Here's an Example

Most students have experienced this need to maintain optimal levels of arousal over the course of their academic career. Think about how much stress students experience toward the end of the spring semester. They feel overwhelmed with seemingly endless exams, papers, and major assignments that must be completed on time. They probably yearn for the rest and relaxation that awaits them over the extended summer break. However, once they finish the semester, it doesn't take too long before they begin to feel bored. Generally, by the time the next semester is beginning in the fall, many students are quite happy to return to school. This is an example of how arousal theory works.

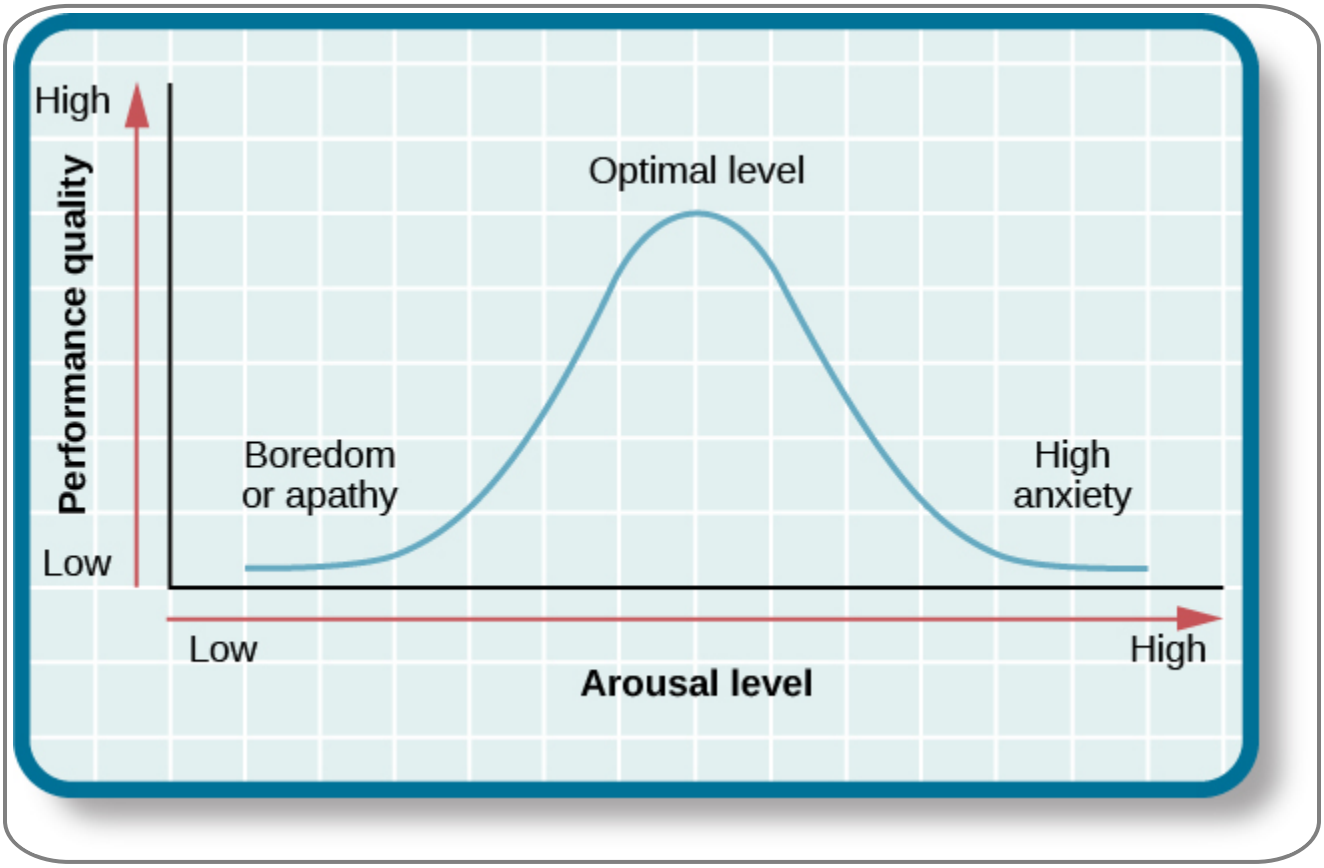


Figure 9.2.2. *The concept of optimal arousal in relation to performance on a task is depicted here. Performance is maximized at the optimal level of arousal, and it tapers off during under- and overarousal.*

Image Description

Graph showing the relationship between arousal level and performance quality. The horizontal axis is labelled "Arousal level," ranging from low on the left to high on the right. The vertical axis is labelled "Performance quality," ranging from low at the bottom to high at the top. A bell-shaped curve rises from low performance at low

arousal, peaks in the middle at an "Optimal level," and then declines again at high arousal. The left side is labelled "Boredom or apathy," and the right side is labelled "High anxiety," illustrating that performance is best at moderate arousal and lower at either extreme.

So what is the optimal level of arousal? What level leads to the best performance? Research shows that moderate arousal is generally best; when arousal is very high or very low, performance tends to suffer (Yerkes & Dodson, 1908).

Here's an Example

Think of your arousal level regarding taking an exam for this class. If your level is very low, such as boredom and apathy, your performance will likely suffer. Similarly, a very high level, such as extreme anxiety, can be paralyzing and hinder performance. Consider the example of a softball team facing a tournament. They are favoured to win their first game by a large margin, so they go into the game with a lower level of arousal and get beaten by a less skilled team.

However, the optimal arousal level is more complex than a simple answer that the middle level is always best. Researchers Robert Yerkes (pronounced "Yerk-EES") and John Dodson discovered that the optimal arousal level depends on the complexity and difficulty of the task to be performed. This relationship is known as the **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.

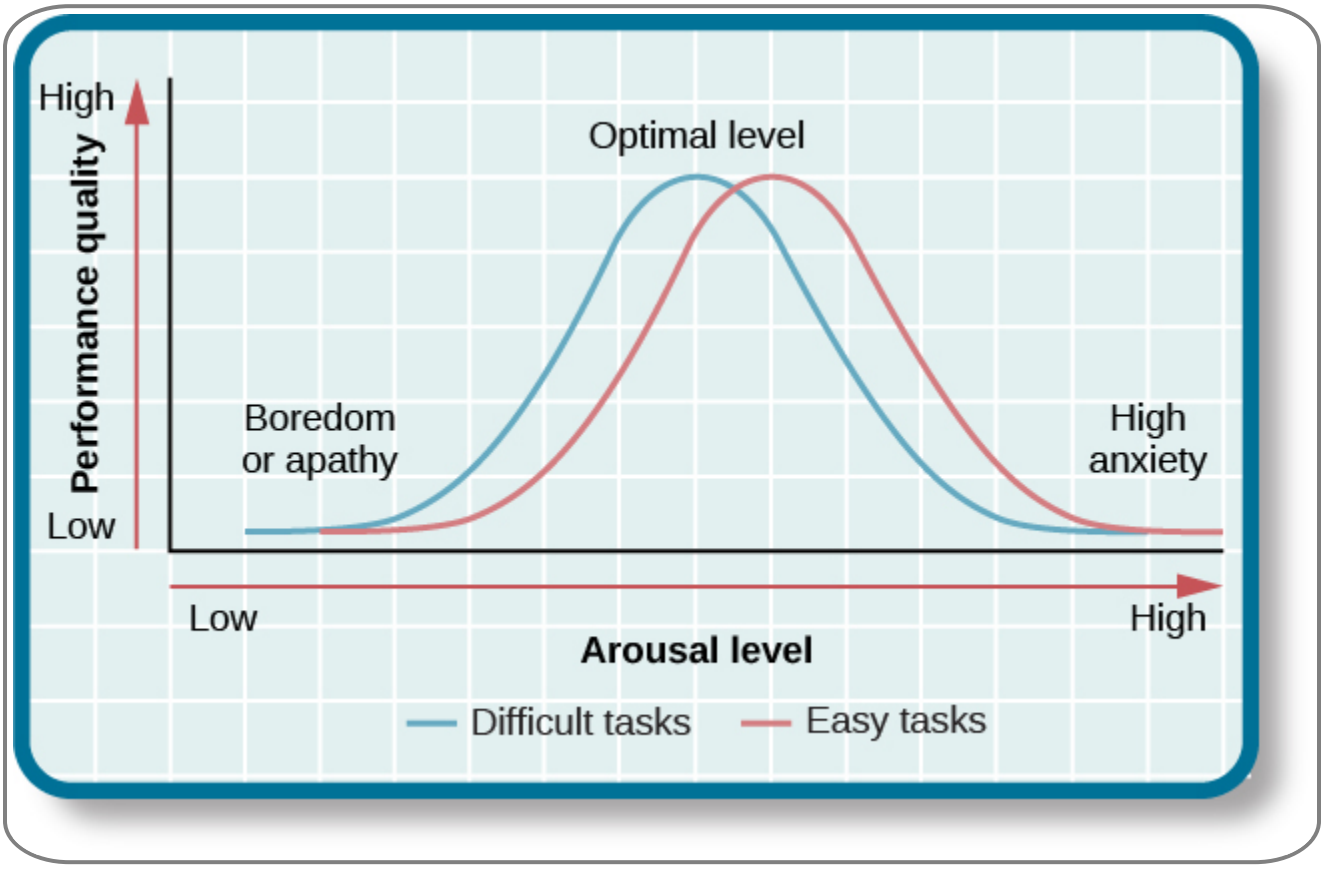


Figure 9.2.3. *Task performance is best when arousal levels are in a middle range, with difficult tasks best performed under lower levels of arousal and simple tasks best performed under higher levels of arousal.*

Image Description

Graph illustrating the Yerkes-Dodson law, showing how arousal level affects performance quality for easy versus difficult tasks. The horizontal axis is labelled "Arousal level," ranging from low to high, and the vertical axis is labelled "Performance quality," ranging from low to high. Two bell-shaped curves are shown. The blue curve, labelled "Difficult tasks," peaks earlier at a moderate arousal level, indicating best performance at lower arousal. The red curve, labelled "Easy tasks," peaks farther to the right, indicating best performance at a higher arousal level. The left side of the graph is labelled "Boredom or apathy," and the right side is labelled "High anxiety." Both curves decline at very low and very high arousal levels.

Self-efficacy and Social Motives

Self-efficacy is an individual's belief in her own capability to complete a task, which may include a previous successful completion of the exact task or a similar task. Albert Bandura (1994) theorized that an individual's sense of self-efficacy plays a pivotal role in motivating behaviour. Bandura argues that motivation derives from expectations that we have about the consequences of our behaviours, and ultimately, it is the appreciation of our capacity to engage in a given behaviour that will determine what we do and the future goals that we set for ourselves. For example, if you have a sincere belief in your ability to achieve at the highest level, you are more likely to take on challenging tasks and to not let setbacks dissuade you from seeing the task through to the end.

A number of theorists have focused their research on understanding social motives (McAdams & Constantian, 1983; McClelland & Liberman, 1949; Murray et al., 1938). Among the motives they describe are needs for achievement, affiliation, and intimacy. It is the need for achievement that drives accomplishment and performance. The need for affiliation encourages positive interactions with others, and the need for intimacy causes us to seek deep, meaningful relationships. Henry Murray et al. (1938) categorized these needs into domains. For example, the need for achievement and recognition falls under the domain of ambition. Dominance and aggression were recognized as needs under the domain of human power, and play was a recognized need in the domain of interpersonal affection.

Maslow's Hierarchy of Needs

While the theories of motivation described earlier relate to basic biological drives, individual characteristics, or social contexts, Abraham Maslow (1943) proposed a hierarchy of needs that spans the spectrum of motives ranging from the biological to the individual to the social. These needs are often depicted as a pyramid.

Maslow and the Canadian Connection

Prior to developing his theory of motivation, Maslow is believed to have visited the Siksika First Nations (Blackfoot) community in Southern Alberta. Modern scholars have since debated the extent to which his hierarchy of needs was influenced by the ways of knowing he learned about in this community. Bear et al. (2022) suggest that the worldview of the Siksika does not align with Maslow's work and that the worldviews presented in Maslow's theory are different from those of the Siksika community.

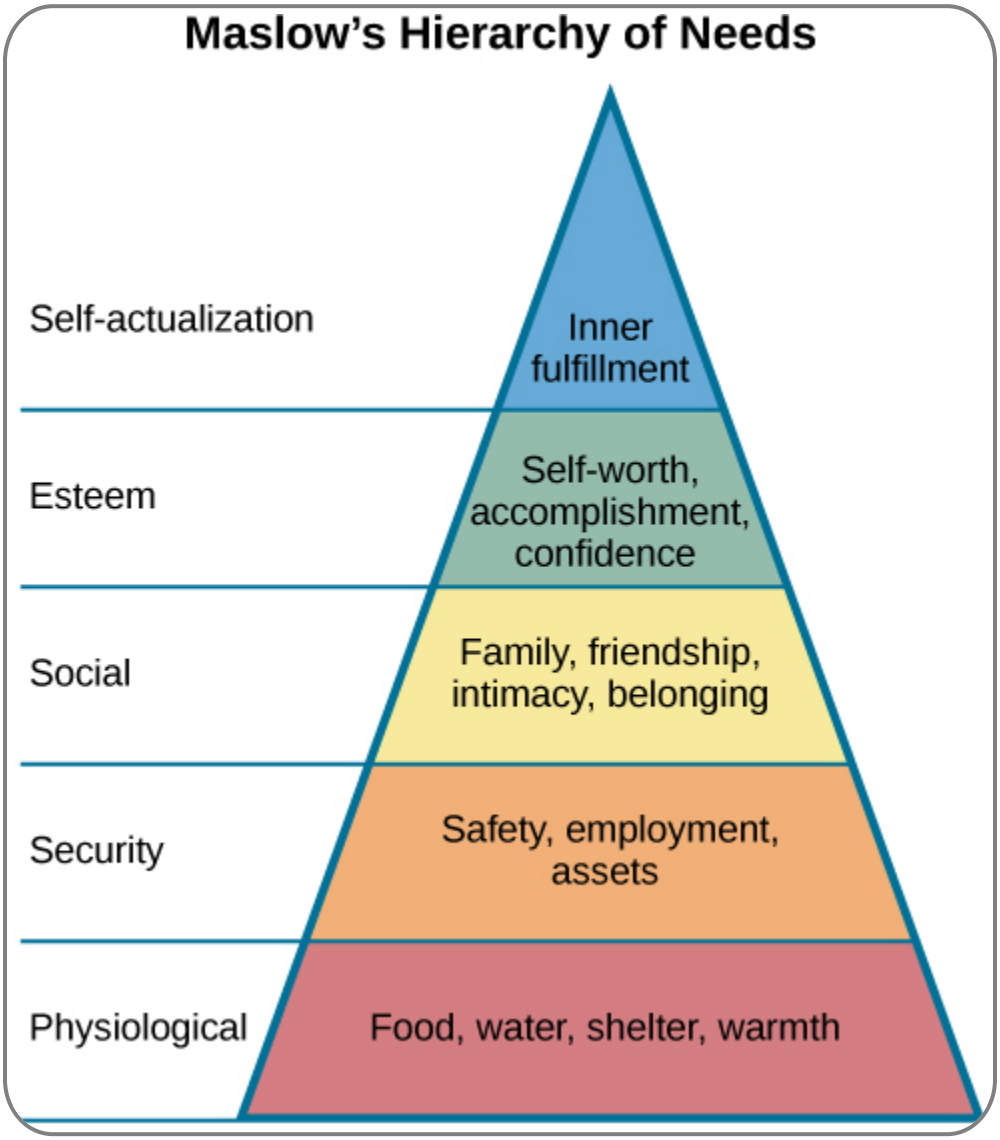


Figure 9.2.4. *In some versions of the pyramid, cognitive and aesthetic needs are also included between esteem and self-actualization. Others include another tier at the top of the pyramid for self-transcendence.*

Image Description

A pyramid diagram showing Maslow's Hierarchy of Needs arranged in five levels from bottom to top. The base level is "Physiological," labelled with food, water, shelter, and warmth. Above that is "Security," labelled with safety, employment, and assets. The middle level is "Social," labelled with family, friendship, intimacy, and belonging. Above that is "Esteem," labelled with self-worth, accomplishment, and confidence. The top level is "Self-actualization," labelled with inner fulfillment. The diagram shows that basic needs form the foundation for higher-level needs.

At the base of the pyramid are the physiological needs necessary for survival. These are followed by basic needs for security and safety, the need to be loved and to feel a sense of belonging, and the need for self-worth and confidence. The top tier of the pyramid is self-actualization, which is a need that essentially equates to achieving one's full potential, and it can only be realized when needs lower on the pyramid have been

met. According to Maslow and humanistic theorists, **self-actualization** reflects the humanistic emphasis on the positive aspects of human nature. Maslow suggested that this is an ongoing, life-long process and that only a small percentage of people actually achieve a self-actualized state (Francis & Kritsonis, 2006; Maslow, 1943).

According to Maslow (1943), one must satisfy lower-level needs before addressing those needs that occur higher in the pyramid. So, for example, if someone is struggling to find enough food to meet his nutritional requirements, it is quite unlikely that he would spend an inordinate amount of time thinking about whether others viewed him as a good person or not. Instead, all of his energies would be geared toward finding something to eat. However, it should be pointed out that Maslow's theory has been criticized for its subjective nature and its inability to account for phenomena that occur in the real world (Leonard, 1982). Other research has more recently addressed that late in life, Maslow proposed a self-transcendence level above self-actualization—to represent striving for meaning and purpose beyond the concerns of oneself (Koltko-Rivera, 2006). For example, people sometimes make self-sacrifices in order to make a political statement or in an attempt to improve the conditions of others.

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OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 9.2.1. "Create an illustration graphic depicting the 5 theories of motivation based on the attached chapter file."

9.3 Emotions Defined

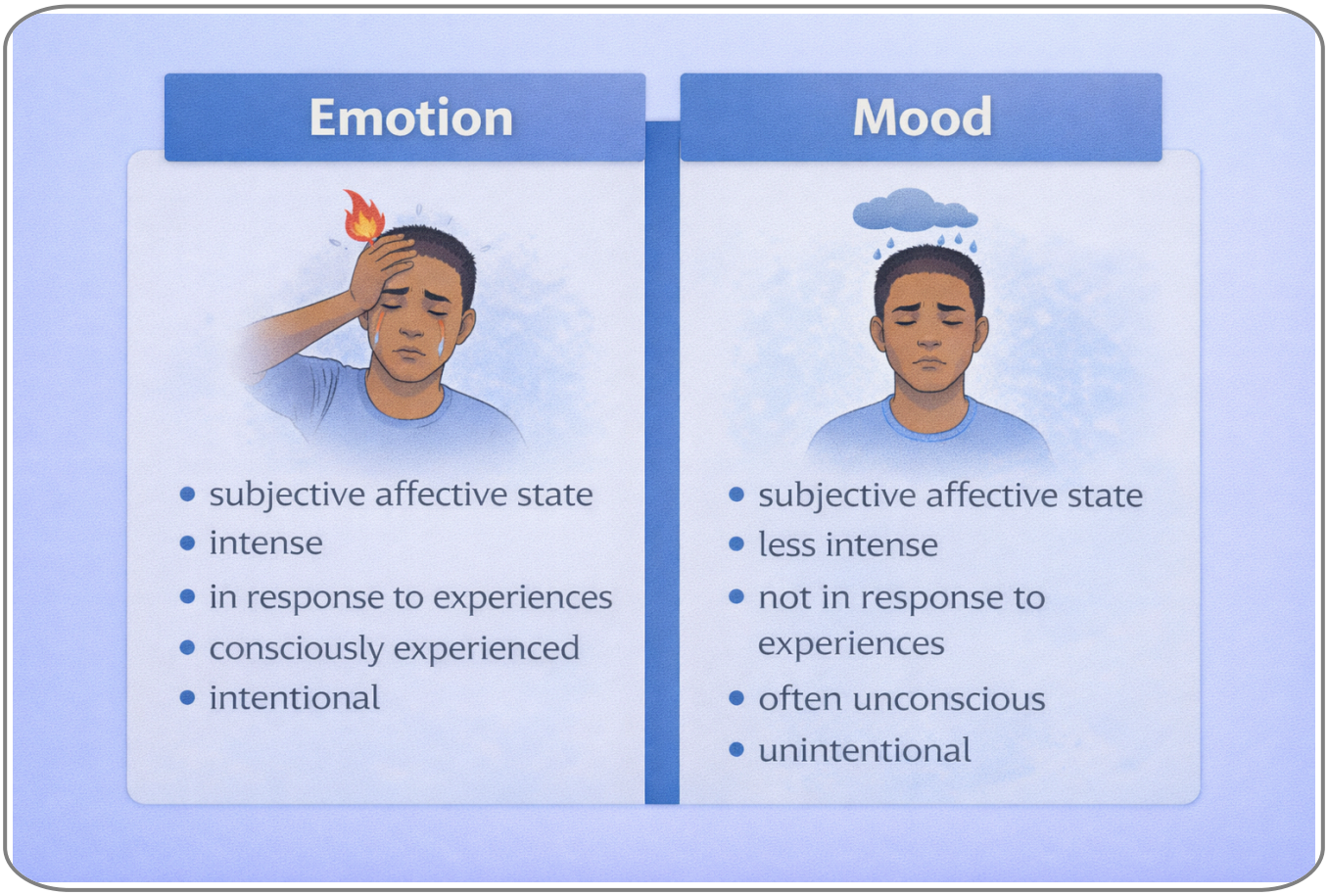

***Figure 9.3.1**. A comparison between emotion and mood.*

Image Description

Infographic comparing emotion and mood on a light blue gradient background. The left panel, titled "Emotion," shows a person crying with a hand on their forehead and a small flame above their head. Bullet points describe emotion as a subjective affective state that is intense, occurs in response to experiences, is consciously experienced, and is intentional. The right panel, titled "Mood," shows the same person with a neutral, downcast expression and a rain cloud above their head. Bullet points describe mood as a subjective affective state that is less intense, not in response to experiences, often unconscious, and unintentional.

As we move through our daily lives, we experience a variety of emotions. An emotion is a subjective state of being that we often describe as our feelings. The words emotion and mood are sometimes used interchangeably, but psychologists use these words to refer to two different things. Typically, the word **emotion** indicates a subjective, affective state that is relatively intense and that occurs in response to something we experience. Emotions are often thought to be consciously experienced and intentional. **Mood**, on the other hand, refers to a prolonged, less intense, affective state that does not occur in response to something we experience. Mood states may not be consciously recognized and do not carry the intentionality that is associated with emotion

(Beedie et al., Terry, Lane, & Devonport, 2011). Here we will focus on emotion, and you will learn more about mood in the chapter that covers psychological disorders.

The Biology of Emotions

Earlier, you learned about the limbic system, which is the area of the brain involved in emotion and memory. The limbic system includes the hypothalamus, thalamus, amygdala, and hippocampus. The hypothalamus plays a role in the activation of the sympathetic nervous system that is a part of any given emotional reaction. The thalamus serves as a sensory relay center whose neurons project to both the amygdala and the higher cortical regions for further processing. The amygdala plays a role in processing emotional information and sending that information on to cortical structures (Fossati, 2012). The hippocampus integrates emotional experience with cognition (Femenía et al., 2012).

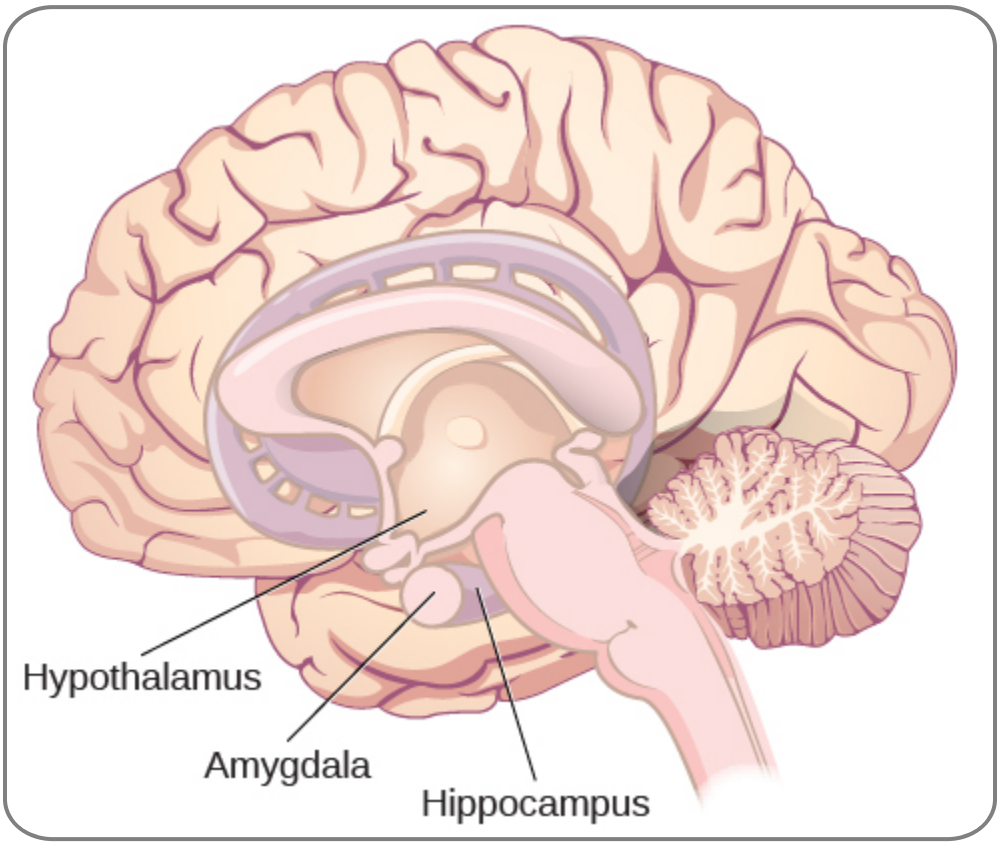

Figure 9.3.2. *The limbic system*

What are the Basic and Secondary Emotions?

The most basic emotions in the scientific literature are anger, disgust, fear, happiness, sadness, and surprise. These basic emotions 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 9.3.3). 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 9.3.3, and in part by whether they are pleasant or unpleasant feelings — termed valence — as seen on the horizontal axis of Figure 9.3.3.

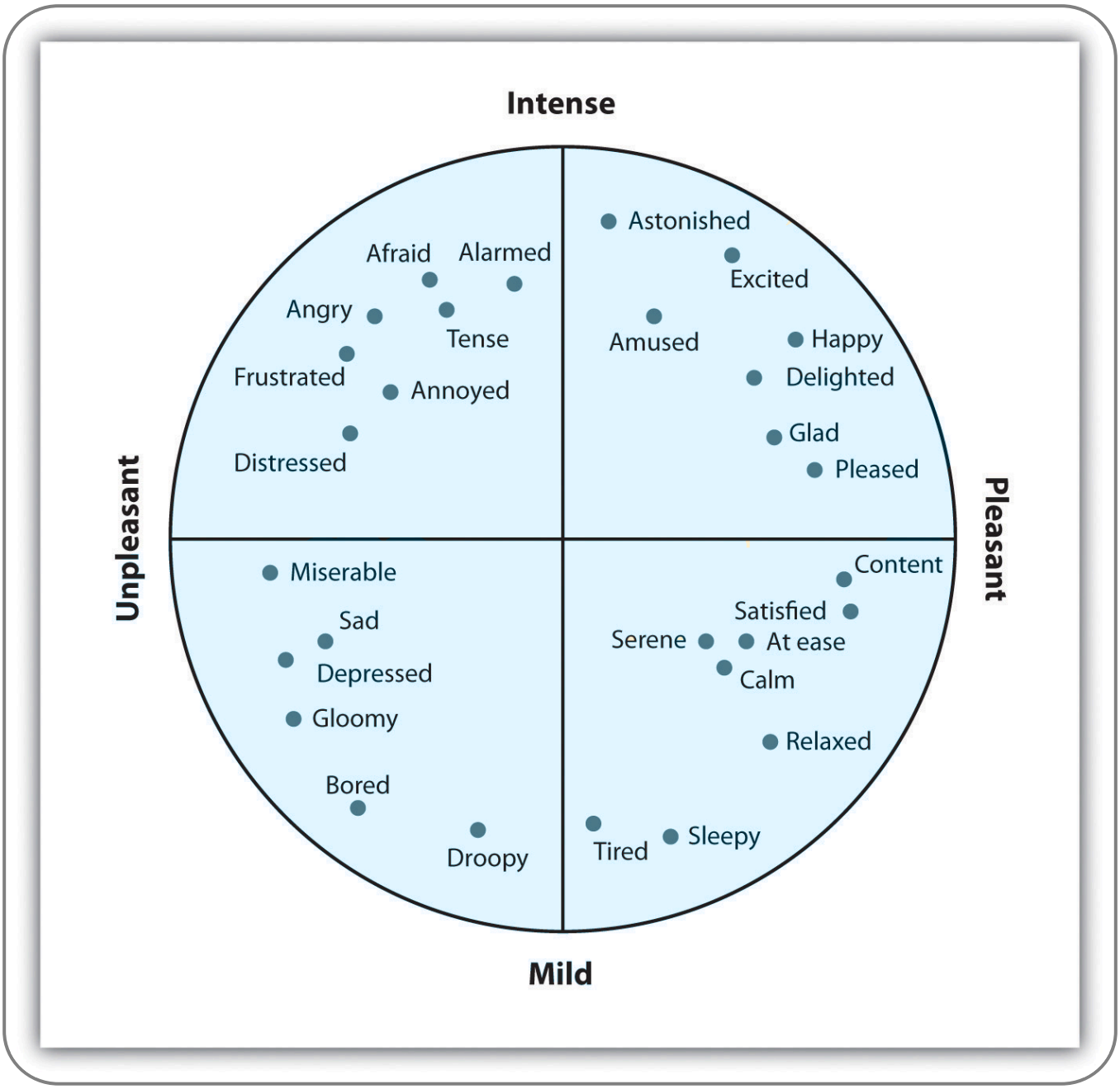

Figure 9.3.3 *The secondary emotions are those that have a major cognitive component. They are determined by both their level of arousal, ranging from mild to intense, and their valence, ranging from pleasant to unpleasant (Russell, 1980). Image: Psychology – 1st Canadian Ed., Sally Walters, CC BY-NC-SA 4.0. Colour altered from original.*

Image Description

A circular diagram showing how secondary emotions vary in pleasantness and intensity. The vertical axis ranges from Intense at the top to Mild at the bottom, and the horizontal axis ranges from Unpleasant on the left to Pleasant on the right. Dots with emotion labels are scattered in four quadrants: in the intense–unpleasant area are emotions such as afraid, alarmed, angry, tense, annoyed, frustrated, and distressed; in the mild–unpleasant area are miserable, sad, depressed, gloomy, and bored; in the intense–pleasant area are astonished, excited, amused, happy, delighted, glad, and pleased; and in the mild–pleasant area are content, satisfied, at ease, serene, calm, relaxed, tired, droopy, and sleepy.

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.

Here's an Exxample

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 9.3.4), 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 integra-

tion, 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.

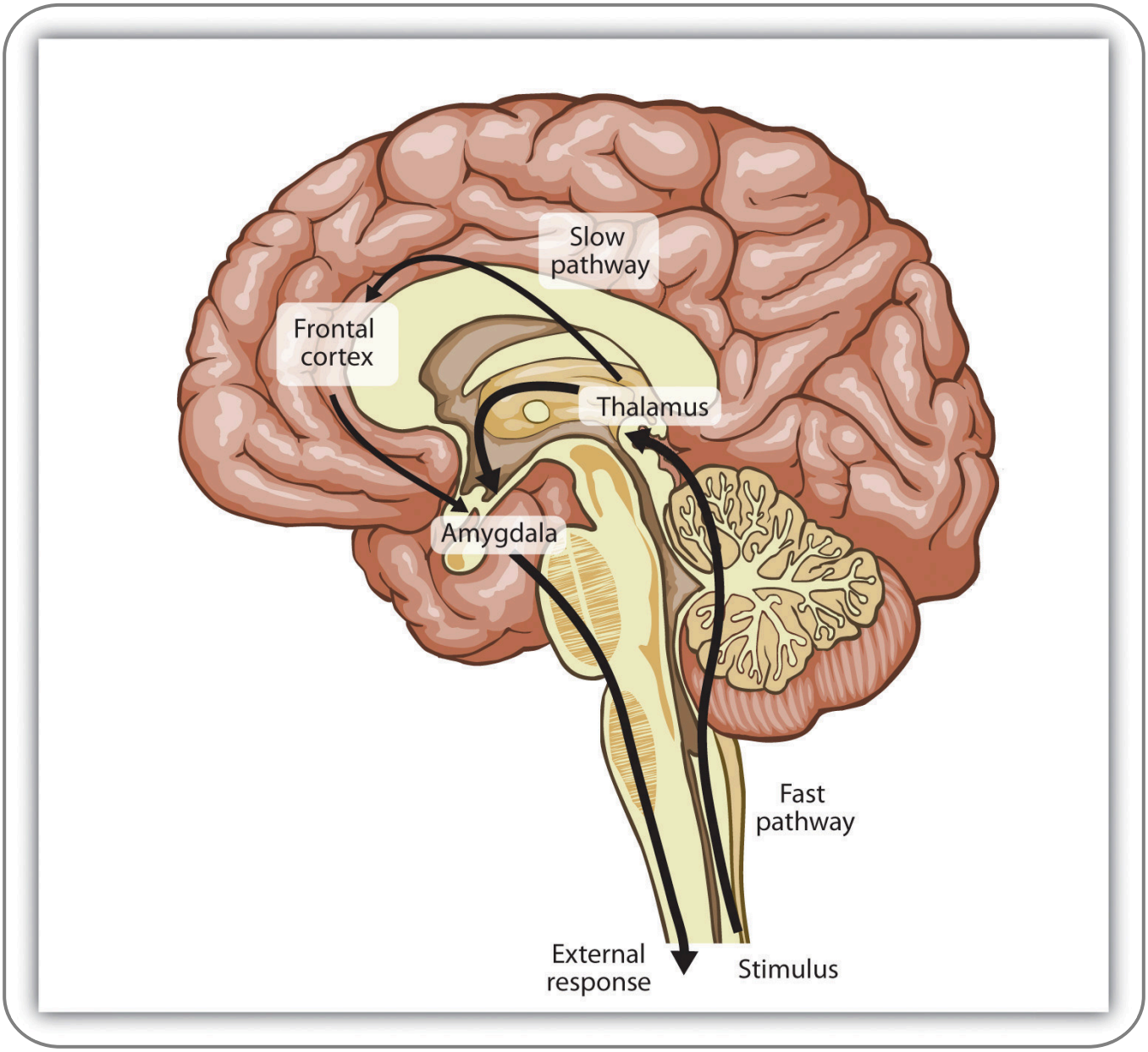

Figure 9.3.4. *There are two emotional pathways in the brain — one slow and the other fast — both of which are controlled by the thalamus. Image: Psychology – 1st Canadian Ed., Sally Walters, CC BY-NC-SA 4.0.*

Image Description

A side-view diagram of the human brain showing two routes for emotional processing. A stimulus enters at the bottom and travels first to the thalamus, which then sends information along a fast pathway directly down to the amygdala, producing an immediate external response. At the same time, the thalamus sends the information along a slow pathway up to the frontal cortex, where the stimulus is evaluated more carefully before influencing the amygdala and shaping a more considered emotional reaction.

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).

Facial Expression and Recognition of Emotions

Culture can impact the way in which people display emotion. A cultural display rule is one of a collection of culturally specific standards that govern the types and frequencies of displays of emotions that are acceptable (Malatesta & Haviland, 1982). Therefore, people from varying cultural backgrounds can have very different cultural display rules of emotion. For example, research has shown that individuals from the United States express negative emotions like fear, anger, and disgust both alone and in the presence of others, while Japanese individuals only do so while alone (Matsumoto, 1990). Furthermore, individuals from cultures that tend to emphasize social cohesion are more likely to engage in suppression of emotional reaction so they can evaluate which response is most appropriate in a given context (Matsumoto, Yoo, & Nakagawa, 2008).

Other distinct cultural characteristics might be involved in emotionality. For instance, there may be gender differences involved in emotional processing. While research into gender differences in emotional display is equivocal, there is some evidence that men and women may differ in the regulation of emotions (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008).

Despite different emotional display rules, our ability to recognize and produce facial expressions of emotion appears to be universal. In fact, even congenitally blind individuals produce the same facial expressions of emotions, despite their never having the opportunity to observe these facial displays of emotion in other people. This would seem to suggest that the pattern of activity in facial muscles involved in generating emotional expressions is universal, and indeed, this idea was suggested in the late 19th century in Charles Darwin's book *The Expression of Emotions in Man and Animals* (1872). In fact, there is substantial evidence for seven universal emotions that are each associated with distinct facial expressions. These include: happiness, surprise, sadness, fright, disgust, contempt, and anger (Ekman & Keltner, 1997).

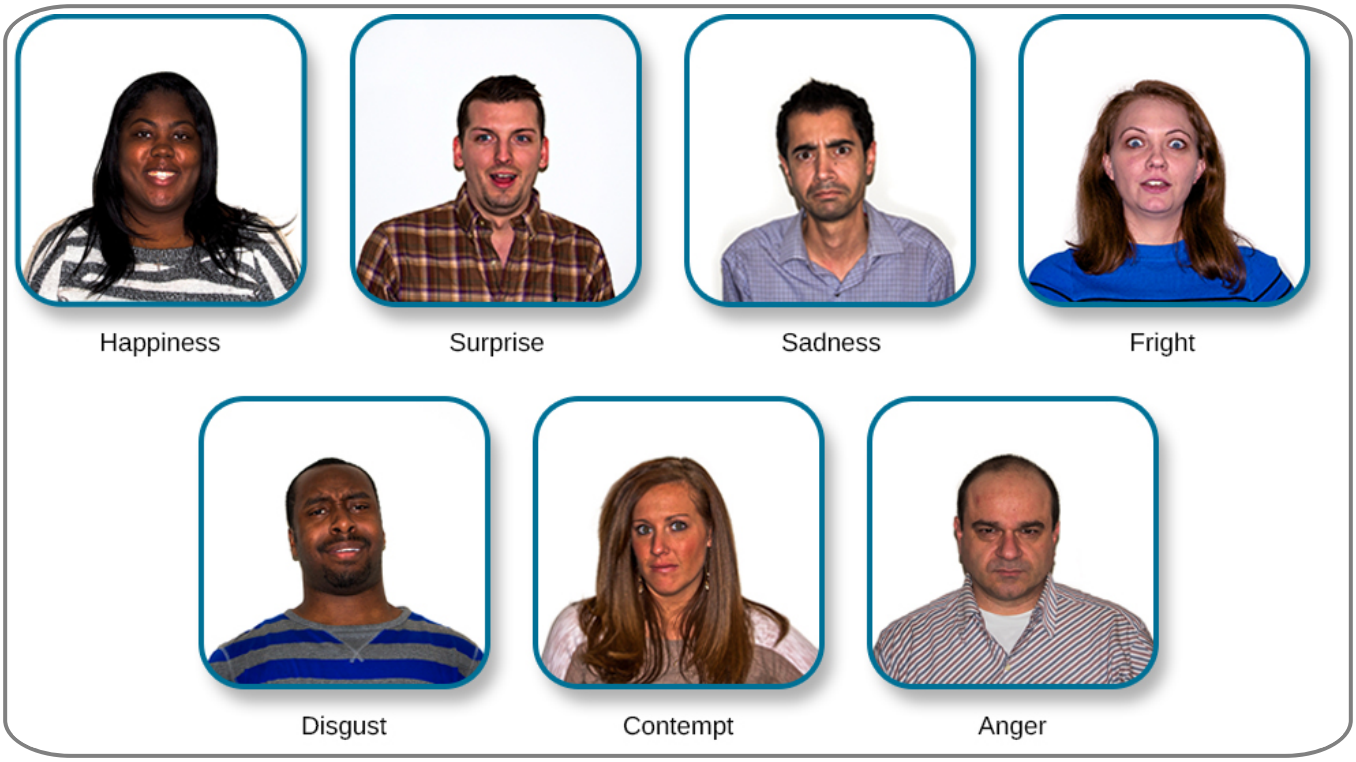

Figure 9.3.5. *The seven universal facial expressions of emotion are shown. (credit: modification of work by Cory Zanker). Image: Psychology 2E, OpenStax, CC BY 4.0.*

Does smiling make you happy? Or does being happy make you smile? The facial feedback hypothesis asserts that facial expressions are capable of influencing our emotions, meaning that smiling can make you feel happier (Buck, 1980; Soussignan, 2001; Strack, Martin, & Stepper, 1988). Recent research explored how Botox, which paralyzes facial muscles and limits facial expression, might affect emotion. Havas, Glenberg, Gutowski, Lucarelli, and Davidson (2010) discovered that depressed individuals reported less depression after paralysis of their frowning muscles with Botox injections.

Of course, emotion is not only displayed through facial expression. We also use the tone of our voices, various behaviours, and body language to communicate information about our emotional states. Body language is the expression of emotion in terms of body position or movement. Research suggests that we are quite sensitive to the emotional information communicated through body language, even if we're not consciously aware of it (de Gelder, 2006; Tamietto et al., 2009).

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What are the Basic and Secondary Emotions? was adapted from "What are Emotions?" in Introduction to Psychology Copyright © 2024 by Jessica Motherwell McFarlane, Amelia Liangzi Shi, Dinesh Ramoo, and Tareq Yousef, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted.

OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 9.3.1. “Create an illustration graphic depicting the differences between emotion and mood based on the attached information.”

9.4 Theories of Emotions

Our emotional states are combinations of physiological arousal, psychological appraisal, and subjective experiences. Together, these are known as the components of emotion. These appraisals are informed by our experiences, backgrounds, and cultures. Therefore, different people may have different emotional experiences even when faced with similar circumstances. Over time, several different theories of emotion have been proposed to explain how the various components of emotion interact with one another.

The James-Lange theory of emotion asserts that emotions arise from physiological arousal. Recall what you have learned about the sympathetic nervous system and our fight or flight response when threatened. If you were to encounter some threat in your environment, like a venomous snake in your backyard, your sympathetic nervous system would initiate significant physiological arousal, which would make your heart race and increase your respiration rate. According to the James-Lange theory of emotion, you would only experience a feeling of fear after this physiological arousal had taken place. Furthermore, different arousal patterns would be associated with different feelings.

Other theorists, however, doubted that the physiological arousal that occurs with different types of emotions is distinct enough to result in the wide variety of emotions that we experience. Thus, the Cannon-Bard theory of emotion was developed. According to this view, physiological arousal and emotional experience occur simultaneously, yet independently (Lang, 1994). So, when you see the venomous snake, you feel fear at exactly the same time that your body mounts its fight or flight response. This emotional reaction would be separate and independent of the physiological arousal, even though they co-occur.

The James-Lange and Cannon-Bard theories have each garnered some empirical support in various research paradigms. For instance, Chwalisz, Diener, and Gallagher (1988) conducted a study of the emotional experiences of people who had spinal cord injuries. They reported that individuals who were incapable of receiving autonomic feedback because of their injuries still experienced emotion; however, there was a tendency for people with less awareness of autonomic arousal to experience less intense emotions. More recently, research investigating the facial feedback hypothesis suggested that suppression of facial expression of emotion lowered the intensity of some emotions experienced by participants (Davis, Senghas, & Ochsner, 2009). In both of these examples, neither theory is fully supported because physiological arousal does not seem to be necessary for the emotional experience, but this arousal does appear to be involved in enhancing the intensity of the emotional experience.

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 venomous snake in your backyard, the two-factor theory maintains that the snake elicits sympathetic nervous system activation that is labelled as fear, given the context, and our experience is that of fear.

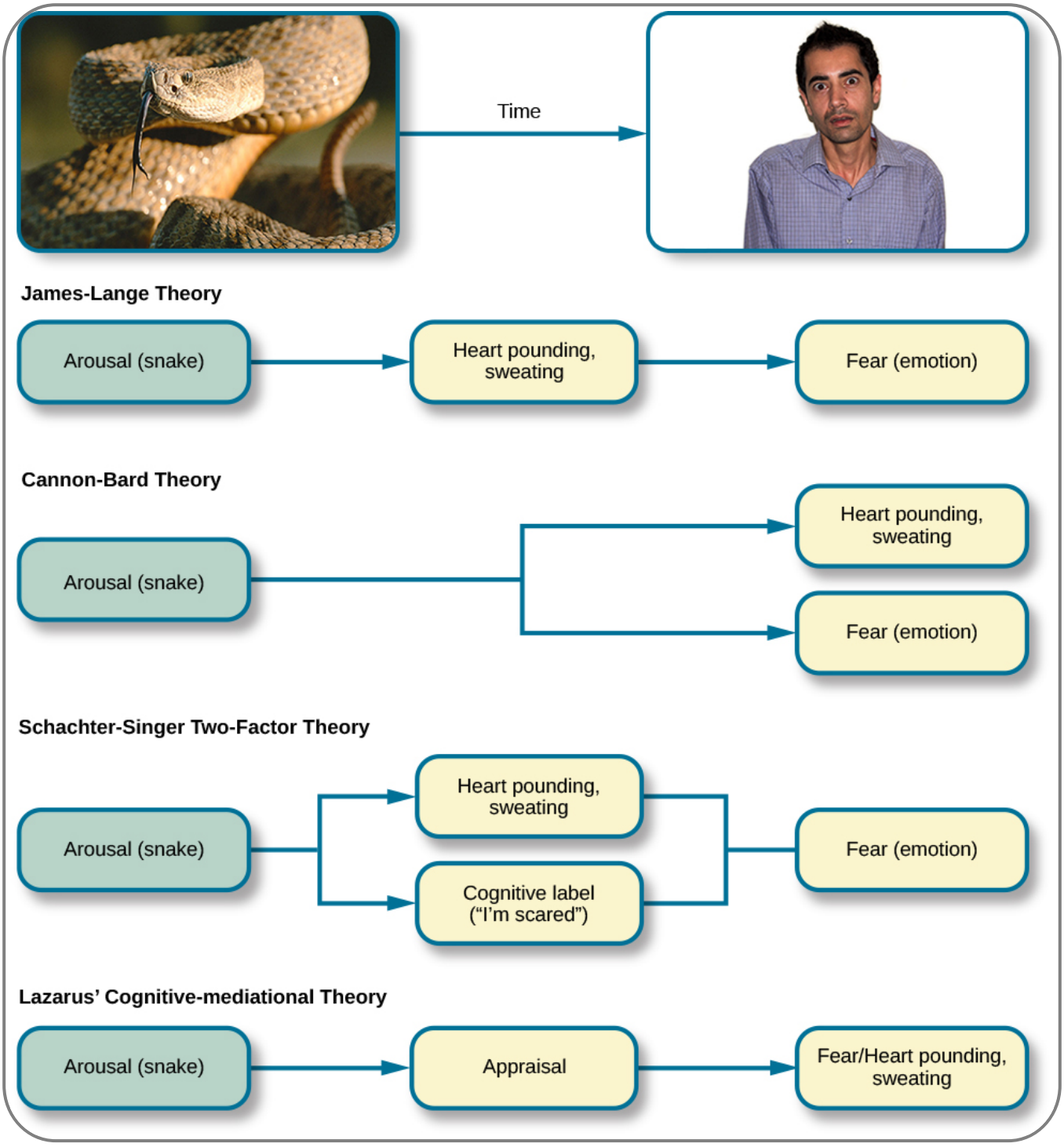

Figure 9.4.1. *This figure illustrates the major assertions of the James-Lange, Cannon-Bard, and Schachter-Singer two-factor theories of emotion. Image: "Rattlesnake," modification of work by "tableatny," Flickr, CC BY 2.0; "Face," modification of work by Cory Zanker, Psychology – H5P Edition, CC BY 4.0.*

It is important to point out that 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).

To test their idea, Schachter and Singer performed a clever experiment. Male 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 men were told to expect these reactions as side effects of the injection. The other men who 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 behavior (Schachter & Singer, 1962).

When those subjects 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 how their confederate behaved), they reported none. However, the men 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 behavior. While everyone that 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. This has led some to suggest that the signs of physiological arousal, which include increased heart rate, respiration rate, and sweating, might serve as a tool to determine whether someone is telling the truth or not. 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).

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** that asserts our emotions are determined by our appraisal of the stimulus. This appraisal mediates between the stimulus and the emotional response, and it is immediate and often unconscious. In contrast to the Schachter-Singer model, the appraisal precedes a cognitive label. You will learn more about Lazarus's appraisal concept when you study stress, health, and lifestyle.

Two other prominent views arise from the work of Robert Zajonc and Joseph LeDoux. Zajonc asserted that some emotions occur separately from or prior to our cognitive interpretation of them, such as feeling fear in response to an unexpected loud sound (Zajonc, 1998). He also believed in what we might casually refer to as a gut feeling—that we can experience an instantaneous and unexplainable like or dislike for someone or something (Zajonc, 1980). 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 of the details of the stimulus. In the following section, we will look more closely at the neuroscience of emotional response.

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9.5 Chapter Summary

Let's Reflect

In this chapter, we learned that motivation to engage in a given behaviour can come from internal and/or external factors. Multiple theories have been put forward regarding motivation. More biologically oriented theories deal with the ways that instincts and the need to maintain bodily homeostasis motivate behaviour. Bandura postulated that our sense of self-efficacy motivates behaviours, and there are a number of theories that focus on a variety of social motives. Abraham Maslow's hierarchy of needs is a model that shows the relationship among multiple motives that range from lower-level physiological needs to the very high level of self-actualization.

We also learned that emotions are subjective experiences that consist of physiological arousal and cognitive appraisal. Various theories have been put forward to explain our emotional experiences. The James-Lange theory asserts that emotions arise as a function of physiological arousal. The Cannon-Bard theory maintains that emotional experience occurs simultaneously with and independent of physiological arousal. The Schachter-Singer two-factor theory suggests that physiological arousal receives cognitive labels as a function of the relevant context and that these two factors together result in an emotional experience.

Finally, we learned that the limbic system is the brain's emotional circuit, including the amygdala and the hippocampus.

Key Terms

- **Cannon-Bard Theory of Emotion**: physiological arousal and emotional experience occur at the same time.
- **Cognitive-Mediational Theory**: our emotions are determined by our appraisal of the stimulus.
- **Components of Emotion**: arousal, psychological appraisal, and subjective experience.
- **Drive Theory**: deviations from homeostasis create physiological needs that result in psychological drive states that direct behaviour to meet the need and ultimately bring the system back to homeostasis.
- **Extrinsic Motivation**: motivation that arises from external factors or rewards.
- **Habit**: a pattern of behaviour in which we regularly engage.
- **Hierarchy of Needs**: a spectrum of needs ranging from basic biological needs to social needs to self-actualization.
- **Instinct**: species-specific pattern of behaviour that is unlearned.
- **Intrinsic Motivation**: motivation based on internal feelings rather than external rewards.
- **James-Lange Theory of Emotion**: emotions arise from physiological arousal.
- **Motivation**: wants or needs that direct behaviour toward some goal.
- **Overjustification Effect**: intrinsic motivation is diminished when extrinsic motivation is given.
- **Schachter-Singer Two-Factor Theory of Emotion**: emotions consist of two factors: physiological and cognitive.
- **Self-Efficacy**: an individual's belief in their own capabilities or capacities to complete a task.
- **Yerkes-Dodson Law**: simple tasks are performed best when arousal levels are relatively high, while complex tasks are best performed when arousal is lower.

Questions for Further Discussion

Critical Thinking Questions

1. How might someone espousing an arousal theory of motivation explain visiting an amusement park?
   Hint
   The idea of optimal levels of arousal is similar to a drive theory of motivation. Presumably, we all seek to maintain some intermediate level of arousal. If we are underaroused, we are bored. If we are overaroused, we experience stress. The rides at an amusement park would provide higher arousal (however, we would hope that these rides don't actually pose significant threats to personal safety that would lead to a state of panic) to push us toward our own optimal level of arousal. Individuals at the park would choose different rides based on their specific arousal thresholds; for example, one person might find a simple water ride optimally arousing and an extreme roller coaster overarousing, while others would find the extreme roller coaster optimally arousing.
2. Schools often use concrete rewards to increase adaptive behaviors. How might this be a disadvantage for students intrinsically motivated to learn? What are educational implications of the potential for concrete rewards to diminish intrinsic motivation for a given task?
   Hint
   We would expect to see a shift from learning for the sake of learning to learning to earn some reward. This would undermine the foundation upon which traditional institutions of higher education are built. For a student motivated by extrinsic rewards, dependence on those may pose issues later in life (post-school) when there are not typically extrinsic rewards for learning.
3. Imagine you find a venomous snake crawling up your leg just after taking a drug that prevents sympathetic nervous system activation. What would the James-Lange theory predict about your experience?
   Hint
   The James-Lange theory would predict that I would not feel fear because I haven't had the physiological arousal necessary to induce that emotional state.
4. Why can we not make causal claims regarding the relationship between the volume of the hippocampus and PTSD?
   Hint
   The research that exists is correlational in nature. It could be the case that reduced hippocampal volume predisposes people to develop PTSD, or the decreased volume could result from PTSD. Causal claims can only be made when performing an experiment.

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

Which statement best defines motivation?

a. A universal facial expression of emotion.
b. A reflex that always occurs without learning.
c. The wants or needs that direct behaviour toward a goal.
d. A temporary loss of awareness during sleep.

2. MultiChoice Activity

A student studies psychology because they genuinely enjoy learning about human behaviour. This is an example of:

a. Extrinsic motivation.
b. Drive reduction.
c. A cultural display rule.
d. Intrinsic motivation.

3. MultiChoice Activity

What is the overjustification effect?

a. Intrinsic motivation decreases when external rewards are added.
b. External rewards always strengthen intrinsic motivation.
c. A person confuses emotion with mood.
d. People perform best only when they are extremely stressed.

4. MultiChoice Activity

According to the chapter, students are more likely to experience intrinsic motivation in class when they:

a. Have no choice or control in learning activities.
b. Receive only tangible rewards for every task.
c. Feel a sense of belonging and respect.
d. Are constantly compared with others.

5. MultiChoice Activity

According to drive theory, deviations from homeostasis create:

a. Physiological needs that lead to drive states.
b. Universal facial expressions.

c. A complete loss of arousal.
d. Secondary emotions such as jealousy.

6. MultiChoice Activity

According to arousal theory, what is most likely to happen when a person is underaroused?

a. They will immediately reach self-actualization.
b. They may feel bored and seek stimulation.
c. They will automatically perform all tasks better.
d. They will stop experiencing emotions.

7. MultiChoice Activity

According to the Yerkes-Dodson law, complex tasks are generally performed best when arousal levels are:

a. Higher than for simple tasks in every case.
b. As high as possible.
c. Lower than for simple tasks.
d. Completely absent.

8. MultiChoice Activity

Self-efficacy refers to:

a. A person's belief in their ability to complete a task.
b. The need to maintain bodily balance.
c. A measure of how intense a mood feels.
d. The urge to copy another person's emotions.

9. MultiChoice Activity

At the top of Maslow's hierarchy of needs is:

a. Self-actualization.
b. Belongingness and love.
c. Safety and security.
d. Physiological need.

10. MultiChoice Activity

Which statement best distinguishes emotion from mood?

a. Moods are always conscious and intentional, while emotions are not.
b. Emotions and moods mean exactly the same thing in psychology.
c. Moods are always more intense than emotions.
d. Emotions are typically more intense and tied to experiences, while moods are less intense and more prolonged.

11. MultiChoice Activity

Which brain structure serves as a sensory relay centre and sends information to both the amygdala and higher cortical regions?

a. Cerebellum.
b. Thalamus.
c. Medulla.
d. Hippocampus.

12. MultiChoice Activity

Which of the following is identified in the chapter as a basic emotion?

a. Embarrassment.
b. Fear.
c. Pride.
d. Jealousy.

13. MultiChoice Activity

Secondary emotions differ from primary emotions because secondary emotions are more likely to:

a. Be identical across all situations.
b. Involve cognitive appraisal and interpretation.
c. Be automatic, immediate reflexes only.
d. Bypass all thinking and context.

14. MultiChoice Activity

In the brain's fast emotional pathway, sensory information related to fear travels most directly from the thalamus to the:

a. Frontal lobes first.
b. Spinal cord only.
c. Amygdala.
d. Hippocampus only.

15. MultiChoice Activity

What does the facial feedback hypothesis suggest?

a. Facial expressions can influence emotional experience.
b. People must learn all facial expressions by watching others.
c. Only body language communicates emotion.
d. Culture has no effect on emotional display rules.

Solution:

1. c. The wants or needs that direct behaviour toward a goal.

2. d. Intrinsic motivation.
3. a. Intrinsic motivation decreases when external rewards are added.
4. c. Feel a sense of belonging and respect.
5. a. Physiological needs that lead to drive states.
6. b. They may feel bored and seek stimulation.
7. c. Lower than for simple tasks.
8. a. A person's belief in their ability to complete a task.
9. a. Self-actualization.
10. d. Emotions are typically more intense and tied to experiences, while moods are less intense and more prolonged.
11. b. Thalamus.
12. b. Fear.
13. b. Involve cognitive appraisal and interpretation.
14. c. Amygdala.
15. a. Facial expressions can influence emotional experience.

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CHAPTER 10: SOCIAL PSYCHOLOGY

Chapter Overview

10.0 Learning Objectives
10.1 Social Psychology Defined
10.2 Self-Presentation and Situational Influences
10.3 Attitudes and Persuasion
10.4 Conformity and Obedience
10.5 Helping and Prosocial Behaviour
10.6 Chapter Summary

10.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Define social psychology.
2. Describe situational and dispositional influences on behaviour.
3. Define stereotypes, prejudice and discrimination.
4. Identify the components of attitudes.
5. Describe the state of cognitive dissonance and how it relates to people's attitudes and behaviours.
6. Explain common methods of persuasion.
7. Evaluate which situational and social factors lead people to go along with the group.
8. List the personality and individual difference factors that make some people more likely to help than others.

Chapter Overview

In this chapter, we will explore social behaviours. We will consider the impact of situational and individual factors on our behaviour. Next, we will define attitude and discuss a state of discomfort, called cognitive dissonance, that occurs when we hold conflicting attitudes/beliefs/behaviours. We will define stereotypes, prejudice, and discrimination, and explore ways our attitudes and behaviours can be changed by others through persuasion or conformity to expectations. Finally, we will discuss prosocial behaviours and examine factors that influence when and why helping behaviour occurs.

10.1 Social Psychology Defined

Social psychology examines how people affect one another, and it looks at the power of the situation. According to the American Psychological Association (n.d.), social psychologists "are interested in all aspects of personality and social interaction, exploring the influence of interpersonal and group relationships on human behaviour." Throughout this chapter, we will examine how the presence of other individuals and groups of people impacts a person's behaviours, thoughts, and feelings. Essentially, people will change their behaviour to align with the social situation at hand. If we are in a new situation or are unsure how to behave, we will take our cues from other individuals.

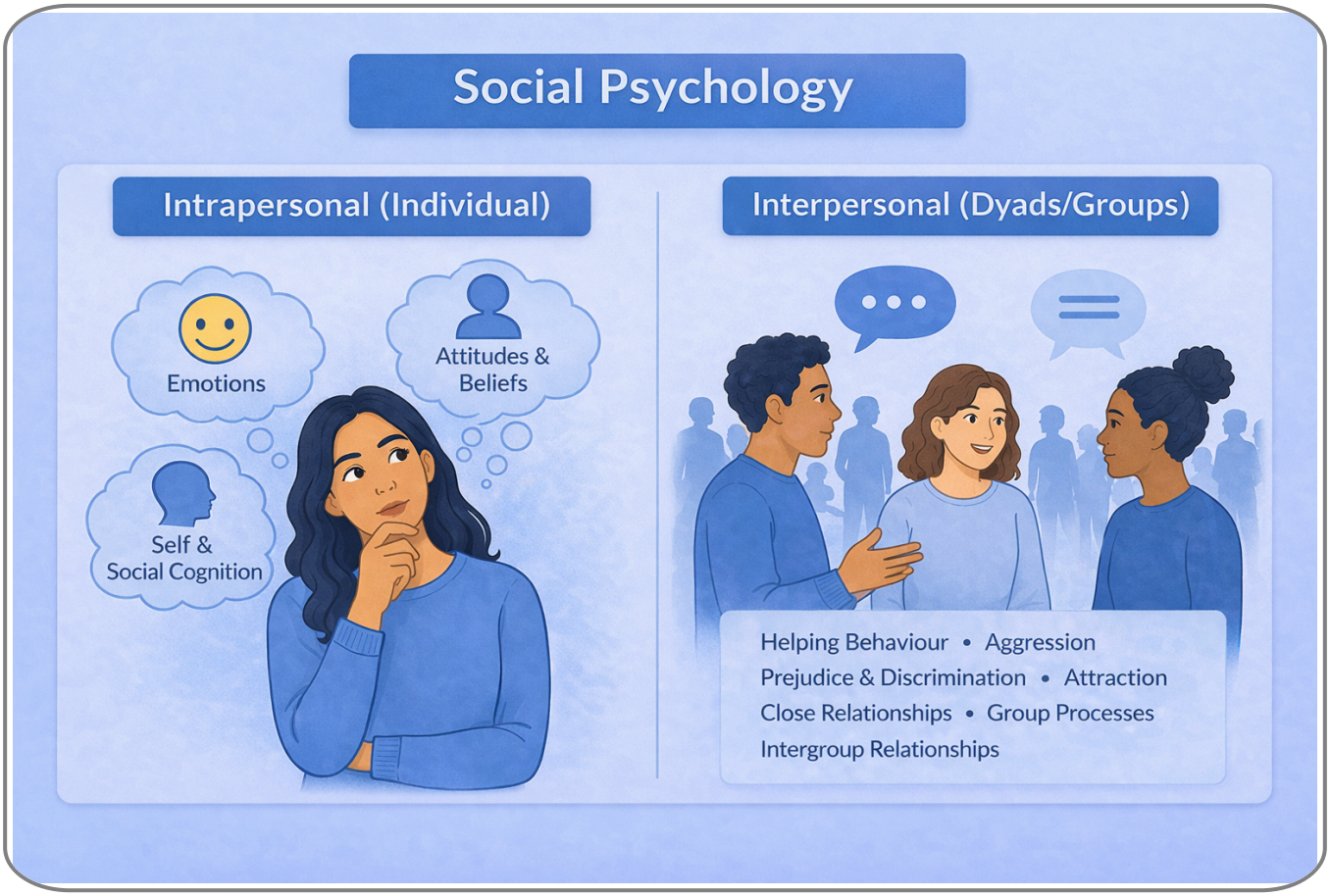

Figure 10.1.1. *A comparison between intrapersonal and interpersonal behaviour.*

The field of social psychology studies topics at both the intra- and interpersonal levels. Intrapersonal topics (those that pertain to the individual) include emotions and attitudes, the self, and social cognition (the ways in which we think about ourselves and others). Interpersonal topics (those that pertain to dyads and groups) include helping behaviour, aggression, prejudice and discrimination, attraction and close relationships, and group processes and intergroup relationships.

Social psychologists focus on how people conceptualize and interpret situations and how these interpretations influence their thoughts, feelings, and behaviours (Ross & Nisbett, 1991). Thus, social psychology studies individuals in a social context and how situational variables interact to influence behaviour.

In this chapter, we discuss the intrapersonal processes of self-presentation, cognitive dissonance and attitude change, and the interpersonal processes of conformity and obedience.

Situational and Dispositional Influences on Behaviour

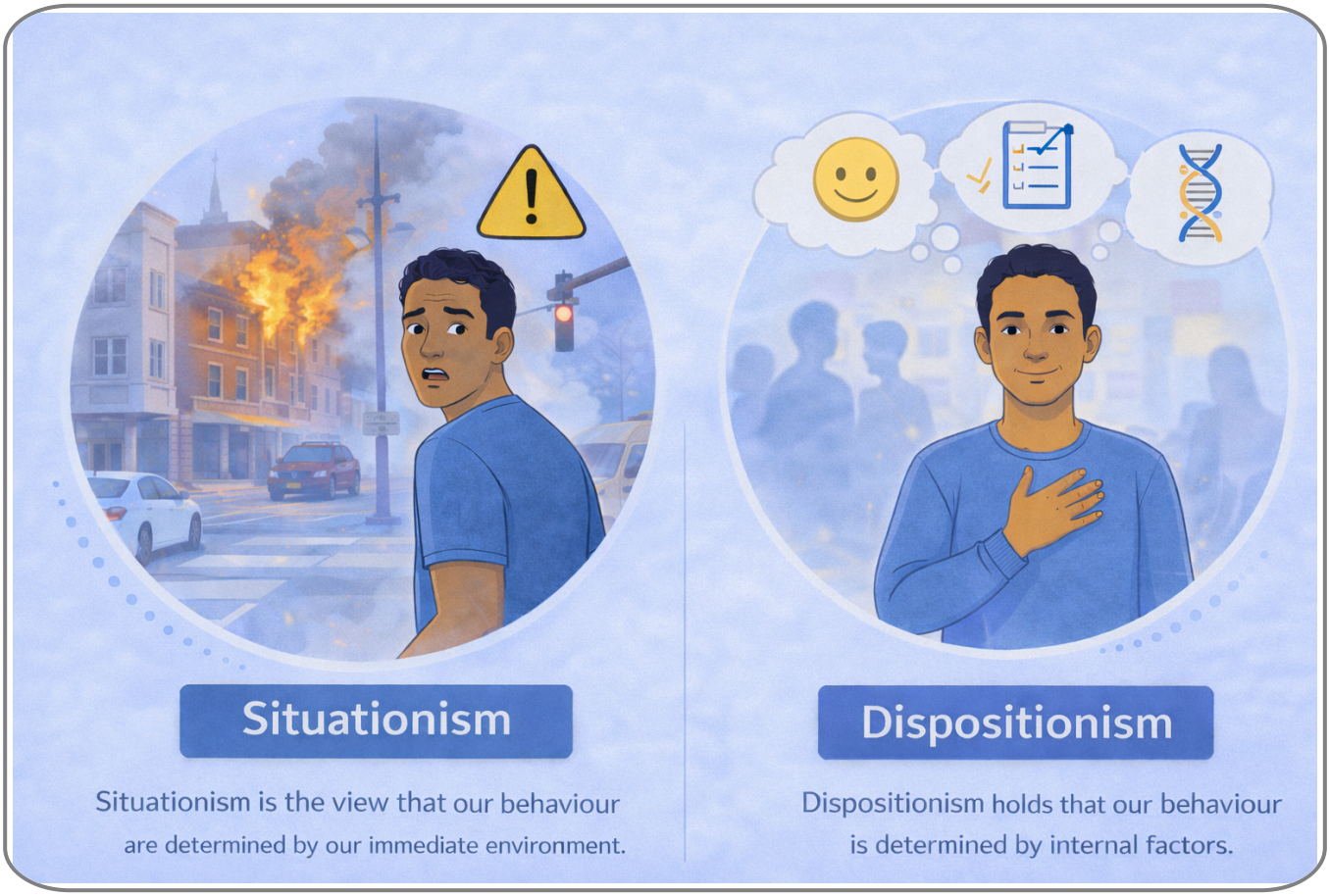

***Figure 10.1.2**. Situationism vs. dispositionism*

Behaviour is a product of both the situation (e.g., cultural influences, social roles, and the presence of bystanders) and of the person (e.g., personality characteristics). Subfields of psychology tend to focus on one influence or behaviour over others. **Situationism** is the view that our behaviour and actions are determined by our immediate environment and surroundings. In contrast, **dispositionism** holds that our behaviour is determined by internal factors (Heider, 1958). An internal factor is an attribute of a person and includes personality traits and temperament. Social psychologists have tended to take the situationist perspective, whereas personality psychologists have promoted the dispositionist perspective. Modern approaches to social psychology, however, take both the situation and the individual into account when studying human behaviour (Fiske et al., Gilbert, & Lindzey, 2010). In fact, the field of social-personality psychology has emerged to study the complex interaction of internal and situational factors that affect human behaviour (Mischel, 1977; Richard et al., Bond, & Stokes-Zoota, 2003).

Fundamental Attribution Error

In the United States, the predominant culture tends to favour a dispositional approach in explaining human behaviour. Why do you think this is? We tend to think that people are in control of their own behaviours, and, therefore, any behaviour change must be due to something internal, such as their personality, habits, or temperament. According to some social psychologists, people tend to overemphasize internal factors as explanations—or attributions—for the behaviour of other people. They tend to assume that the behaviour of another person is a *trait* of that person and to underestimate the power of the situation on the behaviour of others. They tend to fail to recognize when the behaviour of another is due to situational variables, and thus to the person's *state*. This erroneous assumption is called the **fundamental attribution error (**Ross, 1977; Riggio & Garcia, 2009).

Consider This

The fundamental attribution error is so powerful that people often overlook obvious situational influences on behaviour. A classic example was demonstrated in a series of experiments known as the quizmaster study (Ross et al., 1977). Participants were randomly assigned to play the role of a questioner (the quizmaster) or a contestant in a quiz game. Questioners developed difficult questions to which they knew the answers, and they presented these questions to the contestants. The contestants answered the questions correctly only 4 out of 10 times. After the task, the questioners and contestants were asked to rate their own general knowledge compared to that of the average student. Questioners did not rate their general knowledge higher than the contestants', but the contestants rated the questioners' intelligence higher than their own.

Image: "High School Quiz Show (11)," by Mike, Flickr, CC BY-NC-ND 2.0.

In a second study, observers of the interaction also rated the questioner as having more general knowledge than the contestant. The obvious influence on performance is the situation. The questioners wrote the questions, so of course, they had an advantage. Both the contestants and observers made an internal attribution for the performance. They concluded that the questioners must be more intelligent than the contestants.

As demonstrated in the example above, the fundamental attribution error is considered a powerful influence in how we explain the behaviours of others. However, it should be noted that some researchers have suggested that the fundamental attribution error may not be as powerful as it is often portrayed. In fact, a recent review of more than 173 published studies suggests that several factors (e.g., high levels of idiosyncrasy of the character and how well hypothetical events are explained) play a role in determining just how influential the fundamental attribution error is (Malle, 2006).

Actor-Observer Bias

Why do you think we underestimate the influence of the situation on the behaviours of others? One reason is that we often don't have all the information we need to make a situational explanation for another person's behaviour. The only information we might have is what is observable. Due to this lack of information, we have a tendency to assume the behaviour is due to a dispositional, or internal, factor. When it comes to explaining our own behaviours, however, we have much more information available to us. If you came home from school or work angry and yelled at your dog or a loved one, what would your explanation be? You might say you were very tired or feeling unwell and needed quiet time—a situational explanation. The actor-observer bias is the phenomenon of attributing other people's behaviour to internal factors (fundamental attribution error) while attributing our own behaviour to situational forces (Jones & Nisbett, 1971; Nisbett et al., 1973; Choi & Nisbett, 1998). As actors of behaviour, we have more information available to explain our own behaviour. However, as observers, we have less information available; therefore, we tend to default to a dispositionist perspective.

Self-Serving Bias

Following an outcome, self-serving biases are those attributions that enable us to see ourselves in a favourable light (for example, making internal attributions for success and external attributions for failures). When you do well at a task, for example, acing an exam, it is in your best interest to make a dispositional attribution for your behaviour ("I'm smart,") instead of a situational one ("The exam was easy,"). The tendency of an individual to take credit by making dispositional or internal attributions for positive outcomes but situational or external attributions for negative outcomes is known as the self-serving bias (Miller & Ross, 1975). This bias serves to protect self-esteem. You can imagine that if people always made situational attributions for their behaviour, they would never be able to take credit and feel good about their accomplishments.

We can understand self-serving bias by digging more deeply into attribution, a belief about the cause of a result. One model of attribution proposes three main dimensions: locus of control (internal versus external), stability (stable versus unstable), and controllability (controllable versus uncontrollable). In this context, stability refers to the extent to which the circumstances that result in a given outcome are changeable. The circumstances are considered stable if they are unlikely to change. Controllability refers to the extent to which the circumstances that are associated with a given outcome can be controlled. Obviously, those things that we have the power to control would be labelled controllable (Weiner, 1979).

Consider the example of how we explain our favourite sports team's wins. Research shows that we make internal, stable, and controllable attributions for our team's victory (Grove et al., 1991). For example, we might tell ourselves that our team is talented (internal), consistently works hard (stable), and uses effective strategies (controllable). In contrast, we are more likely to make external, unstable, and uncontrollable attributions when our favourite team loses. For example, we might tell ourselves that the other team has more experienced players or that the referees were unfair (external), the other team played at home (unstable), and the cold weather affected our team's performance (uncontrollable).

We tend to believe that our team wins because it's better, but loses for reasons it cannot control (Roesch & Amirkham, 1997). Image: "Canadian women's ice hockey team," by S. Yume, Wikimedia Commons, CC BY 2.0.

Just-World Hypothesis

One consequence of Westerners' tendency to provide dispositional explanations for behaviour is victim blame (Jost & Major, 2001). When people experience bad fortune, others tend to assume that they are somehow responsible for their own fate. A common ideology, or worldview, in the United States is the just-world hypothesis. **The just-world hypothesis** is the belief that people get the outcomes they deserve (Lerner & Miller, 1978). In order to maintain the belief that the world is a fair place, people tend to think that good people experience positive outcomes, and bad people experience negative outcomes (Jost et al., 2004; Jost & Major, 2001). The ability to think of the world as a fair place, where people get what they deserve, allows us to feel that the world is predictable and that we have some control over our life outcomes (Jost et al., 2004; Jost & Major, 2001). For example, if you want to experience positive outcomes, you just need to work hard to get ahead in life.

Can you think of a negative consequence of the just-world hypothesis? One negative consequence is people's tendency to blame poor individuals for their plight. What common explanations are given for why people live in poverty? Have you heard statements such as, "The poor are lazy and just don't want to work," or "Poor people just want to live off the government"? What types of explanations are these, dispositional or situational? These dispositional explanations are clear examples of the fundamental attribution error. Blaming poor people for their poverty ignores situational factors that impact them, such as high unemployment rates, recession, poor educational opportunities, and the familial cycle of poverty. Other research shows that people who hold

just-world beliefs have negative attitudes toward people who are unemployed and people living with AIDS (Sutton & Douglas, 2005). In the United States and other countries, victims of sexual assault may find themselves blamed for their abuse. Victim advocacy groups, such as Domestic Violence Ended (DOVE), attend court in support of victims to ensure that blame is directed at the perpetrators of sexual violence, not the victims.

People who hold just-world beliefs tend to blame the people in poverty for their circumstances, ignoring situational and cultural causes of poverty. Image: "Helping the homeless," by Ed Yourdon, Flickr, CC BY-NC-SA 2.0.

The section on *Social Psychology Defined* was adapted from "What is Social Psychology?", and the section on *Situational and Dispositional Influences* was adapted from "What is Social Psychology?" In Psychology – 2e by Rose M. Spielman, William J. Jenkins, Marilyn D. Lovett from OpenStax, which is licensed under Creative Commons Attribution 4.0 International License. *Modifications: removed examples of fundamental attribution errors, the universality of dispositional attributions and Nisbett's study.*

OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 10.1.1. "Using the same look and feel as previous images in this book, create an illustration graphic depicting the difference between intrapersonal and interpersonal behaviour."
Figure 10.1.2. "Using the same look and feel as previous images in this book, create an illustration graphic depicting situational and dispositional Influences on Behaviour."

10.2 Self-Presentation and Situational Influences

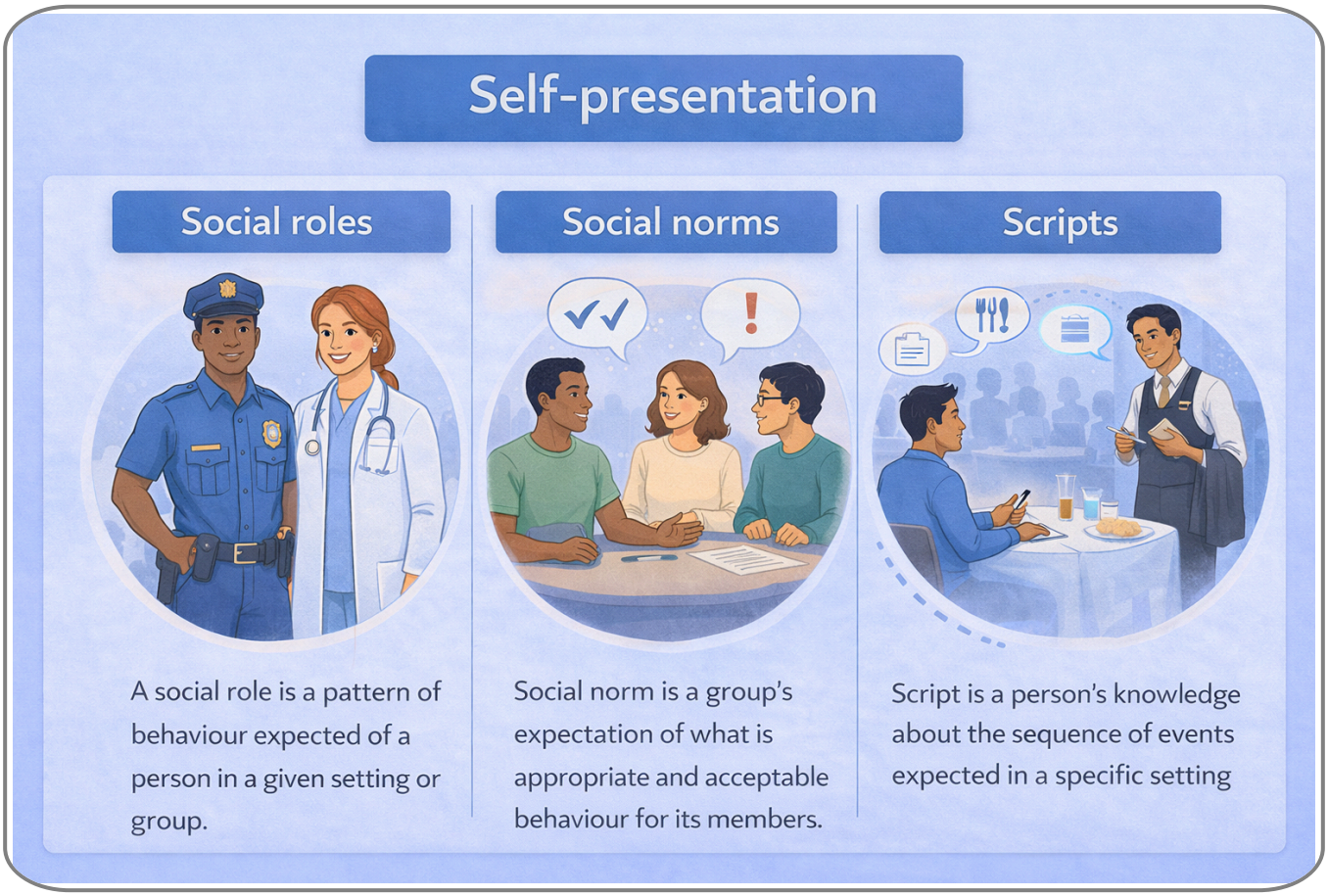

Figure 10.2.1. *A comparison between social roles, social norms, and scripts.*

In this section, we examine situational forces that have a strong influence on human behavior including social roles, social norms, and scripts. We discuss how humans use the social environment as a source of information, or cues, on how to behave. Situational influences on our behaviour have important consequences, such as whether we will help a stranger in an emergency or how we will behave in an unfamiliar environment.

Social Roles

One major social determinant of human behaviour is our social roles. A **social role** is a pattern of behaviour that is expected of a person in a given setting or group (Hare, 2003). Each one of us has several social roles. You may be, at the same time, a student, a parent, an aspiring teacher, a son or daughter, a spouse, and a lifeguard. How do these social roles influence your behaviour? Social roles are defined by culturally shared knowledge. That is, nearly everyone in a given culture knows what behaviour is expected of a person in a given role.

Here's an Example

What is the social role of a student? If you look around a college classroom, you will likely see students engaging in studious behaviour, taking notes, listening to the professor, reading the textbook, and sitting quietly at their desks. Of course, you may see students deviating from the expected studious behavior such as texting on their phones or using Facebook on their laptops, but in all cases, the students that you observe are attending class—a part of the social role of students.

Social roles and our related behaviour can vary across different settings. How do you behave when you are engaging in the role of son or daughter and attending a family function? Now imagine how you behave when you are engaged in the role of employee at your workplace. It is very likely that your behaviour will be different. Perhaps you are more relaxed and outgoing with your family, making jokes and doing silly things. But at your workplace, you might speak more professionally, and although you may be friendly, you are also serious and focused on getting the work completed. These are examples of how our social roles influence and often dictate our behaviour to the extent that identity and personality can vary with context (that is, in different social groups) (Malloy et al.,1997).

Social Norms

As discussed previously, social roles are defined by a culture's shared knowledge of what is expected behaviour of an individual in a specific role. This shared knowledge comes from social norms. A **social norm** is a group's expectation of what is appropriate and acceptable behaviour for its members—how they are supposed to behave and think (Deutsch & Gerard, 1955; Berkowitz, 2004). How are we expected to act? What are we expected to talk about? What are we expected to wear? In our discussion of social roles, we noted that colleges have social norms for students' behaviour in the role of student and workplaces have social norms for employees' behaviours in the role of employee. Social norms are everywhere, including in families, gangs, and on social media outlets. What are some social norms on Instagram?

Scripts

Because of social roles, people tend to know what behaviour is expected of them in specific, familiar settings. A **script** is a person's knowledge about the sequence of events expected in a specific setting (Schank & Abelson, 1977). How do you act on the first day of school, when you walk into an elevator, or are at a restaurant? For example, at a restaurant in the United States, if we want the server's attention, we try to make eye contact. In Brazil, you would make the sound "psst" to get the server's attention. You can see the cultural differences in scripts. To an American, saying "psst" to a server might seem rude, yet to a Brazilian, trying to make eye contact might not seem an effective strategy. Scripts are important sources of information to guide behaviour in given situations. Can you imagine being in an unfamiliar situation and not having a script for how to behave? This could be uncomfortable and confusing. How could you find out about social norms in an unfamiliar culture?

Prejudice and Discrimination

Humans are very diverse, and although we share many similarities, we also have many differences. The social groups we belong to help form our identities (Tajfel, 1974). These differences may be difficult for some people to reconcile, which may lead to prejudice toward people who are different. **Prejudice** is a negative attitude and feeling toward an individual based solely on one's membership in a particular social group (Allport, 1954; Brown, 2010). Prejudice is common against people who are members of an unfamiliar cultural group. Thus, certain types of education, contact, interactions, and building relationships with members of different cultural groups can reduce the tendency toward prejudice. In fact, simply imagining interacting with members of different cultural groups might affect prejudice. Indeed, when experimental participants were asked to imagine themselves positively interacting with someone from a different group, this led to an increased positive attitude toward the other group and an increase in positive traits associated with the other group. Furthermore, imagined social interaction can reduce anxiety associated with intergroup interactions (Crisp & Turner, 2009). What are some examples of social groups that you belong to that contribute to your identity? Social groups can include gender, race, ethnicity, nationality, social class, religion, sexual orientation, profession, and many more. And, as is true for social roles, you can simultaneously be a member of more than one social group. An example of prejudice is having a negative attitude toward people who are not born in the United States. Although people holding this prejudiced attitude do not know all people who were not born in the United States, they dislike them.

Can you think of a prejudiced attitude you have held toward a group of people? How did your prejudice develop? Prejudice often begins in the form of a **stereotype**—that is, a specific belief or assumption about individuals based solely on their membership in a group, regardless of their individual characteristics. Stereotypes become overgeneralized and applied to all members of a group. For example, someone holding prejudiced attitudes toward older adults may believe that older adults are slow and incompetent (Cuddy et al., 2005; Nelson, 2004). We cannot possibly know each individual person of advanced age to know that all older adults are slow and incompetent. Therefore, this negative belief is overgeneralized to all members of the group, even though many of the individual group members may in fact be spry and intelligent.

Sometimes people will act on their prejudiced attitudes toward a group of people, and this behaviour is known as discrimination. Discrimination is a negative action toward an individual as a result of one's membership in a particular group (Allport, 1954; Dovidio & Gaertner, 2004). As a result of holding negative beliefs (stereotypes) and negative attitudes (prejudice) about a particular group, people often treat the target of prejudice poorly.

The section on Self-Presentation was adapted from "Self-Presentation", and the section on Prejudice and Discrimination was adapted from "Prejudice and Discrimination" in Psychology – 2e by Rose M. Spielman, William J. Jenkins, Marilyn D. Lovett from OpenStax, which is licensed under Creative Commons Attribution 4.0 International License. *Modifications: revisions include that we omitted images and removed the section on Zimbardo's Stanford Prison Experiment*.

OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 10.2.1. "Using the same look and feel as previous images in this book, create an illustration graphic depicting a comparison between social roles, social norms, and scripts. Include the attached definitions."

10.3 Attitudes and Persuasion

Social psychologists have documented how the power of the situation can influence our behaviours. Now we turn to how the power of the situation can influence our attitudes and beliefs. Attitude is our evaluation of a person, an idea, or an object. We have attitudes for many things, ranging from products that we might pick up in the supermarket to people around the world to political policies. Typically, attitudes are favourable or unfavourable: positive or negative (Eagly & Chaiken, 1993). And, they have three components: an affective component (feelings), a behavioural component (the effect of the attitude on behaviour), and a cognitive component (belief and knowledge) (Rosenberg & Hovland, 1960).

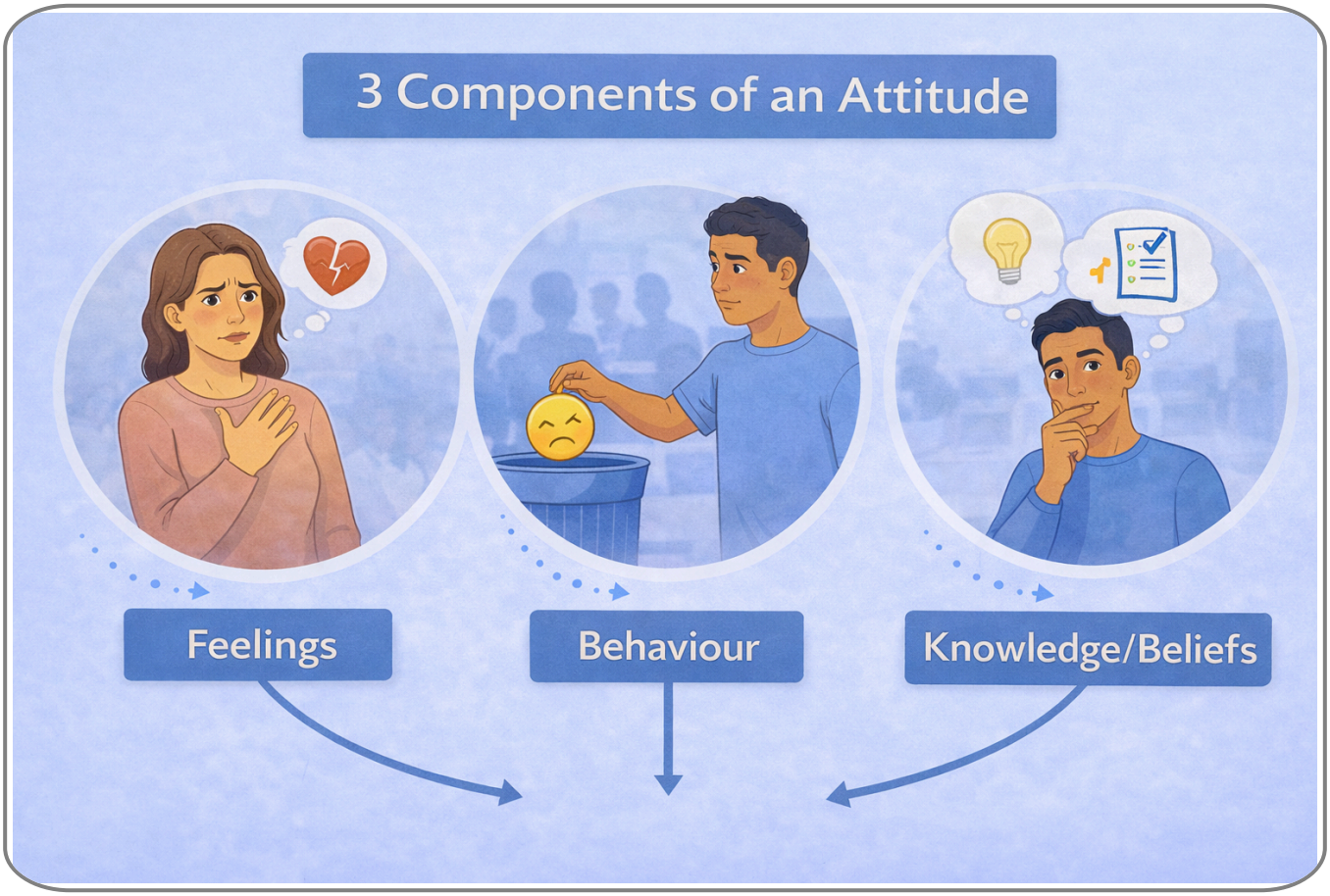

Figure 10.3.1. *Three components of an attitude: feelings, behaviour and knowledge/beliefs.*

How Do You Feel About Recycling?

You may hold a positive attitude toward recycling. This attitude should result in positive feelings toward recycling (such as "It makes me feel good to recycle" or "I enjoy knowing that I make a small difference in reducing the amount of waste that ends up in landfills"). Certainly, this attitude should be reflected in our behaviour: You actually recycle as often as you can. Finally, this attitude will be reflected in favourable

thoughts (for example, “Recycling is good for the environment” or “Recycling is the responsible thing to do”).

Our attitudes and beliefs are not only influenced by external forces, but also by internal influences that we control. Like our behaviour, our attitudes and thoughts are not always changed by situational pressures, but they can be consciously changed by our own free will. In this section, we discuss the conditions under which we would want to change our own attitudes and beliefs.

What is Cognitive Dissonance?

Social psychologists have documented that feeling good about ourselves and maintaining positive self-esteem is a powerful motivator of human behaviour (Tavris & Aronson, 2008). In the United States, members of the predominant culture typically think very highly of themselves and view themselves as good people who are above average on many desirable traits (Ehrlinger et al., 2005). Often, our behaviour, attitudes, and beliefs are affected when we experience a threat to our self-esteem or positive self-image. Psychologist Leon Festinger (1957) defined **cognitive dissonance** as psychological discomfort arising from holding two or more inconsistent attitudes, behaviours, or cognitions (thoughts, beliefs, or opinions). Festinger’s theory of cognitive dissonance states that when we experience a conflict in our behaviours, attitudes, or beliefs that runs counter to our positive self-perceptions, we experience psychological discomfort (dissonance). For example, if you believe smoking is bad for your health but you continue to smoke, you experience conflict between your belief and behaviour.

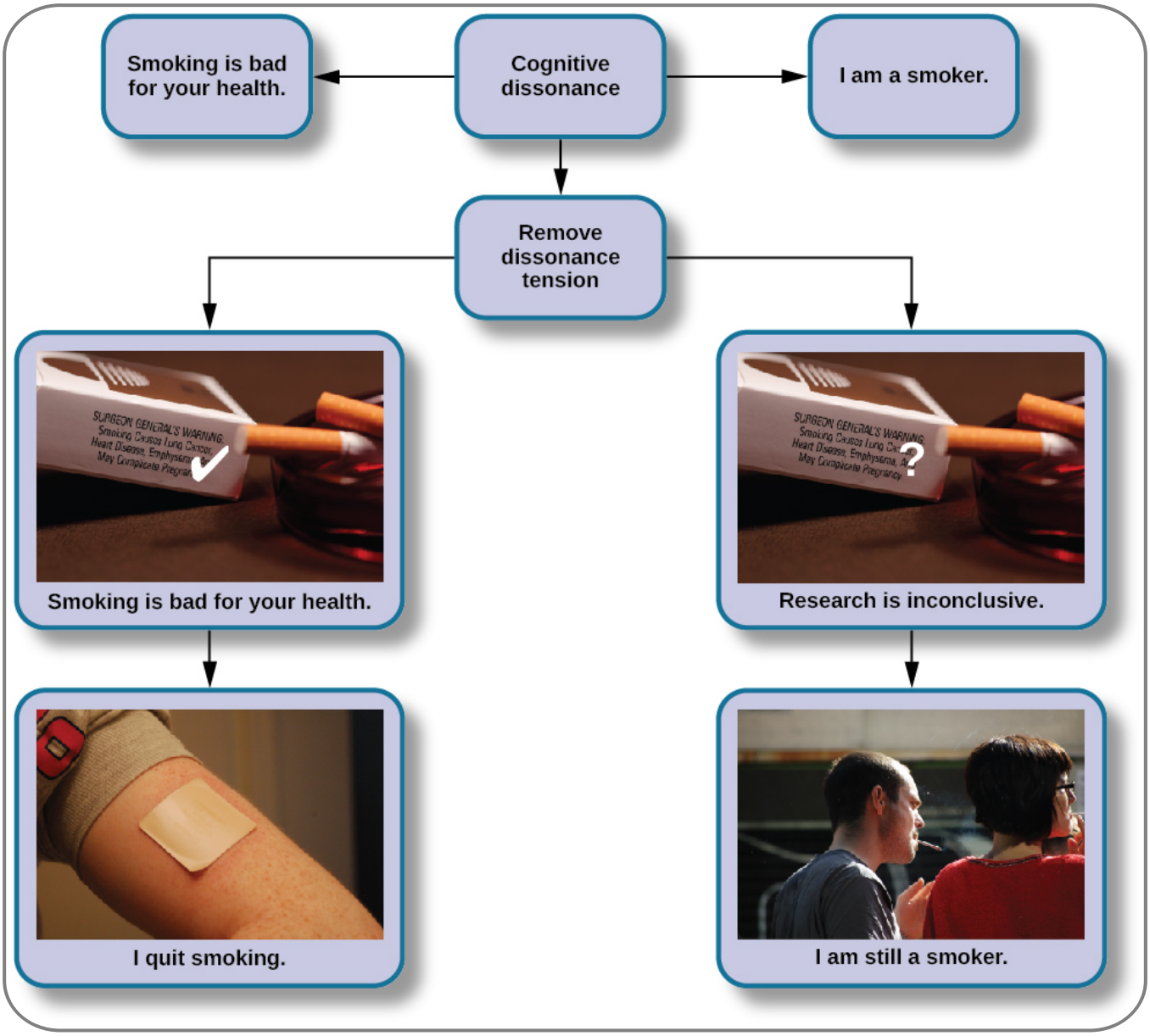

Figure 10.3.2. *Cognitive dissonance is aroused by inconsistent beliefs and behaviours. Believing cigarettes are bad for your health, but smoking cigarettes anyway, can cause cognitive dissonance. To reduce cognitive dissonance, individuals can change their behaviour, such as quitting smoking, or change their beliefs, such as discounting the evidence that smoking is harmful. Images: "cigarettes," by CDC/Debora Cartagena, Wikipedia, Public Domain; "patch," by RegBarc, Wikipedia, CC BY 2.5, and "smoking," by Tim Parkinson. Modification by Spielman et al. in Psychology – H5P Edition.*

Image Description

Flowchart illustrating cognitive dissonance in a smoker. At the top, two beliefs—"Smoking is bad for your health" and "I am a smoker"—both point to a central box labeled "Cognitive dissonance." An arrow leads downward to "Remove dissonance tension," which then branches into two possible outcomes. On the left path, the person accepts that smoking is harmful, leading to "I quit smoking," shown with an image of a nicotine patch on an arm. On the right path, the person resolves the tension by deciding "Research is inconclusive," leading to "I am still a smoker," shown with an image of two people smoking.

Later research documented that only conflicting cognitions that threaten individuals' positive self-image cause dissonance (Greenwald & Ronis, 1978). Additional research found that dissonance is not only psychologically uncomfortable but also can cause physiological arousal (Croyle & Cooper, 1983) and activate regions of the brain important in emotions and cognitive functioning (van Veen et al., 2009). When we experience cognitive dissonance, we are motivated to decrease it because it is psychologically, physically, and mentally uncomfortable. We can reduce cognitive dissonance by bringing our cognitions, attitudes, and behaviours in line—that is, making them harmonious. This can be done in different ways, such as:

- changing our discrepant behaviour (e.g., stop smoking),
- changing our cognitions through rationalization or denial (e.g., telling ourselves that health risks can be reduced by smoking filtered cigarettes),
- adding a new cognition (e.g., "Smoking suppresses my appetite so I don't become overweight, which is good for my health.").

The Effect of Initiation

A difficult initiation into a group influences us to like the group *more*, due to the justification of effort. We do not want to waste time and effort joining a group that we eventually leave. A classic experiment by Aronson and Mills (1959) demonstrated this justification of the effort effect. College students volunteered to join a campus group that would meet regularly to discuss the psychology of sex. Participants were randomly assigned to one of three conditions: no initiation, an easy initiation, or a difficult initiation into the group. After participating in the first discussion, which was deliberately made very boring, participants rated how much they liked the group. Participants who underwent a difficult initiation process to join the group rated the group more favourably than did participants with an easy initiation or no initiation.

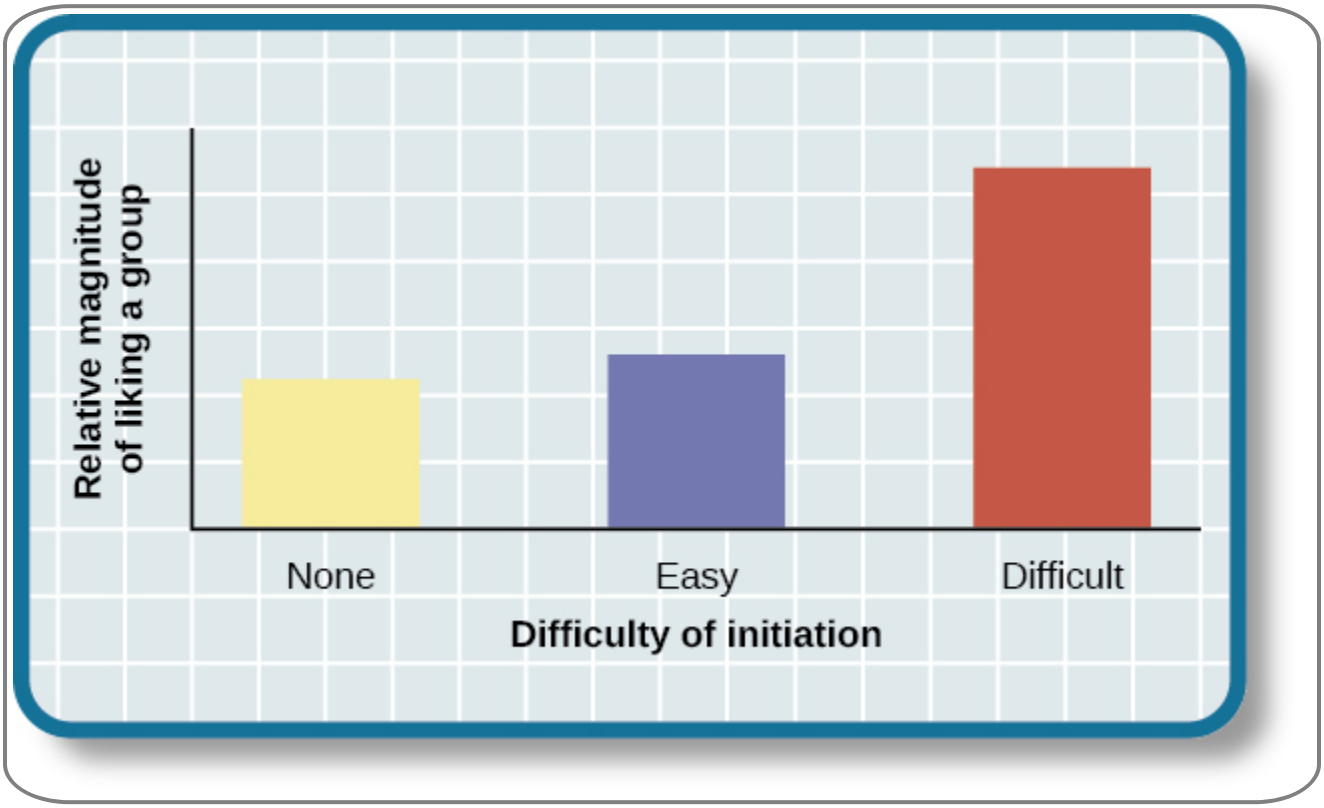

Figure 10.3.3. *Justification of effort has a distinct effect on a person liking a group. Students in the difficult initiation condition liked the group more than students in other conditions due to the justification of effort.*

Image Description

Bar graph showing the relationship between the difficulty of initiation and liking a group. The horizontal axis is labelled "Difficulty of initiation" with three categories: None, Easy, and Difficult. The vertical axis is labelled "Relative magnitude of liking a group." The bars increase in height from None to Easy to Difficult, showing that as initiation becomes more difficult, liking for the group also increases.

Similar effects can be seen in a more recent study of how student effort affects course evaluations. Heckert et al. surveyed 463 undergraduates enrolled in courses at a midwestern university about the amount of effort that their courses required of them. In addition, the students were also asked to evaluate various aspects of the course. Given what you've just read, it will come as no surprise that those courses that were associated with the highest level of effort were evaluated as being more valuable than those that were not. Furthermore, students indicated that they learned more in courses that required more effort, regardless of the grades that they received in those courses (Heckert et al., 2006).

Persuasion

In the previous section, we discussed that the motivation to reduce cognitive dissonance leads us to change our attitudes, behaviours, and/or cognitions to make them consonant. Persuasion is the process of changing our attitude toward something based on some kind of communication. Much of the persuasion we experience comes from outside forces. How do people convince others to change their attitudes, beliefs, and behaviours?

What communications do you receive that attempt to persuade you to change your attitudes, beliefs, and behaviours?

A subfield of social psychology studies persuasion and social influence, providing us with a plethora of information on how humans can be persuaded by others.

Yale Attitude Change Approach

The topic of persuasion has been one of the most extensively researched areas in social psychology (Fiske et al., 2010). During the Second World War, Carl Hovland extensively researched persuasion for the U.S. Army. After the war, Hovland continued his exploration of persuasion at Yale University. Out of this work came a model called the Yale attitude change approach, which describes the conditions under which people tend to change their attitudes. Hovland demonstrated that certain features of the source of a persuasive message, the content of the message, and the characteristics of the audience will influence the persuasiveness of a message (Hovland et al.,1953).

Features of the source of the persuasive message include the credibility of the speaker (Hovland & Weiss, 1951) and the physical attractiveness of the speaker (Eagly & Chaiken, 1975; Petty et al.,1997). Thus, speakers who are credible, or have expertise on the topic, and who are deemed as trustworthy are more persuasive than less credible speakers. Similarly, more attractive speakers are more persuasive than less attractive speakers. The use of famous actors and athletes to advertise products on television and in print relies on this principle. The immediate and long-term impact of the persuasion also depends, however, on the credibility of the messenger (Kumkale & Albarracín, 2004).

Features of the message itself that affect persuasion include subtlety (the quality of being important, but not obvious) (Petty & Cacioppo, 1986; Walster & Festinger, 1962); sidedness (that is, having more than one side) (Crowley & Hoyer, 1994; Igou & Bless, 2003; Lumsdaine & Janis, 1953); timing (Haugtvedt & Wegener, 1994; Miller & Campbell, 1959), and whether both sides are presented. Messages that are more subtle are more persuasive than direct messages. Arguments that occur first, such as in a debate, are more influential if messages are given back-to-back. However, if there is a delay after the first message and before the audience needs to make a decision, the last message presented will tend to be more persuasive (Miller & Campbell, 1959).

Features of the audience that affect persuasion are attention (Albarracín & Wyer, 2001; Festinger & Maccoby, 1964), intelligence, self-esteem (Rhodes & Wood, 1992), and age (Krosnick & Alwin, 1989). In order to be persuaded, audience members must be paying attention. People with lower intelligence are more easily persuaded than people with higher intelligence; whereas people with moderate self-esteem are more easily persuaded than people with higher or lower self-esteem (Rhodes & Wood, 1992). Finally, younger adults aged 18–25 are more persuadable than older adults.

Elaboration Likelihood Model

An especially popular model that describes the dynamics of persuasion is the elaboration likelihood model of persuasion (Petty & Cacioppo, 1986). The **elaboration likelihood model** considers the variables of the attitude change approach—that is, features of the source of the persuasive message, contents of the message, and characteristics of the audience are used to determine when attitude change will occur. According to the elaboration likelihood model of persuasion, there are two main routes that play a role in delivering a persuasive message: central and peripheral.

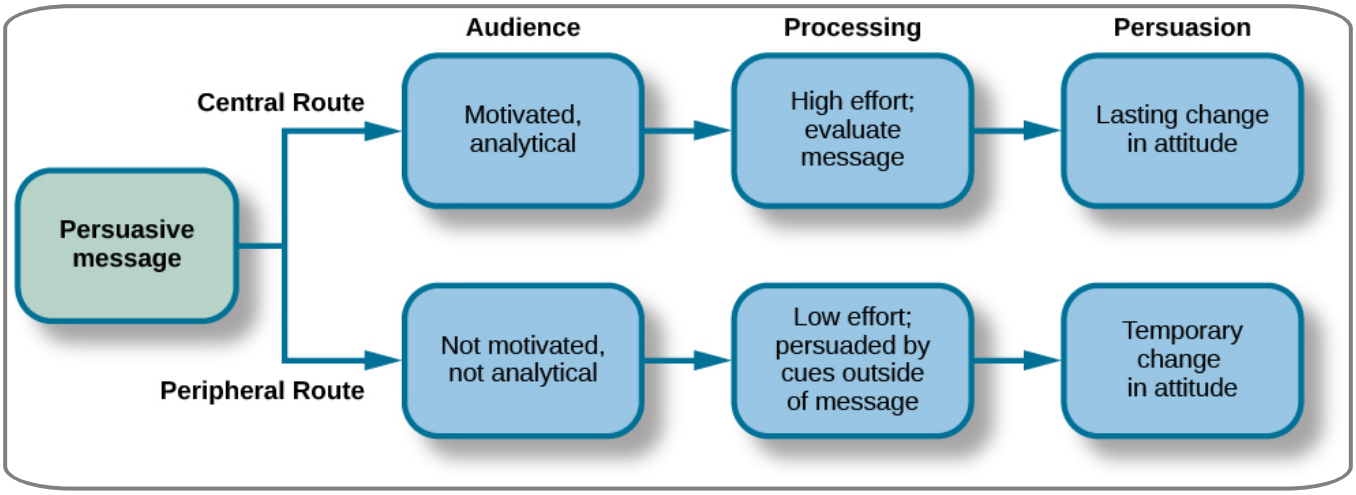

***Figure 10.3.4**. Persuasion can take one of two paths, and the durability of the outcome depends on the path chosen.*

Image Description

Flowchart showing the elaboration likelihood model of persuasion. A persuasive message branches into two routes: the central route and the peripheral route. In the central route, the audience is motivated and analytical, processes the message with high effort by evaluating it carefully, and is more likely to experience a lasting change in attitude. In the peripheral route, the audience is not motivated and not analytical, processes the message with low effort by relying on cues outside the message, and is more likely to experience a temporary change in attitude.

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 emphasize 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, thoughts, and behaviors, the argument must be strong and, if successful, will result in lasting attitude change.

The central route to persuasion works best when the target of persuasion, or the audience, is analytical and willing to engage in processing of the information. From an advertiser's perspective, what products would be best 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, for example, that small business owners might be especially influenced by the focus on the computer's quality and features, such as processing speed and memory capacity.

The **peripheral route** is an indirect route that uses peripheral cues to associate positivity with the message (Petty & Cacioppo, 1986). Instead of focusing on the facts and a product's quality, the peripheral route relies on association with positive characteristics, such as positive emotions and 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 or behavior 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 (Gupta & Lord, 1998). 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 be best sold using the peripheral route to persuasion? Another example is clothing: A retailer may focus on celebrities who are wearing the same style of clothing.

Foot-in-the-door Technique

Researchers have tested many persuasion strategies that are effective in selling products and changing people's attitudes, ideas, and behaviours. One effective strategy is the foot-in-the-door technique (Cialdini, 2001; Pliner et al.,1974). Using the foot-in-the-door technique, the persuader gets a person to agree to bestow a small favour or to buy a small item, only to later request a larger favour or purchase of a bigger item. 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. Research on this technique also illustrates the principle of consistency (Cialdini, 2001): Our past behaviour often directs our future behaviour, and we have a desire to maintain consistency once we have committed to a behaviour.

Here's an Example

A common application of foot-in-the-door is when teens ask their parents for a small permission (for example, extending curfew by a half hour) and then ask them for something larger. Having granted the smaller request increases the likelihood that parents will acquiesce to the later, larger request.

How would a store owner use the foot-in-the-door technique to sell you an expensive product? For example, say that you are buying the latest model smartphone, and the salesperson suggests you purchase the best data plan. You agree to this. The salesperson then suggests a bigger purchase—the three-year extended warranty. After agreeing to the smaller request, you are more likely to also agree to the larger request. You may have encountered this if you have bought a car. When salespeople realize that a buyer intends to purchase a certain model, they might try to get the customer to pay for many or most available options on the car.

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OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompts

Figure 10.3.1. "Using the same look and feel as previous images in this book, create an illustration graphic depicting three components of an attitude: feelings, behaviour and knowledge/beliefs."

10.4 Conformity and Obedience

We often change our attitudes and behaviours to match those of the people around us.

Every day observation confirms that we often adopt the actions and attitudes of the people around us. Trends in clothing, music, food, and entertainment are obvious. But our views on political issues, religious questions, and lifestyles also reflect to some degree the attitudes of the people we interact with. Similarly, decisions about behaviours such as smoking and drinking are influenced by whether the people we spend time with engage in these activities. Psychologists refer to this widespread tendency to act and think like the people around us as **conformity**.

Conformity

What causes all this conformity? To start, humans may possess an inherent tendency to imitate the actions of others. Although we usually are not aware of it, we often mimic the gestures, body posture, language, talking speed, and many other behaviours of the people we interact with. Researchers find that this mimicking increases the connection between people and allows our interactions to flow more smoothly (Chartrand & Bargh, 1999).

Beyond this automatic tendency to imitate others, psychologists have identified two primary reasons for conformity. The first of these is **normative influence**. When normative influence is operating, people go along with the crowd because they are concerned about what others think of them. We don't want to look out of step or become the target of criticism just because we like different kinds of music or dress differently than everyone else. Fitting in also brings rewards such as camaraderie and compliments.

Normative Influence: A Classic Study

How powerful is normative influence? Consider a classic study conducted many years ago by Solomon Asch (1956). The participants were male college students who were asked to engage in a seemingly simple task. An experimenter standing several feet away held up a card that depicted one line on the left side and three lines on the right side. The participant's job was to say aloud which of the three lines on the right was the same length as the line on the left. Sixteen cards were presented one at a time, and the correct answer on each was so obvious as to make the task a little boring. Except for one thing. The participant was not alone. In fact, there were six other people in the room who also gave their answers to the line-judgment task aloud. Moreover, although they pretended to be fellow participants, these other individuals were, in fact, confederates working with the experimenter. The real participant was seated so that he always gave his answer after hearing what five other "participants" said. Everything went smoothly until the third trial, when inexplicably the first "participant" gave an obviously incorrect answer. The mistake might have been amusing, except the second participant gave the same answer. As did the third, the fourth, and the fifth participant. Suddenly, the real participant was in a difficult situation. His eyes told him one thing, but five out of five people apparently saw something else.

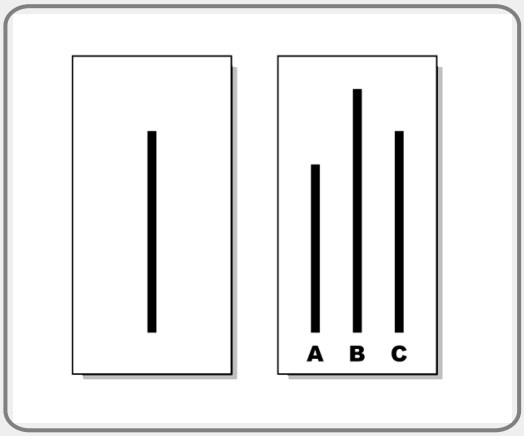

Figure 10.4.1. *Examples of the cards used in the Asch experiment. How powerful is the normative influence? Would you be tempted to give a clearly incorrect answer, like many participants in the Asch experiment did, to better match the thoughts of a group of peers? Image: "Asch experiment," by Fred the Oyster, Wikimedia Commons, CC BY-SA 4.0.*

It's one thing to wear your hair a certain way or like certain foods because everyone around you does. But, would participants intentionally give a wrong answer just to conform with the other participants? The confederates uniformly gave incorrect answers on 12 of the 16 trials, and 76 percent of the participants went along with the norm at least once and also gave the wrong answer. In total, they conformed with the group on one-third of the 12 test trials. Although we might be impressed that the majority of the time participants answered honestly, most psychologists find it remarkable that so many college students caved in to the pressure of the group rather than do the job they had volunteered to do. In almost all cases, the participants knew they were giving an incorrect answer, but their concern for what these other people might be thinking about them overpowered their desire to do the right thing.

Variations of Asch's procedures have been conducted numerous times (Bond, 2005; Bond & Smith, 1996). We now know that the findings are easily replicated, that there is an increase in conformity with more confederates (up to about five), that teenagers are more prone to conforming than are adults, and that people conform significantly less often when they believe the confederates will not hear their responses (Berndt, 1979; Bond, 2005; Crutchfield, 1955; Deutsch & Gerard, 1955). This last finding is consistent with the notion that participants change their answers because they are concerned about what others think of them. Finally, although we see the effect in virtually every culture that has been studied.

The other reason we sometimes go along with the crowd is that people are often a source of information. Psychologists refer to this process as **informational influence**. Most of us, most of the time, are motivated to do the right thing. If society deems that we put litter in a proper container, speak softly in libraries, and tip our waiter, then that's what most of us will do. But sometimes it's not clear what society expects of us. In these situations, we often rely on **descriptive norms** (Cialdini et al., 1990). That is, we act the way most people—or most people like us—act. This is not an unreasonable strategy. Other people often have information that we do not, especially when we find ourselves in new situations.

Informational Influence
If you have ever been part of a conversation that went something like this,

"Do you think we should?"
"Sure. Everyone else is doing it.",

you have experienced the power of informational influence.

Efforts to influence people to engage in healthier or more sustainable behaviours have benefited from the informational influence. For example, hotels have been able to significantly increase the number of people who reuse bath towels (reducing water and energy use) by informing them on signs in their rooms that reusing towels is a typical behaviour of other hotel guests. Image: Infrogmation of New Orleans, CC BY 2.0.

However, it's not always easy to obtain good descriptive norm information, which means we sometimes rely on a flawed notion of the norm when deciding how we should behave. A good example of how misperceived norms can lead to problems is found in research on binge drinking among college students. Excessive drinking is a serious problem on many campuses (Mita, 2009). There are many reasons why students binge drink,

but one of the most important is their perception of the descriptive norm. How much students drink is highly correlated with how much they believe the average student drinks (Neighbours et al., 2007). Unfortunately, students aren't very good at making this assessment. They notice the boisterous heavy drinker at the party, but fail to consider all the students not attending the party. As a result, students typically overestimate the descriptive norm for college student drinking (Borsari & Carey, 2003; Perkins et al., 2005). Most students believe they consume significantly less alcohol than the norm, a miscalculation that creates a dangerous push toward more and more excessive alcohol consumption. On the positive side, providing students with accurate information about drinking norms has been found to reduce overindulgent drinking (Burger et al.,; Neighbors et al., 2009).

Researchers have demonstrated the power of descriptive norms in a number of areas. Homeowners reduced the amount of energy they used when they learned that they were consuming more energy than their neighbors (Schultz et al., Nolan, Cialdini, Goldstein, & Griskevicius, 2007). Undergraduates selected the healthy food option when led to believe that other students had made this choice (Burger et al., 2010). Hotel guests were more likely to reuse their towels when a hanger in the bathroom told them that this is what most guests did (Goldstein et al., 2008). And more people began using the stairs instead of the elevator when informed that the vast majority of people took the stairs to go up one or two floors (Burger & Shelton, 2011).

Obedience

Although we may be influenced by the people around us more than we recognize, whether we conform to the norm is up to us. But sometimes decisions about how to act are not so easy. Sometimes we are directed by a more powerful person to do things we may not want to do. Researchers who study **obedience** are interested in how people react when given an order or command from someone in a position of authority. In many situations, obedience is a good thing. We are taught at an early age to obey parents, teachers, and police officers. It's also important to follow instructions from judges, firefighters, and lifeguards. And a military would fail to function if soldiers stopped obeying orders from superiors. But there is also a dark side to obedience. In the name of "following orders" or "just doing my job," people can violate ethical principles and break laws. More disturbingly, obedience often is at the heart of some of the worst of human behaviour—massacres, atrocities, and even genocide.

Photographs of victims of Cambodian dictator Pol Pot. From 1975-79 the Khmer Rouge army obediently carried out orders to execute tens of thousands of civilians. Image: "Tuol Sleng Genocide Museum," by your local connection, CC BY-NC-SA 2.0.

It was this unsettling side of obedience that led to some of the most famous and most controversial research in the history of psychology. Milgram (1963, 1965, 1974) wanted to know why so many otherwise decent German citizens went along with the brutality of the Nazi leaders during the Holocaust. "These inhumane policies may have originated in the mind of a single person," Milgram (1963, p. 371) wrote, "but they could only be carried out on a massive scale if a very large number of persons obeyed orders."

To understand this obedience, Milgram conducted a series of laboratory investigations. Milgram conducted

many variations of this basic procedure to explore some of the factors that affect obedience. Milgram's obedience research has been the subject of much controversy and discussion. Psychologists continue to debate the extent to which Milgram's studies tell us something about atrocities in general and about the behaviour of German citizens during the Holocaust in particular (Miller, 2004). Certainly, there are important features of that time and place that cannot be recreated in a laboratory, such as a pervasive climate of prejudice and dehumanization. Another issue concerns the relevance of the findings. Some people have argued that today we are more aware of the dangers of blind obedience than we were when the research was conducted back in the 1960s. However, findings from partial and modified replications of Milgram's procedures conducted in recent years suggest that people respond to the situation today much like they did half a century ago (Burger, 2009).

Another point of controversy concerns the ethical treatment of research participants. Researchers have an obligation to look out for the welfare of their participants. Yet, there is little doubt that many of Milgram's participants experienced intense levels of stress as they went through the procedure. In his defence, Milgram was not unconcerned about the effects of the experience on his participants. And in follow-up questionnaires, the vast majority of his participants said they were pleased they had been part of the research and thought similar experiments should be conducted in the future. Nonetheless, in part because of Milgram's studies, guidelines and procedures were developed to protect research participants from these kinds of experiences. Although Milgram's intriguing findings left us with many unanswered questions, conducting a full replication of his experiment remains out of bounds by today's standards.

Finally, it is also worth noting that although a number of factors appear to lead to obedience, there are also those who would not obey. In one conceptual replication of the Milgram studies, conducted with a small sample in Italy, the researchers explored the moment that approximately two-thirds of the sample refused to cooperate (Bocchiaro & Zimbardo, 2010). The investigators identified compassion, ethics, and recognition of the situation as problematic as major influences on refusal. Thus, just as there are pressures to obey, there are also instances in which people can stand up to authority.

Social psychologists are fond of saying that we are all influenced by the people around us more than we recognize. Of course, each person is unique, and ultimately each of us makes choices about how we will and will not act. But decades of research on conformity and obedience make it clear that we live in a social world and that—for better or worse—much of what we do is a reflection of the people we encounter.

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10.5 Helping and Prosocial Behaviour

People often act to benefit other people, and these acts are examples of prosocial behaviour. Such behaviours may come in many guises: helping an individual in need; sharing personal resources; volunteering time, effort, and expertise; cooperating with others to achieve some common goals. The focus of this module is on helping—prosocial acts in dyadic situations in which one person is in need, and another provides the necessary assistance to eliminate the other's need. Although people are often in need, help is not always given. Why not? The decision of whether or not to help is not as simple and straightforward as it might seem, and many factors need to be considered by those who might help. In this module, we will try to understand how the decision to help is made by answering the question: Who helps when and why?

When Do People Help?

Social psychologists began trying to answer this question following the unfortunate murder of Kitty Genovese in 1964 (Dovidio et al., 2006; Penner et al., 2005). A knife-wielding assailant attacked Kitty repeatedly as she was returning to her apartment early one morning. At least 38 people may have been aware of the attack, but no one came to save her. More recently, in 2010, Hugo Alfredo Tale-Yax was stabbed when he apparently tried to intervene in an argument between a man and a woman. As he lay dying in the street, only one man checked his status, but many others simply glanced at the scene and continued on their way. (One passerby did stop to take a cellphone photo, however.) Unfortunately, failures to come to the aid of someone in need are not unique. Help is not always forthcoming for those who may need it the most. Trying to understand why people do not always help became the focus of **bystander intervention** research (e.g., Latané & Darley, 1970).

To answer the question regarding when people help, researchers have focused on

1. how bystanders come to define emergencies,
2. when they decide to take responsibility for **helping**, and
3. how the costs and benefits of intervening affect their decisions of whether to help.

1. Defining the situation: The role of pluralistic ignorance

The decision to help is not a simple yes/no proposition. In fact, a series of questions must be addressed before help is given—even in emergencies in which time may be of the essence. Sometimes help comes quickly; an onlooker recently jumped from a Philadelphia subway platform to help a stranger who had fallen on the track. Help was clearly needed and was quickly given. But some situations are ambiguous, and potential helpers may have to decide whether a situation is one in which help, in fact, *needs* to be given.

To define ambiguous situations (including many emergencies), potential helpers may look to the actions of others to decide what should be done. But those others are looking around too, also trying to figure out what to do. Everyone is looking, but no one is acting! Relying on others to define the situation and to then erroneously conclude that no intervention is necessary when help is actually needed is

called **pluralistic ignorance** (Latané & Darley, 1970). When people use the *inactions* of others to define their own course of action, the resulting pluralistic ignorance leads to less help being given.

2. Do I have to be the one to help?: Diffusion of responsibility

Simply being with others may facilitate or inhibit whether we get involved in other ways as well. In situations in which help is needed, the presence or absence of others may affect whether a bystander will assume personal responsibility to give the assistance. If the bystander is alone, personal responsibility to help falls solely on the shoulders of that person. But what if others are present? Although it might seem that having more potential helpers around would increase the chances of the victim getting help, the opposite is often the case. Knowing that someone else *could* help seems to relieve bystanders of personal responsibility, so bystanders do not intervene. This phenomenon is known as **diffusion of responsibility** (Darley & Latané, 1968).

How does being in a crowd decrease someone's chance of being helped? How does being in a crowd increase someone's chance of being helped? Image: "Crowd," by James Cridland, Wikipedia, CC BY 2.0.

On the other hand, watch the video of the race officials following the 2013 Boston Marathon after two bombs exploded as runners crossed the finish line. Despite the presence of many spectators, the yellow-jacketed race officials immediately rushed to give aid and comfort to the victims of the blast. Each one no doubt felt a personal responsibility to help by virtue of their official capacity in the event; fulfilling the obligations of their roles overrode the influence of the diffusion of responsibility effect.

There is an extensive body of research showing the negative impact of pluralistic ignorance and diffusion of responsibility on helping (Fisher et al., 2011), in both emergencies and everyday need situations. These studies show the tremendous importance potential helpers place on the social situation in which unfortunate events occur, especially when it is not clear what should be done and who should do it. Other people provide important social information about how we should act and what our personal obligations might be. But does knowing a person needs help and accepting responsibility to provide that help mean the person will get assistance? Not necessarily.

3. The costs and rewards of helping

The nature of the help needed plays a crucial role in determining what happens next. Specifically, potential helpers engage in a **cost–benefit analysis** before getting involved (Dovidio et al., 2006). If the needed help is of relatively low cost in terms of time, money, resources, or risk, then help is more likely to be given. Lending a classmate a pencil is easy; confronting the knife-wielding assailant who attacked

Kitty Genovese is an entirely different matter. As the unfortunate case of Hugo Alfredo Tale-Yax demonstrates, intervening may cost the life of the helper.

The potential rewards of helping someone will also enter into the equation, perhaps offsetting the cost of helping. Thanks from the recipient of help may be a sufficient reward. If helpful acts are recognized by others, helpers may receive social rewards of praise or monetary rewards. Even avoiding feelings of guilt if one does not help may be considered a benefit. Potential helpers consider how much helping will cost and compare those costs to the rewards that might be realized; it is the economics of helping. If costs outweigh the rewards, helping is less likely. If rewards are greater than the cost, helping is more likely.

Why Help?

Finally, the question of *why* a person would help needs to be asked. What motivation is there for that behaviour? Psychologists have suggested the following:

1. Evolutionary forces may serve to predispose humans to help others,
2. Egoistic concerns may determine if and when help will be given, and
3. Selfless, altruistic motives may also promote helping in some cases.

1. Evolutionary roots for prosocial behavior

Our evolutionary past may provide keys to why we help (Buss, 2004). Our very survival was no doubt promoted by the prosocial relations with clan and family members, and, as a hereditary consequence, we may now be especially likely to help those closest to us—blood-related relatives with whom we share a genetic heritage. According to evolutionary psychology, we are helpful in ways that increase the chances that our DNA will be passed along to future generations (Burnstein et al., 1994)—the goal of the "selfish gene" (Dawkins, 1976). Our personal DNA may not always move on, but we can still be successful in getting some portion of our DNA transmitted if our daughters, sons, nephews, nieces, and cousins survive to produce offspring. The favouritism shown for helping our blood relatives is called **kin selection** (Hamilton, 1964).

Evolutionary theory suggests that being a good helper was a benefit for survival and reproductive success. And we don't just help our family members; reciprocal altruism has also been a benefit to our survival. Image: "Bradshaw rock paintings," by TimJN1, Wikipedia, CC BY-SA 2.0.

But we do not restrict our relationships just to our own family members. We live in groups that include individuals who are unrelated to us, and we often help them, too. Why? **Reciprocal altruism** (Trivers, 1971) provides the answer. Because

of reciprocal altruism, we are all better off in the long run if we help one another. If helping someone now increases the chances that you will be helped later, then your overall chances of survival are increased. There is a chance that someone will take advantage of your help and not return your favours. But people seem predisposed to identify those who fail to reciprocate, and punishments, including social exclusion, may result (Buss, 2004). Cheaters will not enjoy the benefit of help from others, reducing the likelihood of the survival of themselves and their kin.

Evolutionary forces may provide a general inclination for being helpful, but they may not be as good an explanation for why we help in the here and now. What factors serve as proximal influences for decisions to help?

2. Egoistic motivation for helping

Most people would like to think that they help others because they are concerned about the other person's plight. In truth, the reasons why we help may be more about ourselves than others: Egoistic or selfish motivations may make us help. Implicitly, we may ask, "What's in it *for me*?" There are two major theories that explain what types of reinforcement helpers may be seeking. The **negative state relief model** (e.g., Cialdini et al., 1973; Cialdini et al., 1982) suggests that people sometimes help in order to make themselves feel better. Whenever we are feeling sad, we can use helping someone else as a positive mood boost to feel happier. Through socialization, we have learned that helping can serve as a secondary reinforcement that will relieve negative moods (Cialdini & Kenrick, 1976).

The **arousal: cost–reward model** provides an additional way to understand why people help (e.g., Piliavin et al.,1981). This model focuses on the aversive feelings aroused by seeing another in need. If you have ever heard an injured puppy yelping in pain, you know that feeling, and you know that the best way to relieve that feeling is to help and to comfort the puppy. Similarly, when we see someone who is suffering in some way (e.g., injured, homeless, hungry), we vicariously experience a sympathetic arousal that is unpleasant, and we are motivated to eliminate that aversive state. One way to do that is to help the person in need. By eliminating the victim's pain, we eliminate our own aversive arousal. Helping is an effective way to alleviate our own discomfort.

As an egoistic model, the arousal: cost–reward model explicitly includes the cost/reward considerations that come into play. Potential helpers will find ways to cope with the aversive arousal that will minimize their costs—maybe by means other than direct involvement. For example, the costs of directly confronting a knife-wielding assailant might stop a bystander from getting involved, but the cost of some *indirect* help (e.g., calling the police) may be acceptable. In either case, the victim's need is addressed. Unfortunately, if the costs of helping are too high, bystanders may reinterpret the situation to justify not helping at all. We now know that the attack of Kitty Genovese was a murderous assault, but it may have been misperceived as a lover's spat by someone who just wanted to go back to sleep. For some, fleeing the situation causing their distress may do the trick (Piliavin et al., 1981).

The egoistically based negative state relief model and the arousal: cost–reward model see the primary motivation for helping as being the helper's own outcome. Recognize that the victim's outcome is of

relatively little concern to the helper—benefits to the victim are incidental byproducts of the exchange (Dovidio et al., 2006). The victim may be helped, but the helper's real motivation, according to these two explanations, is egoistic: Helpers help to the extent that it makes them feel better.

3. Altruistic help

Altruism is helping with the aim of improving the well-being of others. Having a feeling of empathy for others is an important aspect of altruism. Image: "Homeless and hungry," by Ed Yourdon, Flickr, CC BY-NC-SA 2.0.

Although many researchers believe that **egoism** is the only motivation for helping, others suggest that **altruism**—helping that has as its ultimate goal the improvement of another's welfare—may also be a motivation for helping under the right circumstances. Batson (2011) has offered the **empathy–altruism model** to explain altruistically motivated helping for which the helper expects no benefits. According to this model, the key to altruism is empathizing with the victim, that is, putting oneself in the shoes of the victim and imagining how the victim must feel. When taking this perspective and having **empathic concern**, 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. The empathy–altruism model does not dismiss egoistic motivations; helpers not empathizing with a victim may experience **personal distress** and have an egoistic motivation, not unlike the feelings and motivations explained by the arousal: cost–reward model. Because egoistically motivated individuals are primarily concerned with their own cost–benefit outcomes, they are less likely to help if they think they can escape the situation with no costs to themselves. In contrast, altruistically motivated helpers are willing to accept the cost of helping to benefit a person with whom they have empathized—this "self-sacrificial" approach to helping is the hallmark of altruism (Batson, 2011).

Although there is still some controversy about whether people can ever act for purely altruistic motives, it is important to recognize that, while helpers may derive some personal rewards by helping others, the help that has been given also benefits someone who was in need. The residents who offered food, blankets, and shelter to stranded runners who were unable to get back to their hotel rooms because of the Boston Marathon bombing undoubtedly received positive rewards because of the help they gave, but those stranded runners who were helped got what they needed badly as well. "In fact, it is quite remarkable how the fates of people who have never met can be so intertwined and complementary. Your benefit is mine; and mine is yours" (Dovidio et al., 2006, p. 143).

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10.6 Chapter Summary

Let's Reflect

In this chapter, we learned that social psychology is the subfield of psychology that examines how situations influence individuals' thoughts, feelings, and behaviours. Although human behaviour can be explained by internal factors, such as personality, and external factors, such as cultural and social influences, it is best understood by considering both. We also learned that people often overemphasize dispositional explanations and underestimate situational influences, a tendency known as the fundamental attribution error. In addition, our explanations for both our own behaviour and the behaviour of others can be biased when we lack information about others' motivations or when we interpret events in ways that protect our self-esteem.

Human behaviour is also strongly shaped by social roles, norms, and scripts, which provide shared cultural expectations about how people should behave in particular situations and help guide appropriate actions in everyday life. As individuals interact with others from different backgrounds, conflict can arise, and prejudice—negative feelings and evaluations toward members of an out-group—can develop. These negative attitudes can lead to discrimination based on gender, race, ethnicity, social class, sexual orientation, and other social identities.

We also explored attitudes, which are our positive or negative evaluations of a person, idea, or object, and saw that attitudes and beliefs are shaped by both internal and external influences. One internal process of attitude change is cognitive dissonance, the tension that occurs when thoughts, feelings, and behaviours conflict; people may reduce this tension by changing their behaviour, attitudes, or cognitions, or by adding a new cognition. External influences on attitude change include persuasion, such as advertising, where the source, message, and audience all affect responses. Finally, we learned that persuasion can occur through two main routes: the central route, which relies on facts and information, and the peripheral route, which relies on cues such as beauty, fame, and positive emotions.

The chapter concluded by distinguishing altruism, which involves helping others out of empathy, from egoistic motivations for helping.

Key Terms

- **Actor-Observer Bias**: a phenomenon of explaining other people's behaviors are due to internal factors and our own behaviors are due to situational forces.
- **Attitude**: evaluations of or feelings toward a person, idea, or object that are typically positive or negative.
- **Attribution**: explanation for the behaviour of other people.
- **Central Route Persuasion**: logic-driven arguments using data and facts to convince people of an argument's worthiness.
- **Cognitive Dissonance**: psychological discomfort that arises from a conflict in a person's behaviours, attitudes, or beliefs that runs counter to one's positive self-perception.
- **Dispositionism**: describes a perspective common to personality psychologists, which asserts that our behaviour is determined by internal factors, such as personality traits and temperament.
- **Foot-in-the-Door Technique**: persuasion of one person by another person, encouraging a person to agree to a small favour, or to buy a small item, only to later request a larger favour or purchase a larger item.
- **Fundamental Attribution Error**: tendency to overemphasize internal factors as attributions for behaviour and underestimate the power of the situation.
- **Individualistic Culture**: a culture that focuses on individual achievement and autonomy.
- **Internal Factor**: internal attribute of a person, such as personality traits or temperament.
- **Just-World Hypothesis**: an ideology common in the United States that people get the outcomes they deserve.
- **Peripheral Route Persuasion**: one person persuades another person; an indirect route that relies on the association of peripheral cues (such as positive emotions and celebrity endorsement) to associate positivity with a message.
- **Persuasion**: the process of changing our attitude toward something based on some form of communication.
- **Script**: a person's knowledge about the sequence of events in a specific setting.
- **Self-Serving Bias**: the tendency for individuals to take credit by making dispositional or internal attributions for positive outcomes and situational or external attributions for negative outcomes.
- **Situationism**: describes a perspective that behaviour and actions are determined by the immediate environment and surroundings; a view promoted by social psychologists.
- **Social Norm**: group's expectations regarding what is appropriate and acceptable for the thoughts and behaviour of its members.
- **Social Psychology**: a field of psychology that examines how people impact or affect each other, with particular focus on the power of the situation.
- **Social Role**: a socially defined pattern of behaviour that is expected of a person in a given setting or group.

Questions for Further Discussion

Critical Thinking Questions

1. Compare and contrast situational influences and dispositional influences and give an example of each. Explain how situational influences and dispositional influences might explain inappropriate behaviour.
   Hint
   A situationist view is that our behaviours are determined by the situation—for example, a person who is late for work claims that heavy traffic caused the delay. A dispositional view is that our behaviours are determined by personality traits—for example, a driver in a road rage incident claims the driver who cut her off is an aggressive person. Thus, a situational view tends to provide an excuse for inappropriate behaviour, and a dispositional view tends to lay blame for inappropriate behaviour.
2. Give an example (one not used in class or your text) of cognitive dissonance and how an individual might resolve this.
   Hint
   One example is choosing which college to attend—the public school close to home or the Ivy League school out of state. Since both schools are desirable, the student is likely to experience cognitive dissonance in making this decision. In order to justify choosing the public school close to home, the student could change her cognition about Ivy League schools, asserting that it is too expensive and the quality of education at the public school is just as good. She could change her attitude toward the Ivy League school and determine that the students there are too stuffy and wouldn't make good classmates.
3. Imagine that you work for an advertising agency, and you've been tasked with developing an advertising campaign to increase sales of Bliss Soda. How would you develop an advertisement for this product that uses a central route of persuasion? How would you develop an ad using a peripheral route of persuasion?
   Hint
   Although potential answers will vary, advertisements using the central route of persuasion might involve a doctor listing logical reasons for drinking this product. For example, the doctor might cite research suggesting that the soda is better than alternatives because of its reduced calorie content, lack of adverse health consequences, etc. An advertisement using a peripheral route of persuasion might show very attractive people consuming the product while spending time on a beautiful, sunny beach.
4. What do you think is the primary motive for helping behaviour: egoism or altruism? Are there any professions in which people are being "pure" altruists, or are some egoistic motivations always playing a role?

Personal Application Questions

1. Provide a personal example of an experience in which your behavior was influenced by the power of the situation.
2. Think of an example in the media of a sports figure—player or coach—who gives a self-serving attribution for winning or losing. Examples might include accusing the referee of incorrect calls, in the case of losing, or citing their own hard work and talent, in the case of winning.
3. Cognitive dissonance often arises after making an important decision, called post-decision dissonance (or in popular terms, buyer's remorse). Describe a recent decision you made that caused dissonance and describe how you resolved it.
4. Describe a time when you or someone you know used the foot-in-the-door technique to gain someone's compliance.
5. Pluralistic ignorance suggests that inaction by other observers of an emergency will decrease the likelihood that help will be given. What do you think will happen if even one other observer begins to offer assistance to a victim?
6. What are the characteristics possessed by your friends who are most helpful? By your friends who are least helpful? What has made your helpful friends and your unhelpful friends so different? What kinds of help have they given to you, and what kind of help have you given to them? Are you a helpful person?

Activities: Let's Review

Activity 1

Quiz Text Description

1. MultiChoice Activity

Which of the following are examples of situational influences on behaviour?

a. Starting to study late for an exam because you feel lazy.
b. Making a silly mistake on an exam because you do not have a lot of time to write the exam.
c. Walking in a wall because you were temporarily blinded by some light reflecting off a nearby window.
d. Being told to study for an exam by your gaurdians.
e. A person making new friends because they are extroverted.
f. Tripping on a chair because you tend to be an absent minded.

2. MultiChoice Activity

Prof. Wagner has to have one of his lectures recorded so that her boss at the psychology department can decide if they want to rehire her.

The students know that the lecture is being recorded and that it will be used to decide if Prof. Wagner is rehired. During this lecture, the students pay extra attention, answer questions, participate well, and are well-behaved.

Prof. Wagner feels that the lecture went well because the students were putting in extra effort, as the students knew she was being filmed. Prof. Wagner's boss, when reviewing the lecture, thinks that she is an amazing lecturer who is really good at her job. Prof. Wagner's boss decides to rehire her! Whoop!

The differing opinions between Prof. Wagner and her boss as to how well the lecture went is an example of the

a. correspondence bias
b. interpersonal-positioning bias
c. fundamental attribution error
d. self-serving bias
e. actor-observer bias

3. MultiChoice Activity

Which is the best definition of the fundamental attribution error (also known as the *correspondence bias*)

a. It is when we choose to explain our own success in dispositional terms rather than situational terms.
b. It is when we correctly identify situational explanations for our own behaviour but incorrectly choose dispositional explanations for another person's behaviour.
c. It is when one makes a dispositional inference for another's behaviour when situational factors better explain the behaviour.
d. It is when one makes a situational inference for another's behaviour when dispositional factors better explain the behaviour.
e. It is when we choose to explain our own failures in terms of situational factors and the failures of others in terms of dispositional factors.

4. MultiChoice Activity

Kara gets an F on her social psychology exam. Then she goes home and gets into an argument with her roommate, Lee. Lee assumes Kara is yelling at him because she likes to bully him, not because she had a bad day. Lee is making a _____.

a. confirmation bias
b. central attribution error
c. fundamental attribution error
d. situational attribution
e. actor-observer bias

5. MultiChoice Activity

Tom believes he is unable to stop playing computer games because his friends play computer games too and are a bad influenceon him. He also believes, however, that Barnaby is unable to stop playing computer games because Barnaby is addicted to computer games. This is an example of _____.

a. sanctimonious bias
b. actor-observer bias
c. self-serving bias
d. correspondence bias
e. cognitive dissonance

6. DragText Activity

Drag the words into the correct boxes

1. _____ is the belief that our behavior is determined by our surroundings, while _____ states that behavior is determined by internal factors such as personality and temperament.
2. _____ makes us fail to recognize that someone's behavior may be because of situational factors. We may falsely believe their behavior is dispositional.
3. _____ is a phenomena where we misattribute others' actions to internal factors and our own behaviors we attribute to situational factors.
4. _____ enable us to see ourselves in the most favorable light. For example: If you do good on a test you'll say you are smart (dispositional), but if you do poorly on a test you'll blame the situation.
5. _____ are the beliefs that people get the outcomes they deserve.

Possible answers:

- Just-world hypotheses
- Situationism
- Actor-observer bias
- Fundamental attribution error
- Self-serving bias
- Dispositionism

7. MultiChoice Activity

Kenji decided to lose weight. They were reflecting on their own weight gain and how they had put on so much weight. They were looking at explanations for their own prior behaviour that allowed them to not change their behaviour. For instance, when they sat down and broke a chair, they thought to themselves "the chair was damaged before I sat on it". This is an example of

a. the correspondence bias
b. cognitive dissonance
c. the actor-observer bias
d. subtyping
e. the self-serving bias

Solution:

1. b. Making a silly mistake on an exam because you do not have a lot of time to write the exam.; c. Walking in a wall because you were temporarily blinded by some light reflecting off a nearby window.; d. Being told to study for an exam by your gaurdians.;
2. e. actor-observer bias
3. c. It is when one makes a dispositional inference for another's behaviour when situational factors better explain the behaviour.
4. c. fundamental attribution error
5. c. self-serving bias
6. ***Situationism*** is the belief that our behavior is determined by our surroundings, while ***Dispositionism*** states that behavior is determined by internal factors such as personality and temperament.
7. ***Fundamental attribution error*** makes us fail to recognize that someone's behavior may be because of situational factors. We may falsely believe their behavior is dispositional.
8. ***Actor-observer bias*** is a phenomena where we misattribute others' actions to internal factors and our own behaviors we attribute to situational factors.
9. ***Self-serving bias*** enable us to see ourselves in the most favorable light. For ***example, just-world hypotheses*** are the beliefs that people get the outcomes they deserve.
10. e. the self-serving bias

Activity 2

Quiz Text Description

1. MultiChoice Activity

Matías is shopping for a wedding ring for himself and his husband-to-be. He happens upon a shop owner who says that they will sell him a sterling silver wedding band for $300 cheaper than any other ring store he has been to. After Matías says he will buy the ring, the shop owner asks if he wants to buy insurance for the ring for an extra $100. Matías agrees. After this, the shop owner asks if Matías wants to buy life-long clearning at the jeweler for an extra $150. Matías agrees. For another $200, the shop owner further offers to put a special coating on the ring that will stop it from getting dusty. Matías agrees.

All-in-all, Matías ends up spending more money here than he would have at any other shop. What technique did the shop owner use on Matías?

a. The foot-over-hand technique
b. The foot-in-the-mouth technique
c. Cognitive dissonance
d. The door-in-the-face technique
e. The foot-in-the-door technique

2. MultiChoice Activity

Gloria has started her own business selling knives around her community. She walks up to peoples' houses and asks them if they would like to buy her "phenomenal collection of stainless steel blades."

In order to get them to buy, Gloria insists that everyone buy a single knife for $5, try it out, and later on they can purchase the whole set (that costs $50). What persuasive technique is Gloria using for her business?

a. Effect-of-initiation-technique
b. Door-in-the-face-technique
c. Foot-in-the-door-technique
d. People who sell knives are inherently persuasive. Gloria isn't using any techniques, that's just who she is.
e. Act-now-buy-again-technique

3. True/False Activity

According to the Yale Attitude Change Approach, an audience with **low intelligence** and **low self-esteem** is the most easily persuadable. (True/False)

4. MultiChoice Activity

Sarah got accepted into her country's military. She arrives at the training camp and is made to endure many weeks of gruelling exercises, drills, and regimens. She is tremendously exhausted at the end of every day.

Based off research of initiation proccesses, what will be Sarah's likely attitude towards the military?

a. Sarah won't dislike the military, but she will dislike the specific commanders that forced her to endure difficult tasks. She will still love the military and what it stands for but she won't like the commanders who bossed her around.

b. Sarah will come to dislike the military because they forced her to do rigorous and difficult tasks that she views as meaningless. Because of the commanders constantly telling her what to do, Sarah will generalize the dislike of her commanders to the entire military.
c. Sarah will be confused with how she feels about the military. On the one hand, she feels really passionate about becoming a well-respected soldier, but on the other hand, she did not enjoy the difficult tasks she was made to do during the initiation process.
d. Sarah will become very dedicated to and protective of the military. This is because she needs to justify why she expended so much effort during the training camp. She feels that she has commited significant time and effort in the past few weeks and she does not want this to be for nothing.

5. MultiChoice Activity

Stanley Milgram conducted some of the most famous studies into obedience. He wanted to see if participants would obey orders to administer a potentially lethal shock to another participant (who was actually a confederate). Many participants administered the potentially lethal shock. Years after participating in the study, several participants said that they viewed their participation in these studies as a valuable experience as it had given them a deeper understanding of themselves.

These beliefs in the importance of their participation in this research might have been bolstered by

a. justifying their behaviour via the peripheral route of persuasion.
b. having been paid to participate in the study.
c. a motivation to reduce cognitive dissonance.
d. diffusion of responsibility
e. justifying their behaviour via the central route of persuasion.

6. MultiChoice Activity

According to the Yale Attitude Change model, which person below might be most persuasive in selling a new type of toothpaste.

a. A person advertising the toothpaste that highlights the obvious beneficial effects of brushing one's teeth.
b. A handsome actor advertising the toothpaste.
c. An advert that is played on a television in a busy public place.
d. A handsome actor wearing a white lab coat advertising the toothpaste.
e. A not very attractive person wearing a white lab coat advertising the toothpaste.

7. DragText Activity

Drag the words into the correct boxes

1. _____ is the modification of opinions of members to align with the group consensus.
2. _____ is the strengthening of a group's original beliefs after discussion.
3. _____ is when people conform to a group to feel good and be accepted by the group, whereas _____ is when people conform because they believe that the group is competent and has substantial knowledge.

4. _____ is the change of an individual's behavior to comply with the demand of an authority figure.
5. _____ is where someone exerts less effort because they are in a group (think of a lazy student who doesn't do much during a group project).
6. A(n) _____ is a person who is aware of the experiment and works for the researcher.
7. _____ is the term used for the change in a person's behavior to go along with the group.
8. _____ is when people perform better with an audience rather than without.

Possible answers:

- Social loafing
- Informational social influence
- Groupthink
- Obedience
- Confederate
- Social facilitation
- Normative social influence
- Conformity
- Group polarization

8. True/False Activity

The Asch Effect is the influence of the group majority on an individual's judgement.

If the group majority is large, there are no other dissenters, and all responses are public then we would assume there to be a high likelihood of conformity.

(True/False)

Solution:

1. e. The foot-in-the-door technique
2. c. Foot-in-the-door-technique
3. False
4. d. Sarah will become very dedicated to and protective of the military. This is because she needs to justify why she expended so much effort during the training camp. She feels that she has commited significant time and effort in the past few weeks and she does not want this to be for nothing.
5. c. a motivation to reduce cognitive dissonance.
6. d. A handsome actor wearing a white lab coat advertising the toothpaste.
7. ***Groupthink*** is the modification of opinions of members to align with the group consensus.
8. ***Group polarization*** is the strengthening of a group's original beliefs after discussion.
9. ***Normative social influence*** is when people conform to a group to feel good and be accepted by the group, whereas ***Informational social influence*** is when people conform because they believe that the group is competent and has substantial knowledge.
10. ***Obedience*** is the change of an individual's behavior to comply with the demand of an authority figure.
11. ***Social loafing*** is where someone exerts less effort because they are in a group (think of a lazy student who doesn't do much during a group project).

12. A(n) ***Confederate*** is a person who is aware of the experiment and works for the researcher.
13. ***Conformity*** is the term used for the change in a person's behavior to go along with the group.
14. ***Social facilitation*** is when people perform better with an audience rather than without.
15. True

Activity 3

Quiz Text Description

1. MultiChoice Activity

Attitudes describe our _____ of people, objects, and ideas.

a. treatment
b. knowledge
c. cognitions
d. evaluations

2. MultiChoice Activity

Cognitive dissonance causes discomfort because it disrupts our sense of _____.

a. unpredictability
b. consistency
c. power
d. dependency

3. MultiChoice Activity

In order for the central route to persuasion to be effective, the audience must be _____ and _____.

a. gullible; distracted
b. analytical; motivated
c. intelligent; unemotional
d. attentive; happy

4. MultiChoice Activity

Examples of cues used in peripheral route persuasion include all of the following *except* _____.

a. celebrity endorsement
b. factual information
c. attractive models
d. positive emotions

Solution:

1. d. evaluations

2. b. consistency
3. b. analytical; motivated
4. b. factual information

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CHAPTER 11: PSYCHOLOGICAL DISORDERS

Chapter Overview

11.0 Learning Objectives
11.1 The Compassionate View of Psychological Disorders
11.2 Understanding Abnormal Behaviour
11.3 Perspectives on Psychological Disorders
11.4 The Stigma of Mental Illness
11.5 Chapter Summary

11.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Identify local mental health resources that are available to students at Fanshawe College.
2. Use respectful, compassionate language when discussing mental health.
3. Explain what it means to display abnormal behaviour.
4. Identify categories of psychological disorders found in the American Psychiatric Association's (APA) Diagnostic and Statistical Manual.
5. Discuss the historical and modern origins of psychological disorders.
6. Describe the diathesis-stress model and its importance to the study of psychopathology.
7. Explain the concept of stigma and its forms.
8. Describe the effect of stigma on those who have a mental illness and individuals around them.

Chapter Overview

In this chapter, we will begin to differentiate between what's considered normal vs abnormal behaviour. We will learn about the DSM-5 as a tool for diagnosing psychological disorders and its diagnostic categories. We will examine historical understandings of mental illness and modern perspectives about the biological and social causes of psychological disorders. Finally, we will consider the nature of stigma and how negative attitudes and beliefs about mental illness can be a barrier to care.

11.1 The Compassionate View of Psychological Disorders

As these disorders are outlined, please bear two things in mind. First, remember that psychological disorders represent *extremes* of inner experience and behaviour. Each of us experiences episodes of sadness, anxiety, and preoccupation with certain thoughts—times when we do not quite feel ourselves. These episodes should not be considered problematic unless the accompanying thoughts and behaviours become extreme and have a disruptive effect on one's life. If, while reading about these disorders, you feel that these descriptions begin to personally characterize you, please know that you are not alone – there is help.

Fanshawe Supports for Mental Health

If you are a Fanshawe College student and need support for mental health, here are some free and confidential supports:

- Fanshawe's Counselling and Accessibility Services (519-452-4282 or counselling@fanshawec.ca) offers services during the week.
- Reach Out (1-866-933-2023; web chat and call-back options available) is a confidential 24/7 information, support and crisis service for people living with mental health or addiction concerns.
- Good2Talk (1-866-925-5454) provides support to post-secondary students across Ontario.
- In an emergency, please call 911 or go to your local hospital immediately. If you are on campus, you can call 519-452-4242 for campus security.

Second, understand that people with psychological disorders are far more than just their disorders. We do not use terms such as schizophrenics, depressives, or phobics because they are labels that objectify people who suffer from these conditions, thus promoting biased and disparaging assumptions. It is important to remember that a psychological disorder is not what a person *is*; it is something that a person *has*, through no fault of their own. As is the case with cancer or diabetes, those with psychological disorders suffer debilitating, often painful conditions that are not of their own choosing. Everyone deserves to be viewed and treated with compassion, understanding, and dignity.

Person or Identity-First?

As noted by St. Lewis (2022), "When writing, the Mental Health Commission of Canada (MHCC) recommends person-first language as a first choice, unless you know that an individual or group describes themselves otherwise. When talking to a person with lived and living experience, listen for or ask them about the language they use. It's not about getting it "right" on the first try. It's about listening, learning, and championing the use of respectful, non-stigmatizing language — whichever form that takes" (para. 7).

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mutter, which is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted. *Modifications: Added links to Fanshawe's mental health resources and content on person-first language*.

11.2 Understanding Abnormal Behaviour

Cassie's Story

Cassie is an 18-year-old female from rural northern Ontario. She was a successful high school student who graduated as valedictorian. She was accepted to Fanshawe College, where she received additional scholarships. Excited to start this new chapter in her life, Cassie's parents begin the 5-hour drive to London, ON, where they will leave their only daughter for the first time.

The semester begins as it always does at the start of September. Cassie meets the challenge with enthusiasm and does well in her classes for the first few weeks of the semester, as expected. Sometime around Week 6, her friends notice she is despondent, detached, and falling behind in her work. After being asked about her condition, she replies that she is "just a bit homesick," and her friends accept this as a typical response to leaving home and starting college for many students. A month later, her condition has not improved but worsened. She now regularly shirks her responsibilities around her apartment, in her classes, and on her job. Cassie does not hang out with friends like she did when she first arrived for college, and stays in bed most of the day. Concerned, Cassie's friends help her contact Fanshawe's Health and Wellness for help.

Cassie's story, though hypothetical, is true of many students leaving home for the first time to earn a higher education. Most students recover from this depression and go on to be functional members of their collegiate environment and accomplished scholars. Some students learn to cope on their own, while others seek assistance from their school's health and wellness center or from friends who have already been through the same ordeal. These are normal reactions. However, in cases like Cassie's, the path to recovery is not as clear. Instead of learning how to cope, their depression increases until it reaches clinical levels and becomes an impediment to success in multiple domains of life, such as home, work, school, and social circles.

What are Psychological Disorders?

A **psychological disorder** is a condition characterized by abnormal thoughts, feelings, and behaviours. **Psychopathology** is the study of psychological disorders, including their symptoms, etiology (i.e., their causes), and treatment. The term *psychopathology* can also refer to the manifestation of a psychological disorder.

Consider This

Although consensus 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 labelled as abnormal and clearly signify some kind of psychological disturbance. The person who washes his 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 man feels when talking to attractive women or the loneliness and longing for home a freshman experiences during her 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 work to distinguish psychological disorders from inner experiences and behaviours that are merely situational, idiosyncratic, or unconventional.

The American Psychiatric Association (APA) Definition

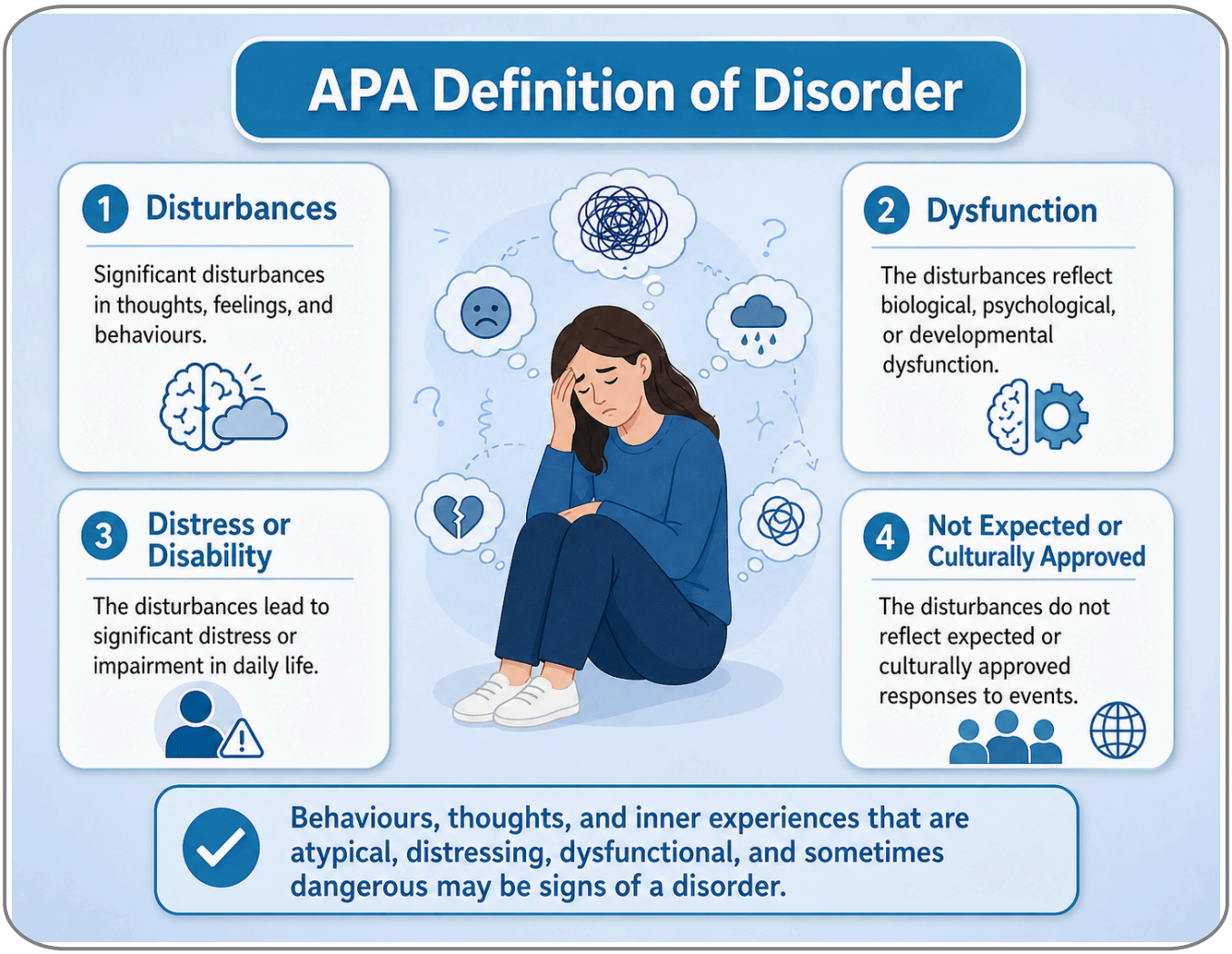

Figure 11.2.1. *The APA definition of a disorder*

Image Description

An infographic titled “APA Definition of Disorder” on a light blue gradient background. In the centre, a distressed person sits curled up with a hand on their forehead, surrounded by thought bubbles showing tangled thoughts, sadness, anxiety, rain clouds, and a broken heart. Four surrounding panels explain signs of disorder. Panel 1, “Disturbances,” states that there are significant disturbances in thoughts, feelings, and behaviours. Panel 2, “Dysfunction,” explains that the disturbances reflect biological, psychological, or developmental dysfunction. Panel 3, “Distress or Disability,” states that the disturbances lead to significant distress or impairment in daily life. Panel 4, “Not Expected or Culturally Approved,” explains that the disturbances do not reflect expected or culturally approved responses to events. A banner at the bottom summarizes that behaviours, thoughts, and inner experiences that are atypical, distressing, dysfunctional, and sometimes dangerous may be signs of a disorder.

- **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, has inner experiences, and displays behaviours that most would consider atypical and negative (disturbed), and that would likely be troubling to family members.

- **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.
- **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).
- **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, the individual would not be assumed to signify a mental disorder.

Some believe that there is no essential criterion or set of criteria that can definitively distinguish all cases of disorder from nondisorder (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.

DSM-5 Disorder Categories

The DSM-5 includes the following categories of disorders:

Table 11.1.2 DSM-5 Classification System of Mental Disorders

Disorder Category	Short Description
Neurodevelopmental disorders	A group of conditions that arise in the developmental period and include intellectual disability, communication disorders, autism spectrum disorder, specific learning disorder, motor disorders, and ADHD
Schizophrenia Spectrum	Disorders characterized by one or more of the following: delusions, hallucinations, disorganized thinking and speech, disorganized motor behaviour, and negative symptoms
Bipolar and Related	Characterized by mania or hypomania and possibly depressed mood; includes Bipolar I and II and cyclothymic disorder
Depressive	Characterized by sad, empty, or irritable mood, as well as somatic and cognitive changes that affect functioning; includes major depressive disorder, persistent depressive disorder, mood dysregulation disorder, and premenstrual dysphoric disorder
Anxiety	Characterized by excessive fear and anxiety and related behavioural disturbances; Includes phobias, separation anxiety, panic disorder, generalized anxiety disorder, social anxiety disorder, agoraphobia
Obsessive-Compulsive	Characterized by obsessions and compulsions, and includes OCD, hoarding, body dysmorphic disorder, trichotillomania, and excoriation
Trauma- and Stressor- Related	Characterized by exposure to a traumatic or stressful event, such as PTSD, acute stress disorder, adjustment disorders, and prolonged grief disorder
Dissociative	Characterized by a disruption or discontinuity in memory, identity, emotion, perception, body representation, consciousness, motor control, or behaviour; dissociative identity disorder, dissociative amnesia, and depersonalization/derealization disorder
Somatic Symptom	Characterized by prominent somatic symptoms and/or illness anxiety associated with significant distress and impairment; includes illness anxiety disorder, somatic symptom disorder, and conversion disorder
Feeding and Eating	Characterized by a persistent disturbance of eating or eating-related behavior to include bingeing and purging; Includes pica, rumination disorder, avoidant/restrictive food intake disorder, anorexia, bulimia, and binge-eating disorder
Elimination	Characterized by the inappropriate elimination of urine or feces; usually first diagnosed in childhood or adolescence; Includes enuresis and encopresis
Sleep-Wake	Characterized by sleep-wake complaints about the quality, timing, and amount of sleep; includes insomnia, sleep terrors, narcolepsy, sleep apnea, hypersomnolence disorder, restless leg syndrome, and circadian-rhythm sleep-wake disorders
Sexual Dysfunctions	Characterized by sexual difficulties and includes premature or delayed ejaculation, female orgasmic disorder, and erectile disorder (to name a few)
Gender Dysphoria	Characterized by distress associated with the incongruity between one's experienced or expressed gender and the gender assigned at birth

Disruptive, Impulse-Control, Conduct	Characterized by problems in the self-control of emotions and behaviour, and involves the violation of the rights of others causing the individual to violate societal norms; includes oppositional defiant disorder, antisocial personality disorder, kleptomania, intermittent explosive disorder, conduct disorder, and pyromania
Substance-Related and Addictive	Characterized by the continued use of a substance despite significant problems related to its use
Neurocognitive	Characterized by a decline in cognitive functioning over time, and the NCD has not been present since birth or early in life; Includes delirium, major and mild neurocognitive disorder, and Alzheimer's disease
Personality	Characterized by a pattern of stable traits which are inflexible, pervasive, and lead to distress or impairment; Includes paranoid, schizoid, borderline, obsessive-compulsive, narcissistic, histrionic, dependent, schizotypal, antisocial, and avoidant personality disorders
Paraphilic	Characterized by recurrent and intense sexual fantasies that can cause harm to the individual or others; includes exhibitionism, voyeurism, sexual sadism, sexual masochism, pedophilia, and fetishistic disorders

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Cassie's Story was adapted from Module 1: What is Abnormal Psychology? by Washington State University, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted. *Modifications: Revised minor details of the example to reflect Fanshawe students' educational context*.

What are Psychological Disorders, and the *American Psychiatric Association (APA) Definition* were excerpts from "What are Psychological Disorders" in Psychology – H5P Edition Copyright © 2021 by Rose M. Spielman; Kathryn Dumper; William Jenkins; Arlene Lacombe; Marilyn Lovett; and Marion Perlmutter, which is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted.

DMS Disorders Categories and *Table 11.1.2* were adapted from "Module 3: Clinical Assessment, Diagnosis and Treatment" in "Fundamentals of Psychological Disorders (3rd edition)" by Alexis Bridley and Lee W. Daffin Jr., which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, except where otherwise noted.

OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompt

Figure 11.2.1. "Using the same look and feel as previous images in this book, create an illustration graphic depicting the idea that behaviours, thoughts, and inner experiences that are atypical, distressing, dysfunctional, and sometimes even dangerous are signs of a disorder. Consider the attached information from the chapter when creating the image."

11.3 Perspectives on Psychological Disorders

Scientists and mental health professionals may adopt different perspectives in attempting to understand or explain the underlying mechanisms that contribute to the development of a psychological disorder. The perspective used in explaining a psychological disorder is extremely important, in that it will consist of explicit assumptions regarding how best to study the disorder, its etiology, and what kinds of therapies or treatments are most beneficial. Different perspectives provide alternate ways to think about the nature of psychopathology.

Supernatural Perspectives of Psychological Disorders

For centuries, psychological disorders were viewed from a supernatural perspective: attributed to a force beyond scientific understanding. Those afflicted were thought to be practitioners of black magic or possessed by spirits (Maher & Maher, 1985). For example, convents throughout Europe in the 16th and 17th centuries reported hundreds of nuns falling into a state of frenzy in which the afflicted foamed at the mouth, screamed and convulsed, sexually propositioned priests, and confessed to having carnal relations with devils or Christ. Although today, these cases would suggest serious mental illness, at the time, these events were routinely explained as possession by devilish forces (Waller, 2009a). Similarly, grievous fits by young girls are believed to have precipitated the witch panic in New England late in the 17th century (Demos, 1983). Such beliefs in supernatural causes of mental illness are still held in some societies today; for example, beliefs that supernatural forces cause mental illness are common in some cultures in modern-day parts of Nigeria (Aghukwa, 2012; Okafor et al., 2022).

In The Extraction of the Stone of Madness, a 15th-century painting by Hieronymus Bosch, a practitioner is using a tool to extract an object (the supposed "stone of madness") from the head of an afflicted person. Image: "Cutting the Stone (detail)," by Hieronymus Bosch, Wikimedia Commons, Public Domain.

Consider This: Dancing Mania

Between the 11th and 17th centuries, a curious epidemic swept across Western Europe. Groups of people would suddenly begin to dance with wild abandon. This compulsion to dance—referred to as dancing mania—sometimes gripped thousands of people at a time. Historical accounts indicate that those afflicted would sometimes dance with bruised and bloody feet for days or weeks, screaming of terrible visions and begging priests and monks to save their souls (Waller, 2009b). What caused dancing mania is not known, but several explanations have been proposed, including spider venom and ergot poisoning ("Dancing Mania," 2011).

Although the cause of dancing mania, depicted in this painting, was unclear, the behaviour was attributed to supernatural forces. Image: "The Dance at St. John," by Pieter Brueghel the Younger, Wikimedia Commons, Public Domain.

Historian John Waller (2009a, 2009b) has provided a comprehensive and convincing explanation of dancing mania that suggests the phenomenon was attributable to a combination of three factors: psychological distress, social contagion, and belief in supernatural forces. Waller argued that various disasters of the time (such as famine, plagues, and floods) produced high levels of psychological distress that could increase the likelihood of succumbing to an involuntary trance state. Waller indicated that anthropological studies and accounts of possession rituals show that people are more likely to enter a trance state if they expect it to happen, and that entranced individuals behave in a ritualistic manner, their thoughts and behaviour shaped by the spiritual beliefs of their culture. Thus, during periods of extreme physical and mental distress, all it took were a few people—believing

themselves to have been afflicted with a dancing curse—to slip into a spontaneous trance and then act out the part of one who is cursed by dancing for days on end.

Biological Perspectives of Psychological Disorders

The **biological perspective** views psychological disorders as linked to biological phenomena, such as genetic factors, chemical imbalances, and brain abnormalities; it has gained considerable attention and acceptance in recent decades (Wyatt & Midkiff, 2006). Evidence from many sources indicates that most psychological disorders have a genetic component; in fact, there is little dispute that some disorders are largely due to genetic factors.

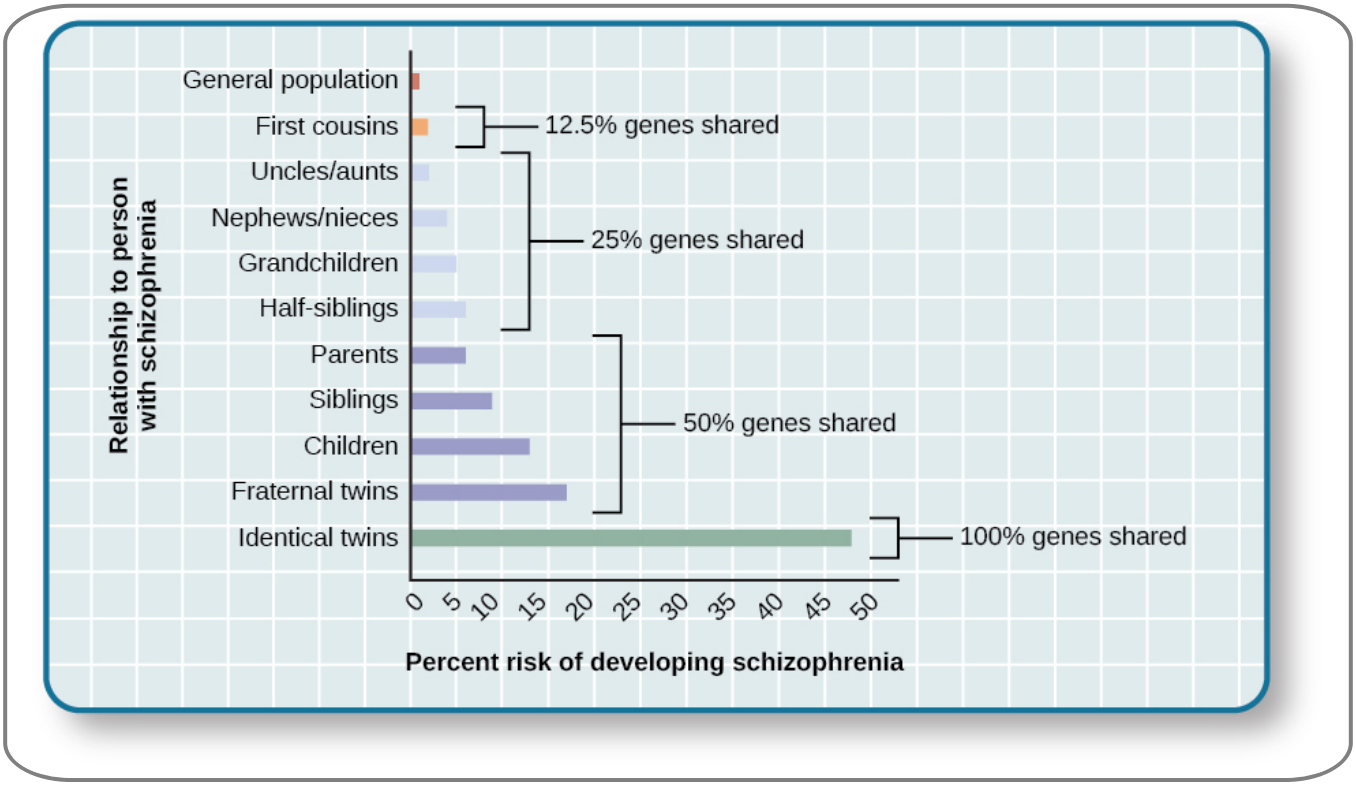

***Figure 11.3.1**. A person's risk of developing schizophrenia increases if a relative has schizophrenia. The closer the genetic relationship, the higher the risk.*

Image Description

A horizontal bar graph showing the percent risk of developing schizophrenia by genetic relationship to a person with schizophrenia. The vertical axis lists relationship categories: general population, first cousins, uncles and aunts, nephews and nieces, grandchildren, half-siblings, parents, siblings, children, fraternal twins, and identical twins. The horizontal axis shows the percent risk from 0 to 50. Risk increases as genetic relatedness increases: the general population has the lowest risk, followed by first cousins and other more distant relatives, then parents, siblings, children, and fraternal twins, while identical twins have by far the highest risk at nearly

50 percent. Brackets on the graph indicate approximate shared genes for groups of relatives: 12.5 percent, 25 percent, 50 percent, and 100 percent.

Findings such as these have led many of today's researchers to search for specific genes and genetic mutations that contribute to mental disorders. Also, sophisticated neural imaging technology in recent decades has revealed how abnormalities in brain structure and function might be directly involved in many disorders, and advances in our understanding of neurotransmitters and hormones have yielded insights into their possible connections. The biological perspective is currently thriving in the study of psychological disorders.

The Diathesis-Stress Model of Psychological Disorders

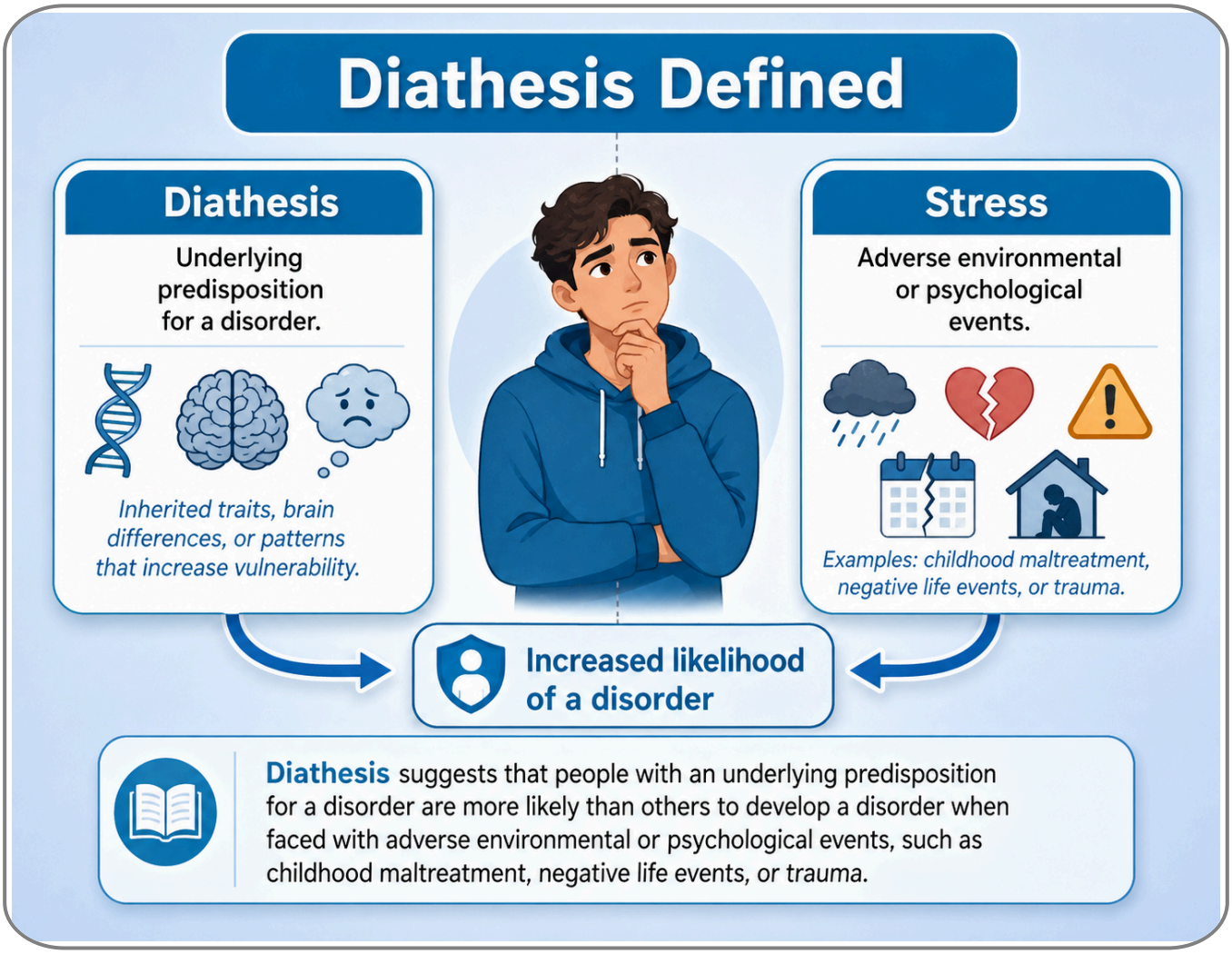

Figure 11.3.2. *Diathesis-Stress defined*

Image Description

An infographic titled "Diathesis Defined" on a light blue gradient background. A central illustration shows a worried person in a blue hoodie, positioned between two panels labeled "Diathesis" and "Stress." The left panel defines diathesis as an underlying predisposition for a disorder and includes icons such as DNA, a brain, and a

worried thought bubble, with a note that inherited traits, brain differences, or patterns can increase vulnerability. The right panel defines stress as adverse environmental or psychological events and includes icons such as a rain cloud, broken heart, warning sign, cracked calendar, and a figure sitting alone in a house, with examples including childhood maltreatment, negative life events, and trauma. Arrows from both panels point toward a centre box reading "Increased likelihood of a disorder." A box at the bottom summarizes that diathesis suggests people with an underlying predisposition are more likely to develop a disorder when faced with adverse environmental or psychological events.

Despite advances in understanding the biological basis of psychological disorders, the **psychosocial perspective** is still very important. This perspective emphasizes the importance of learning, stress, faulty and self-defeating thinking patterns, and environmental factors. Perhaps the best way to think about psychological disorders, then, is to view them as originating from a combination of biological and psychological processes. Many develop not from a single cause, but from a delicate fusion between partly biological and partly psychosocial factors.

The **diathesis-stress model** (Zuckerman, 1999) integrates biological and psychosocial factors to predict the likelihood of a disorder. This diathesis-stress model suggests that people with an underlying predisposition for a disorder (i.e., a diathesis) are more likely than others to develop a disorder when faced with adverse environmental or psychological events (i.e., stress), such as childhood maltreatment, negative life events, trauma, and so on. A diathesis is not always a biological vulnerability to an illness; some diatheses may be psychological (e.g., a tendency to think about life events in a pessimistic, self-defeating way).

The key assumption of the diathesis-stress model is that both factors, diathesis and stress, are necessary in the development of a disorder. Different models explore the relationship between the two factors: the level of stress needed to produce the disorder is inversely proportional to the level of diathesis.

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OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompt

Figure 11.3.2. "Using the same look and feel as previous images in this book, create an illustration graphic depicting the definition of diathesis provided. Consider the attached information from the chapter when creating the image."

11.4 The Stigma of Mental Illness

Why Don't People Seek Care?

Many people who need care never seek it out. Why is that? We already know that society dictates what is considered abnormal behaviour through culture and social norms, and you can likely think of a few implications of that. But to fully understand society's role in why people do not seek care, we need to determine the psychological processes underlying this phenomenon in the individual..

We have spent quite a lot of space and time understanding how people gather information about the world and people around them, process this information, use it to make snap judgements about others, form groups for which stereotypes may exist, and then potentially hold negative views of this group and behave negatively toward them as a result. Just one piece of information, such as the label associated with having a mental disorder, can be used to set this series of mental events into motion. Stereotypes about people with a mental disorder can quickly and easily transform into prejudice when people in a society determine the schema to be correct and form negative emotions and evaluations of this group (Eagly & Chaiken, 1993). This, in turn, can lead to discriminatory practices such as an employer refusing to hire, a landlord refusing to rent an apartment, or avoiding a romantic relationship, all due to the person having a mental illness.

Overlapping with prejudice and discrimination in terms of how people with mental disorders are treated is **stigma**, or when negative stereotyping, labelling, rejection, and loss of status occur. Stigma takes on three forms as described below:

1. *Public stigma*– When members of a society endorse negative stereotypes of people with a mental disorder and discriminate against them. They might avoid them altogether, resulting in social isolation. An example is when an employer intentionally does not hire a person because their mental illness is discovered.
2. *Label avoidance*–To avoid being labelled as "crazy" or "nuts," people needing care may avoid seeking it altogether or stop care once started. Due to these labels, funding for mental health services could be restricted, and instead, physical health services are funded.
3. *Self-stigma*– When people with mental illnesses internalize the negative stereotypes and prejudice, and in turn, discriminate against themselves. They may experience shame, reduced self-esteem, hopelessness, low self-efficacy, and a reduction in coping mechanisms. An obvious consequence of these potential outcomes is the *why try* effect, or the person saying 'Why should I try and get that job? I am not worthy of it' (Corrigan et al., Larson, & Rusch, 2009; Corrigan et al., 2016).

Another form of stigma that is worth noting is that of **courtesy stigma** or when stigma affects people associated with a person who has a mental disorder. Karnieli-Miller et al. (2013) found that families of the afflicted were often blamed, rejected, or devalued when others learned that a family member had a serious mental illness (SMI). Due to this, they felt hurt and betrayed, and an important source of social support during a difficult time had disappeared, resulting in greater levels of stress. To cope, some families concealed their relative's illness, and some parents struggled to decide whether it was their place to disclose their child's condition. Others fought with the issue of confronting the stigma through attempts at education versus just ignoring it due to not having enough energy or desiring to maintain personal boundaries. There was also a need to understand the responses of others and to attribute it to a lack of knowledge, experience, and/or media coverage. In some cases, the reappraisal allowed family members to feel compassion for others rather than feeling put

down or blamed. The authors concluded that each family "develops its own coping strategies which vary according to its personal experiences, values, and extent of other commitments" and that "coping strategies families employ change over time."

Other effects of stigma include experiencing work-related discrimination resulting in higher levels of self-stigma and stress (Rusch et al., 2014), higher rates of suicide, especially when treatment is not available (Rusch et al., 2014; Rihmer & Kiss, 2002), and a decreased likelihood of future help-seeking intention (Lally et al., 2013). The results of the latter study also showed that personal contact with someone with a history of mental illness led to a decreased likelihood of seeking help. This is important because 48% of the university sample stated that they needed help for an emotional or mental health issue during the past year, but did not seek help. Similar results have been reported in other studies (Eisenberg et al., 2009). It is also important to point out that social distance, a result of stigma, has also been shown to increase throughout the life span, suggesting that anti-stigma campaigns should focus on older people primarily (Schomerus et al., 2015).

One potentially disturbing trend is that mental health professionals have been shown to hold negative attitudes toward the people they serve. Hansson et al. (2011) found that staff members at an outpatient clinic in the southern part of Sweden held the most negative attitudes about whether an employer would accept an applicant for work, willingness to date a person who had been hospitalized, and hiring a patient to care for children. Attitudes were stronger when staff treated patients with a psychosis or in inpatient settings. In a similar study, Martensson et al., (2014) found that staff had more positive attitudes towards persons with mental illness if their knowledge of such disorders was less stigmatized; their workplaces were in the county council where they were more likely to encounter patients who recover and return to normal life in society, rather than in municipalities where patients have long-term and recurrent mental illness; and they have or had one close friend with mental health issues.

Consider This: University of Calgary Study

To help deal with stigma in the mental health community, Papish et al. (2013) investigated the effect of a one-time contact-based educational intervention compared to a four-week mandatory psychiatry course on the stigma of mental illness among medical students at the University of Calgary. The curriculum included two methods requiring contact with people diagnosed with a mental disorder: patient presentations, or two one-hour oral presentations in which patients shared their story of having a mental illness, and "clinical correlations" in which a psychiatrist mentored students while they interacted with patients in either inpatient or outpatient settings. Results showed that medical students held a stigma towards mental illness and that comprehensive medical education reduced this stigma. As the authors stated, "These results suggest that it is possible to create an environment in which medical student attitudes towards mental illness can be shifted in a positive direction." That said, the level of stigma was still higher for mental illness than it was for the stigmatized physical illness, type 2 diabetes mellitus.

What might happen if mental illness is presented as a treatable condition? McGinty et al., (2015) found that portraying schizophrenia, depression, and heroin addiction as untreated and symptomatic increased negative public attitudes towards people with these conditions. Conversely, when the same people were portrayed as

successfully treated, the desire for social distance was reduced, there was less willingness to discriminate against them, and belief in treatment effectiveness increased among the public.

Self-stigma has also been shown to affect self-esteem, which then affects hope, which then affects the quality of life among people with severe mental illness. As such, hope should play a central role in recovery (Mashiach-Eizenberg et al., 2013). Narrative Enhancement and Cognitive Therapy (NECT) is an intervention designed to reduce internalized stigma and targets both hope and self-esteem (Yanos et al., 2011). The intervention replaces stigmatizing myths with facts about illness and recovery, which leads to hopefulness and higher levels of self-esteem in clients. This may then reduce susceptibility to internalized stigma.

Stigma leads to health inequities (Hatzenbuehler et al., 2013), prompting calls for stigma change. Targeting stigma involves two different agendas: The *services agenda* attempts to remove stigma so people can seek mental health services, and the *rights agenda* tries to replace discrimination that "robs people of rightful opportunities with affirming attitudes and behaviour" (Corrigan, 2016). The former is successful when there is evidence that people with mental illness are seeking services more or becoming better engaged. The latter is successful when there is an increase in the number of people with mental illnesses in the workforce who are receiving reasonable accommodations.

Adapted from "Module 1: What is Abnormal Psychology?" in "Fundamentals of Psychological Disorders (3rd edition)" by Alexis Bridley and Lee W. Daffin Jr., which is licensed under a Creative Commons Attribution-Non-Commercial-ShareAlike 4.0 International License, except where otherwise noted. *Modifications: Content on social and references to American legislation were removed.*

11.5 Chapter Summary

Let's Reflect

In this chapter, we learned that students at Fanshawe College have access to a variety of mental health resources for support. We also learned that when discussing mental health and psychological disorders, it is important to take a compassionate approach and use respectful language. Person-first language is often preferred, although the context and the preferences of individuals and communities should also be taken into account.

We learned that psychological disorders are conditions characterized by abnormal thoughts, feelings, and behaviours. Although defining psychological disorders can be challenging, it is essential for psychologists and mental health professionals to agree on which kinds of inner experiences and behaviours indicate the presence of a disorder. While atypical behaviours or those that violate social norms may suggest a disorder, neither of these criteria alone is sufficient. The concept of harmful dysfunction explains psychological disorders as resulting from the failure of an internal mechanism to perform its natural function. Many aspects of this view have been incorporated into the APA's formal definition of psychological disorders, which states that such disorders involve significant disturbances in thoughts, feelings, and behaviours; reflect a biological, psychological, or developmental dysfunction; cause significant impairment in a person's life; and are not culturally expected responses to particular life events.

We also explored the complexity of psychopathology, which includes many different theories and perspectives about the causes of psychological disorders. For centuries, these disorders were viewed mainly through a supernatural perspective and were believed to result from divine forces or spirit possession, and some cultures continue to hold these beliefs today. In contrast, the biological perspective views psychological disorders as arising largely from faulty biological processes, and scientific advances have increased understanding of the genetic, neurological, hormonal, and biochemical foundations of psychopathology. The psychological perspective, however, emphasizes the role of psychological factors, such as stress and thoughts, as well as environmental influences in the development of psychological disorders.

Finally, we learned that a contemporary and promising approach is to understand psychological disorders as the result of an interaction between biological and psychosocial factors. The diathesis-stress model explains that people with an underlying vulnerability, or diathesis, are more likely than those without that vulnerability to develop a psychological disorder when they encounter stressful life events. We also learned that stigma involves negative stereotyping, labelling, rejection, and loss of status, and that it can appear in the form of public stigma, self-stigma, and label avoidance. Stigma can have serious effects on well-being, employment, and help-seeking behaviours, which is why reducing stigma and structural barriers is so important for improving access to mental health treatment.

Key Terms

- **Biological Perspective**: views psychological disorders as linked to biological phenomena, such as genetic factors, chemical imbalances, and brain abnormalities.
- **Courtesy Stigma**: when stigma affects people associated with a person who has a mental disorder.
- **Diathesis-Stress Model**: a model of psychological disorders that suggests that people with an underlying predisposition for a disorder (i.e., a diathesis) are more likely than others to develop a disorder when faced with adverse environmental or psychological events (i.e., stress), such as childhood maltreatment, negative life events, trauma, and so on.
- **Label Avoidance**: to avoid being labeled as "crazy" or "nuts," people needing care may avoid seeking it altogether or stop care once started. Due to these labels, funding for mental health services could be restricted, and instead, physical health services are funded.
- **Psychological Disorder**: mental disorders are characterized by psychological dysfunction, which causes physical and/or psychological distress or impaired functioning, and is not an expected behaviour according to societal or cultural standards.
- **Psychopathology**: the scientific study of psychological disorders, including their symptoms, causes, and treatment; manifestation of a psychological disorder.
- **Psychosocial Perspective**: emphasizes the importance of learning, stress, faulty and self-defeating thinking patterns, and environmental factors on psychological disorders.
- **Public Stigma**: when members of a society endorse negative stereotypes of people with a mental disorder and discriminate against them.
- **Self-Stigma**: occurs when people with mental illnesses internalize the negative stereotypes and prejudice, and in turn, discriminate against themselves. They may experience shame, reduced self-esteem, hopelessness, low self-efficacy, and a reduction in coping mechanisms.
- **Stigma**: when negative stereotyping, labelling, rejection, and loss of status occur. Stigma takes on three forms (public, label avoidance, and self-stigma).

Questions for Further Discussion

Critical Thinking Questions

1. Discuss why thoughts, feelings, or behaviours that are merely atypical or unusual would not necessarily signify the presence of a psychological disorder. Provide an example.
   Hint
   Just because something is atypical or unusual does not mean it is disordered. A person may experience atypical inner experiences or exhibit unusual behaviors, but she would not be considered disordered if they are not distressing, disturbing, or reflecting a dysfunction. For example, a classmate might stay up all night studying before exams; although atypical, this behaviour is unlikely to possess any of the other criteria for psychological disorder mentioned previously.
2. Why is the perspective one uses in explaining a psychological disorder important?
   Hint
   The perspective one uses in explaining a psychological disorder consists of assumptions that will guide how to best study and understand the nature of a disorder, including its causes, and how to most effectively treat the disorder.

Personal Application Questions

1. Even today, some believe that certain occurrences have supernatural causes. Think of an event, recent or historical, for which others have provided a supernatural explanation.

Activity: Let's Review

Activity 1

Quiz Text Description

1. TrueFalse Activity

Psychological disorders in the past were viewed as supernatural and those who had disorders were thought to have been affected by black magic or spiritual possessions. (True/False)

2. True/False Activity

Supernatural beliefs about psychological disorders were only believed in the past. (True/False)

3. True/False Activity

The biological perspective covers all aspects of psychological disorder. (True/False)

4. True/False Activity

The diathesis-stress model integrates biological and psychosocial factors to determine the likelihood of a disorder. (True/False)

5. MultiChoice Activity

Taylor and colleagues (2006) found that individuals with two long alleles of the 5-HTTLPR serotonin transporter gene were at a lower risk of developing depression when faced with early childhood adversity and adversity later on in life.

Participants, however, who had two short alleles of the 5-HTTLPR gene, although at greater risk of developing depression if they experienced stress early on and later on in life, reported fewer depressive symptoms if they had not experienced any adversity during their childhood and adult life.

Which theory does this provide evidence for?

a. psychoneuroimmunological theories of mental disorders
b. cognitive theories of depression
c. the medical model of mental disorders
d. None of these are correct
e. the diathesis-stress model

Solution:

1. True
2. False

3. False
4. True
5. e. the diathesis-stress model

Activity 2

Quiz Text Description

1. MultiChoice Activity

The diathesis-stress model presumes that psychopathology results from _____.

a. chemical imbalances and structural abnormalities in the brain
b. adverse childhood experiences
c. vulnerability and adverse experiences
d. biochemical factors

2. MultiChoice Activity

Dr. Anastasia believes that major depressive disorder is caused by an over-secretion of cortisol. His view on the cause of major depressive disorder reflects a _____ perspective.

a. psychological
b. biological
c. supernatural
d. diathesis-stress

Solution:

1. c. vulnerability and adverse experiences
2. b. biological

Psychopathology review section and *Questions for Further Discussion,* adapted from What are Psychological Disorders and Perspectives on Psychological Disorders in Psychology – H5P Edition Copyright © 2021 by Rose M. Spielman; Kathryn Dumper; William Jenkins; Arlene Lacombe; Marilyn Lovett; and Marion Perlmutter is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted.

CHAPTER 12: TREATING PSYCHOLOGICAL DISORDERS

Chapter Overview

12.0 Learning Objectives
12.1 Mental Health Treatment – Past and Present
12.2 Therapeutic Orientations
12.3 Treatment Modalities
12.4 Biomedical Therapies
12.5 Chapter Summary

12.0 Learning Objectives

Learning Objectives

By the end of this chapter, you will be able to:

1. Describe historical approaches to understanding and treating psychological disorders.
2. Explain the process of deinstitutionalization and its consequences.
3. Discuss the ways in which mental health services are delivered today.
4. Summarize the most widely practiced approaches to psychotherapy.
5. List the various modalities of treatment
6. Describe biomedical treatments.

Chapter Overview

In this chapter, we will examine the history of treating individuals who have psychological disorders. In addition, we will see that therapy approaches include both psychological and biological interventions, all aimed at alleviating distress. Because psychological challenges can originate from various sources — biology, genetics, childhood experiences, conditioning, and sociocultural influences — psychologists have developed many different therapeutic techniques and approaches. Therapy that is accessible online or via an app is becoming increasingly popular; it allows individuals to receive the care and support they need at a time and place that are convenient for them.

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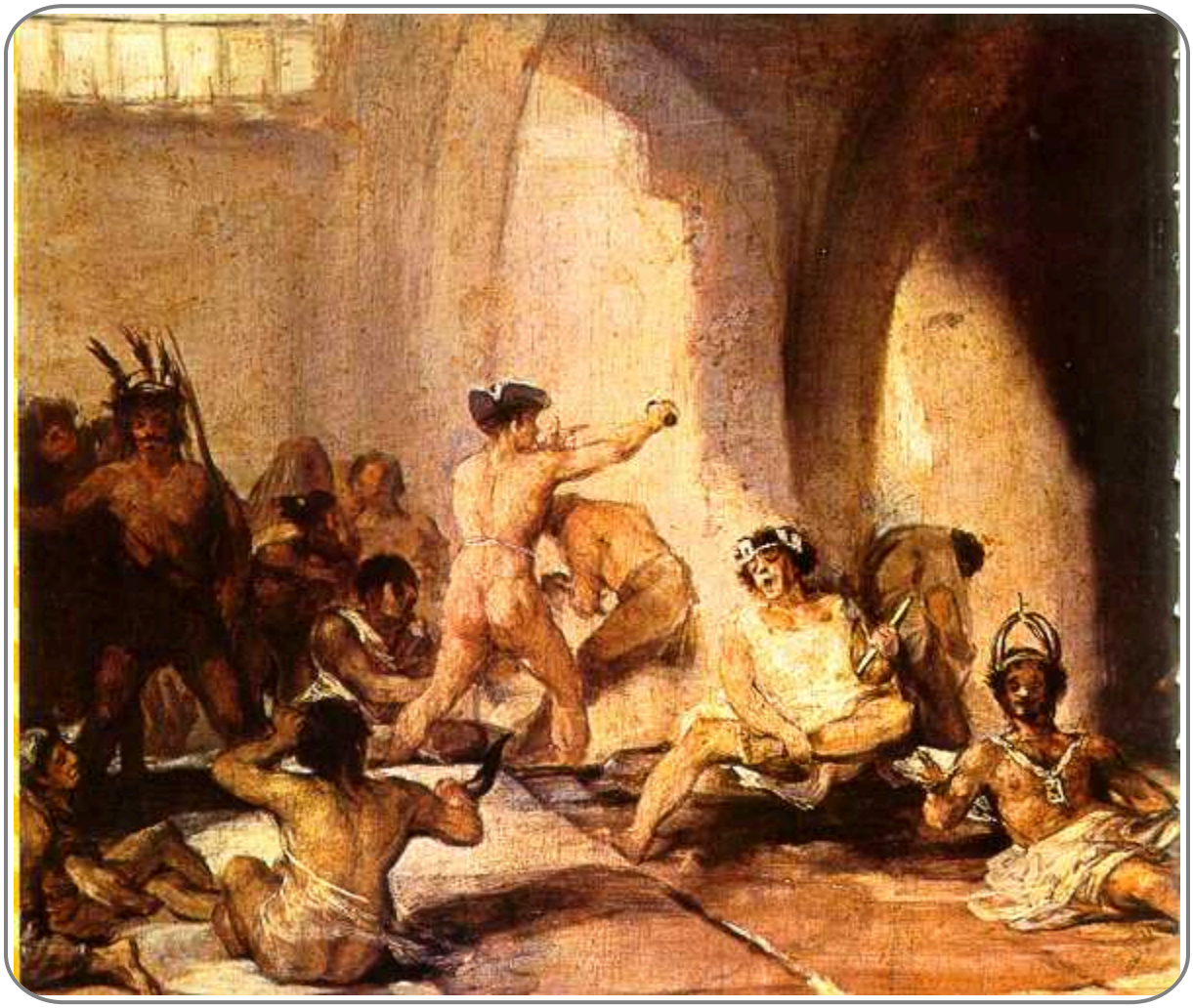
12.1 Mental Health Treatment – Past and Present

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 she 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 the execution or imprisonment of people with psychological disorders. Still others were left homeless and begging. 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 organizations 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 considered odd or unusual were placed in asylums. 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.



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. Image: "La casa de los locos," by Francisco Goya, Wikimedia Commons, Public Domain.

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. Patients benefited from this more humane treatment, and many were able to leave the hospital.

This painting by Tony Robert-Fleury depicts Dr. Philippe Pinel ordering the removal of chains from patients at the Salpêtrière asylum in Paris. Image: "Philippe Pinel à la Salpêtrière,"by Tony Robert-Fleury, Wikimedia Commons, Public Domain.

In the 19th century, Dorothea Dix led reform efforts for mental health care in the United States. 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.

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 anesthesia. A brief application of electric stimulus is used to produce a generalized 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.

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. Image: "Dix-Dorothea-LOC," by United States Library of Congress's Prints and Photographs division, Wikimedia Commons, Public Domain.

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 deinstitutionalization — 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 institutionalized at public hospitals (Torrey, 1997). By 1994 (by percentage of the population), there were 92% fewer hospitalized individuals (Torrey, 1997).

Mental Health Treatment – Present

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 deinstitutionalization 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 were 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 deinstitutionalization 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). In a metal analysis, Canadian researchers Barry et al. (2024) estimated that closer to 67% of people experiencing homelessness in various forms also had mental health disorders, highlighting a need for supports that help with mental health and housing.

Mental Health and the Corrections System: Indigenous people are over-represented

Another group of individuals with psychological disorders 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 colonization (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. Recognizing 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 hospitalization; individuals are often hospitalized only if they are an imminent threat to themselves or others.

Most people suffering from mental illnesses are not hospitalized. 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 first see their primary care physician, then be referred to a mental health practitioner.

Some people seek treatment because they are involved with 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.

Some people seek therapy because the criminal justice system referred them or required them to go. For some individuals, for example, attending weekly counselling 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.

Therapy with children may involve play. Image by Marisa Howenstine, Unsplash License.

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 counsellor, 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 counselling 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).

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12.2 Therapeutic Orientations

Psychoanalysis and Psychodynamic Therapy

The earliest organized therapy for mental disorders was psychoanalysis. Made famous in the early 20th century by one of the best-known clinicians of all time, Sigmund Freud, this approach stresses that mental health problems are rooted in unconscious conflicts and desires. In order to resolve the mental illness, then, these unconscious struggles must be identified and addressed. Psychoanalysis often does this through exploring one's early childhood experiences that may have continuing repercussions on one's mental health in the present and later in life. Psychoanalysis is an intensive, long-term approach in which patients and therapists may meet multiple times per week, often for many years.

History of Psychoanalytic Therapy

Freud initially suggested that mental health problems arise from efforts to push inappropriate sexual urges out of conscious awareness (Freud, 1895/1955). Later, Freud suggested more generally that psychiatric problems are the result of tension between different parts of the mind: the id, the superego, and the ego. In Freud's *structural model,* the id represents pleasure-driven unconscious urges (e.g., our animalistic desires for sex and aggression), while the superego is the semi-conscious part of the mind where morals and societal judgment are internalized (e.g., the part of you that automatically knows how society expects you to behave). The ego—also partly conscious—mediates between the id and superego. Freud believed that bringing unconscious struggles like these (where the id demands one thing and the superego another) into conscious awareness would relieve the stress of the conflict (Freud, 1920/1955)—which became the goal of **psychoanalytic therapy**.

Although psychoanalysis is still practiced today, it has largely been replaced by the more broadly defined **psychodynamic therapy**. This latter approach has the same basic tenets as psychoanalysis, but is briefer, makes more of an effort to put clients in their social and interpersonal context, and focuses more on relieving psychological distress than on changing the person.

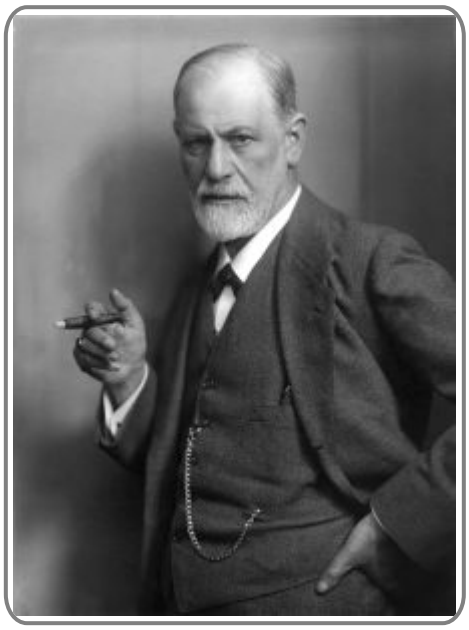
Techniques in Psychoanalysis

Sometimes, free association exercises are applied specifically to childhood recollections. That is, psychoanalysts believe a person's childhood relationships with caregivers often determine the way that person relates to others and predict later psychiatric difficulties. Thus, exploring these childhood memories, through free association or otherwise, can provide therapists with insights into a patient's psychological makeup.

Because we don't always have the ability to consciously recall these deep memories, psychoanalysts also discuss their patients' dreams. In Freudian theory, dreams contain not only *manifest* (or literal) content, but also *latent* (or symbolic) content (Freud, 1900; 1955). For example, someone may have a dream that his/her teeth are falling out—the manifest or actual content of the dream. However, dreaming that one's teeth are falling out could be a reflection of the person's unconscious concern about losing his or her physical attractiveness—the latent or metaphorical content of the dream. It is the therapist's job to help discover the latent content underlying one's manifest content through dream analysis.

In psychoanalytic and psychodynamic therapy, the therapist plays a receptive role—interpreting the patient's thoughts and behaviour based on clinical experience and psychoanalytic theory. For example, if during therapy a patient begins to express unjustified anger toward the therapist, the therapist may recognize this as an act of *transference*. That is, the patient may be displacing feelings for people in his or her life (e.g., anger toward a parent) onto the therapist. At the same time, though, the therapist has to be aware of his or her own thoughts and emotions, for, in a related process called *countertransference*, the therapist may displace his/her own emotions onto the patient.

The key to psychoanalytic theory is to have patients uncover the buried, conflicting content of their mind, and therapists use various tactics—such as seating patients to face away from them—to promote freer self-disclosure. And, as a therapist spends more time with a patient, the therapist can come to view his or her relationship with the patient as another reflection of the patient's mind.



Building on the work of Josef Breuer and others, Sigmund Freud developed psychotherapeutic theories and techniques that became widely known as psychoanalysis or psychoanalytic therapy. Image: "Sigmund Freud," by Max Halberstadt, Wikipedia, Public Domain.Psychoanalysts and psychodynamic therapists employ several techniques to explore patients' unconscious minds. One common technique is called ***free association****. Here, the patient shares any and all thoughts that come to mind, without attempting to organize or censor them in any way. For example, if you took a pen and paper and just wrote down whatever came into your head, letting one thought lead to the next without allowing conscious criticism to shape what you were writing, you would be doing free association. The analyst then uses his or her expertise to discern patterns or underlying meaning in the patient's thoughts.*

Advantages and Disadvantages of Psychoanalytic Therapy

Psychoanalysis was once the only type of psychotherapy available, but presently the number of thera-

pists practicing this approach is decreasing around the world. Psychoanalysis is not appropriate for some types of patients, including those with severe psychopathology or intellectual disability. Further, psychoanalysis is often expensive because treatment usually lasts many years. Still, some patients and therapists find the prolonged and detailed analysis very rewarding.

Perhaps the greatest disadvantage of psychoanalysis and related approaches is the lack of empirical support for their effectiveness. The limited research that has been conducted on these treatments suggests that they do not reliably lead to better mental health outcomes (e.g., Driessen et al., 2010). And, although there are some reviews that seem to indicate that long-term psychodynamic therapies might be beneficial (e.g., Leichsenring & Rabung, 2008), other researchers have questioned the validity of these reviews. Nevertheless, psychoanalytic theory was history's first attempt at formal treatment of mental illness, setting the stage for the more modern approaches used today.

Humanistic and Person-Centred Therapy

One of the next developments in therapy for mental illness, which arrived in the mid-20th century, is called humanistic or **person-centred therapy** (PCT). Here, the belief is that mental health problems result from an inconsistency between patients' behaviour and their true personal identity. Thus, the goal of PCT is to create conditions under which patients can discover their self-worth, feel comfortable exploring their own identity, and alter their behaviour to better reflect this identity.

History of Person-Centred Therapy

PCT was developed by a psychologist named Carl Rogers during a time of significant growth in the movements of humanistic theory and human potential. These perspectives were based on the idea that humans have an inherent drive to realize and express their own capabilities and creativity. Rogers, in particular, believed that all people have the potential to change and improve, and that therapists' role is to foster self-understanding in an environment where adaptive change is most likely to occur (Rogers, 1951). Rogers suggested that the therapist and patient must engage in a genuine, egalitarian relationship in which the therapist is nonjudgmental and empathetic. In PCT, the patient should experience both a vulnerability to anxiety, which motivates the desire to change, and an appreciation for the therapist's support.

The quality of the relationship between therapist and patient is of great importance in person-centred therapy. Image: by NOBA, CC0 1.0 Universal.

Techniques in Person-Centred Therapy

Humanistic and person-centred therapy, like psychoanalysis, involves a largely unstructured conversation between the therapist and the patient. Unlike psychoanalysis, though, a therapist using PCT takes a passive role, guiding the patient toward his or her own self-discovery. Rogers's original name for PCT was *non-directive therapy*, and this notion is reflected in the flexibility found in PCT. Therapists do not try to change patients' thoughts or behaviours directly. Rather, their role is to provide the therapeutic relationship as a platform for personal growth. In these kinds of sessions, the therapist tends only to ask questions and doesn't provide any judgment or interpretation of what the patient says. Instead, the therapist is present to provide a safe and encouraging environment for the person to explore these issues for themselves.

An important aspect of the PCT relationship is the therapist's **unconditional positive regard** for the patient's feelings and behaviours. That is, the therapist is never to condemn or criticize the patient for what s/he has done or thought; the therapist is only to express warmth and empathy. This creates an environment free of approval or disapproval, where patients come to appreciate their value and to behave in ways that are congruent with their own identity.

Advantages and Disadvantages of Person-Centred Therapy

One key advantage of person-centred therapy is that it is highly acceptable to patients. In other words, people tend to find the supportive, flexible environment of this approach very rewarding. Furthermore, some of the themes of PCT translate well to other therapeutic approaches. For example, most therapists of any orientation find that clients respond well to being treated with nonjudgmental empathy. The main disadvantage of PCT, however, is that findings about its effectiveness are mixed. One possibility for this could be that the treatment is primarily based on *nonspecific treatment factors*. That is, rather than using therapeutic techniques that are specific to the patient and the mental problem (i.e., *specific treatment factors*), the therapy focuses on techniques that can be applied to anyone (e.g., establishing a good relationship with the patient) (Cuijpers et al., 2012; Friedli et al., 1997). Similar to how "one-size-fits-all" doesn't really fit every person, PCT uses the same practices for everyone, which may work for some people but not others. Further research is necessary to evaluate its utility as a therapeutic approach.

Cognitive Behavioural Therapy

Although both psychoanalysis and PCT are still used today, another therapy, **cognitive-behavioural therapy (CBT)**, has gained more widespread support and practice. CBT refers to a family of therapeutic approaches whose goal is to alleviate psychological symptoms by changing their underlying cognitions and behaviours. The premise of CBT is that thoughts, behaviours, and emotions interact and contribute to various mental disorders. For example, let's consider how a CBT therapist would view a patient who compulsively washes her hands for hours every day. First, the therapist would identify the patient's maladaptive thought: "If I don't wash my hands like this, I will get a disease and die." The therapist then identifies how this maladap-

tive *thought* leads to a maladaptive *emotion*: the feeling of anxiety when her hands aren't being washed. And finally, this maladaptive emotion leads to the maladaptive behaviour: the patient washing her hands for hours every day.

CBT is a present-focused therapy (i.e., focused on the "now" rather than causes from the past, such as childhood relationships) that uses behavioural goals to improve one's mental illness. Often, these behavioural goals involve between-session homework assignments. For example, the therapist may give the hand-washing patient a worksheet to take home; on this worksheet, the woman is to write down every time she feels the urge to wash her hands, how she deals with the urge, and what behaviour she replaces that urge with. When the patient has her next therapy session, she and the therapist review her "homework" together. CBT is a relatively brief intervention of 12 to 16 weekly sessions, closely tailored to the nature of the psychopathology and treatment of the specific mental disorder. And, as the empirical data show, CBT has proven to be highly efficacious for virtually all psychiatric illnesses (Hofmann et al., 2012).

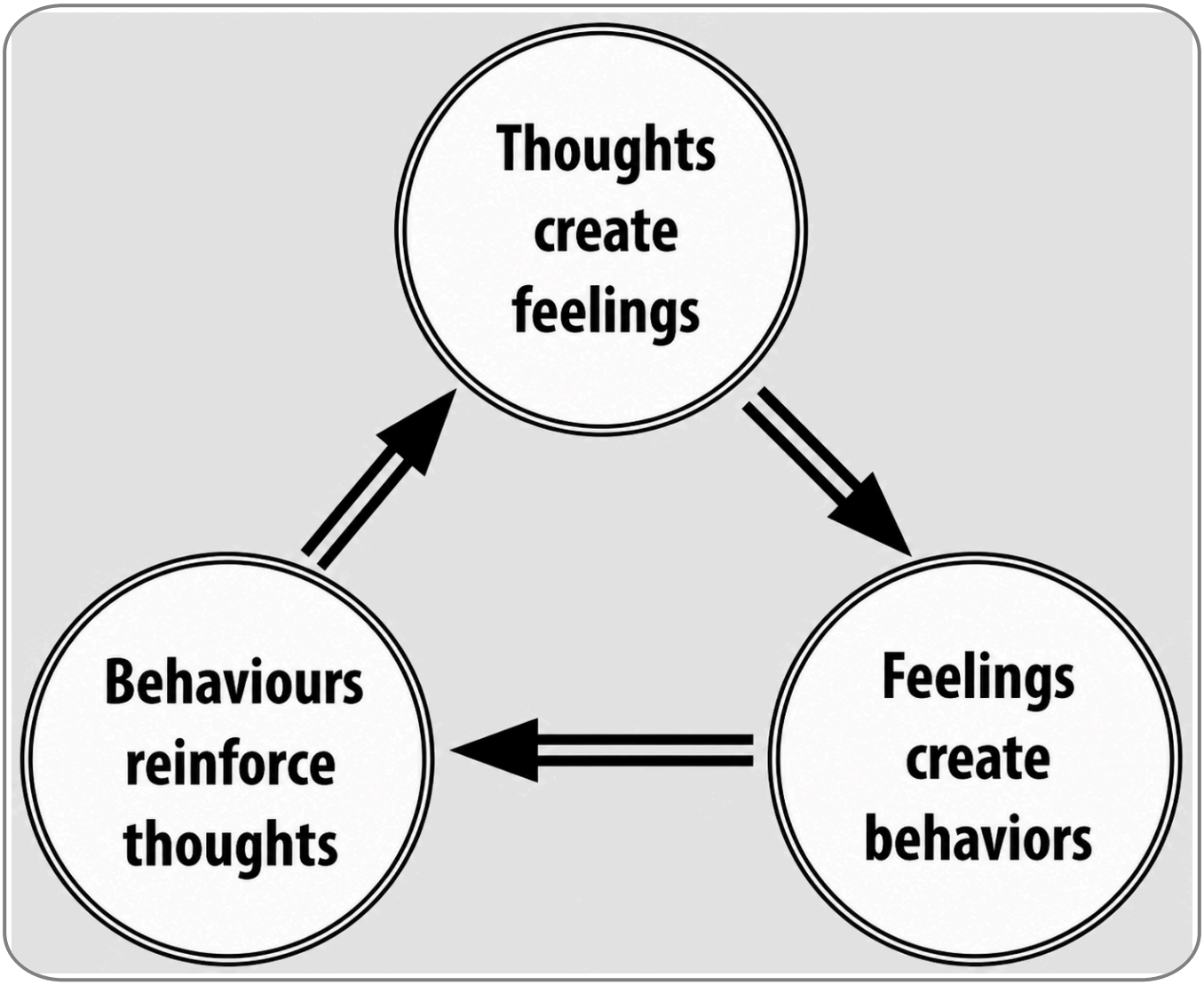


Figure 12.2.1. *Pattern of thoughts, feelings, and behaviors addressed through cognitive-behavioral therapy.*

Image Description

Diagram showing the cognitive behavioural therapy cycle. Three circles are connected by arrows in a loop: “Thoughts create feelings,” “Feelings create behaviours,” and “Behaviours reinforce thoughts.”

Techniques in CBT

Beck and Ellis strove to help patients identify maladaptive appraisals, or the untrue judgments and evaluations of certain thoughts. For example, if it’s your first time meeting new people, you may have the automatic thought, “These people won’t like me because I have nothing interesting to share.” That thought itself is not what’s troublesome; the appraisal (or evaluation) that it might have merit is what’s troublesome. The goal of CBT is to help people make adaptive, instead of maladaptive, appraisals (e.g., “I do know interesting things!”). This technique of **reappraisal, or cognitive restructuring**, is a fundamental aspect of CBT. In cognitive restructuring, the therapist’s job is to help the patient identify inaccurate or maladaptive thoughts, so the patient can either eliminate them or modify them to be more adaptive.

In addition to *thoughts*, though, another important treatment target of CBT is maladaptive *behaviour*. Every time a person engages in maladaptive behaviour (e.g., never speaking to someone in new situations), he or she reinforces the validity of the maladaptive thought, thus maintaining or perpetuating the psychological illness. In treatment, the therapist and patient work together to develop healthy behavioural habits (often tracked with worksheet-like homework), so that the patient can break this cycle of maladaptive thoughts and behaviours.

For many mental health problems, especially anxiety disorders, CBT incorporates what is known as **exposure therapy**. During exposure therapy, a patient confronts a problematic situation and fully engages in the experience instead of avoiding it. For example, imagine a man who is terrified of spiders. Whenever he encounters one, he immediately screams and panics. In exposure therapy, the man would be forced to confront and interact with spiders, rather than simply avoiding them as he usually does. The goal is to reduce the fear associated with the situation through *extinction learning,* a neurobiological and cognitive process by which the patient “unlearns” the irrational fear. For example, exposure therapy for someone terrified of spiders might begin with him looking at a cartoon of a spider, followed by him looking at pictures of real spiders, and later, him handling a plastic spider. After weeks of this incremental exposure, the patient may even be able to hold a live spider. After repeated exposure (starting small and building one’s way up), the patient experiences less physiological fear and maladaptive thoughts about spiders, breaking his tendency for anxiety and subsequent avoidance.

Advantages and Disadvantages of CBT

CBT interventions tend to be relatively brief, making them cost-effective for the average consumer. In addition, CBT is an intuitive treatment that makes logical sense to patients. It can also be adapted to suit the needs of many different populations. One disadvantage, however, is that CBT does involve significant effort on the patient’s part, because the patient is an active participant in treatment. Therapists often assign “homework” (e.g., worksheets for recording one’s thoughts and behaviours) between sessions to maintain the cognitive and behavioural habits the patient is working on. The greatest strength

of CBT is the abundance of empirical support for its effectiveness. Studies have consistently found CBT to be equally or more effective than other forms of treatment, including medication and other therapies (Butler et al., 2006; Hofmann et al., 2012). For this reason, CBT is considered a first-line treatment for many mental disorders.

Consider This: Pioneers of CBT

The central notion of CBT is the idea that a person's behavioural and emotional responses are causally influenced by one's thinking. The stoic Greek philosopher Epictetus is quoted as saying, "men are not moved by things, but by the view they take of them." Meaning, it is not the event per se, but rather one's assumptions (including interpretations and perceptions) of the event that are responsible for one's emotional response to it. Beck calls these assumptions about events and situations automatic thoughts (Beck, 1979), whereas Ellis (1962) refers to these assumptions as self-statements. The cognitive model assumes that these cognitive processes cause the emotional and behavioural responses to events or stimuli. This causal chain is illustrated in Ellis's ABC model, in which A stands for the antecedent event, B stands for belief, and C stands for consequence. During CBT, the person is encouraged to carefully observe the sequence of events and the response to them, and then explore the validity of the underlying beliefs through behavioural experiments and reasoning, much like a detective or scientist.

Acceptance and Mindfulness-Based Approaches

Unlike the preceding therapies, which were developed in the 20th century, this next one was born out of age-old Buddhist and yoga practices. **Mindfulness**, or a process that tries to cultivate a nonjudgmental, yet attentive, mental state, is a therapy that focuses on one's awareness of bodily sensations, thoughts, and the outside environment. Whereas other therapies work to modify or eliminate these sensations and thoughts, mindfulness focuses on nonjudgmentally accepting them (Kabat-Zinn, 2003; Baer, 2003). For example, whereas CBT may actively confront and work to change a maladaptive thought, mindfulness therapy works to acknowledge and accept the thought, understanding that the thought is spontaneous and not what the person truly believes. There are two important components of mindfulness: (1) self-regulation of attention, and (2) orientation toward the present moment (Bishop et al., 2004). Mindfulness is thought to improve mental health because it draws attention away from past and future stressors, encourages acceptance of troubling thoughts and feelings, and promotes physical relaxation.

Techniques in Mindfulness-Based Therapy

Psychologists have adapted the practice of mindfulness as a form of psychotherapy, generally called **mindfulness-based therapy** (MBT). Several types of MBT have become popular in recent years, including *mindfulness-based stress reduction* (MBSR) (e.g., Kabat-Zinn, 1982) and *mindfulness-based cognitive therapy* (MBCT) (e.g., Segal et al., Williams, & Teasdale, 2002).

One of the most important advantages of mindfulness-based therapy is its level of accessibility to patients. Image: "Meditating in Union Station," by Wayne MacPhail, Flickr, CC BY-NC SA 2.0.

MBSR uses meditation, yoga, and attention to physical experiences to reduce stress. The hope is that reducing a person's overall stress will allow that person to more objectively evaluate his or her thoughts. In MBCT, rather than reducing one's general stress to address a specific problem, attention is focused on one's thoughts and their associated emotions. For example, MBCT helps prevent relapses in depression by encouraging patients to evaluate their own thoughts objectively and without value judgment (Baer, 2003). Although cognitive behavioural therapy (CBT) may seem similar to this, it focuses on "pushing out" the maladaptive thought, whereas mindfulness-based cognitive therapy focuses on "not getting caught up" in it. The treatments used in MBCT have been used to address a wide range of illnesses, including depression, anxiety, chronic pain, coronary artery disease, and fibromyalgia (Hofmann et al., 2010).

Mindfulness and acceptance—in addition to being therapies in their own right—have also been used as "tools" in other cognitive-behavioural therapies, particularly in **dialectical behaviour therapy (DBT)** (e.g., Linehan et al., 1991). DBT, often used in the treatment of borderline personality disorder, focuses on skills training. That is, it often employs mindfulness and cognitive behavioural therapy practices, but it also works to teach its patients "skills" they can use to correct maladaptive tendencies. For example, one skill DBT teaches patients is called *distress tolerance*—or, ways to cope with maladaptive thoughts and emotions in the moment. For example, people who feel an urge to cut themselves may be taught to snap their arm with a rubber band instead. The primary difference between DBT and CBT is that DBT employs techniques that address the symptoms of the problem (e.g., cutting oneself) rather than the problem itself (e.g., understanding the psychological motivation to cut oneself). CBT does not teach such skills training because of the concern that the skills—even though they may help in the short-term—may be harmful in the long-term, by maintaining maladaptive thoughts and behaviours.

DBT is founded on the perspective of a **dialectical worldview**. That is, rather than thinking of the world as "black and white," or "only good and only bad," it focuses on accepting that some things can have characteristics of both "good" and "bad." So, in a case involving maladaptive thoughts, instead of teaching that a thought is entirely bad, DBT tries to help patients be less judgmental of their thoughts (as with mindfulness-based therapy) and encourages change through therapeutic progress, using cognitive-behavioural techniques as well as mindfulness exercises.

Another form of treatment that also uses mindfulness techniques is **acceptance and commitment therapy** (ACT) (Hayes et al.,1999). In this treatment, patients are taught to observe their thoughts from a detached perspective (Hayes et al., 1999). ACT encourages patients *not* to attempt to change or avoid

thoughts and emotions they observe in themselves, but to recognize which are beneficial and which are harmful. However, the differences among ACT, CBT, and other mindfulness-based treatments are a topic of controversy in the current literature.

Advantages and Disadvantages of Mindfulness-Based Therapy

Two key advantages of mindfulness-based therapies are their acceptability and accessibility to patients. Because yoga and meditation are already widely known in popular culture, consumers of mental healthcare are often interested in trying related psychological therapies. Currently, psychologists have not come to a consensus on the efficacy of MBT, though growing evidence supports its effectiveness for treating mood and anxiety disorders. For example, one review of MBT studies for anxiety and depression found that mindfulness-based interventions generally led to moderate symptom improvement (Hofmann et al., 2010).

Emerging Treatment Strategies

With growth in research and technology, psychologists have been able to develop new treatment strategies in recent years. Often, these approaches focus on enhancing existing treatments, such as cognitive-behavioural therapies, through the use of technological advances. For example, *internet-* and *mobile-delivered therapies* make psychological treatments more available, through smartphones and online access. Clinician-supervised online CBT modules allow patients to access treatment from home on their own schedule—an opportunity particularly important for patients with less geographic or socioeconomic access to traditional treatments. Furthermore, smartphones help extend therapy to patients' daily lives, allowing for symptom tracking, homework reminders, and more frequent therapist contact.

Recent improvements in video chat technology, along with the proliferation of mobile devices like smartphones and tablets, have made online delivery of therapy more commonplace. Image: NOBA, CC BY 2.0.

Another benefit of technology is **cognitive bias modification**. Here, patients are given exercises, often through the use of video games, aimed at changing their problematic thought processes. For example, researchers might use a mobile app to train alcohol abusers to avoid stimuli related to alcohol. One version of this game flashes four pictures on the screen—three alcohol cues (e.g., a can of beer, the front of a bar) and one health-related image (e.g., someone drinking water). The goal is for the patient to tap the healthy picture as fast as s/he can. Games like these aim to target patients' automatic, subconscious thoughts that may be difficult to direct through conscious effort. That is, by repeatedly tapping the healthy image, the patient learns to "ignore" the alcohol cues, so when those cues are encountered in the environment, they will be less likely to trigger the urge to

drink. Approaches like these are promising because of their accessibility, however they require further research to establish their effectiveness.

Yet another emerging treatment employs *CBT-enhancing pharmaceutical agents*. These are drugs used to improve the effects of therapeutic interventions. Based on research from animal experiments, researchers have found that certain drugs influence the biological processes known to be involved in learning. Thus, if people take these drugs while going through psychotherapy, they are better able to "learn" the techniques for improvement. For example, the antibiotic d-cycloserine improves treatment for anxiety disorders by facilitating the learning processes that occur during exposure therapy. Ongoing research in this exciting area may prove to be quite fruitful.

Integrative and Eclectic Psychotherapy

In discussing therapeutic orientations, it is important to note that some clinicians incorporate techniques from multiple approaches, a practice known as **integrative or eclectic psychotherapy**. For example, a therapist may employ distress tolerance skills from DBT (to resolve short-term problems), cognitive reappraisal from CBT (to address long-standing issues), and mindfulness-based meditation from MBCT (to reduce overall stress). And, in fact, between 13% and 42% of therapists have identified their own approaches as integrative or eclectic (Norcross & Goldfried, 2005).

Evaluating Various Forms of Psychotherapy

How can we assess the effectiveness of psychotherapy? Is one technique more effective than another? For anyone considering therapy, these are important questions. According to the American Psychological Association, three factors work together to produce successful treatment. The first is the use of evidence-based treatment that is deemed appropriate for your particular issue. The second important factor is the clinical expertise of the psychologist or therapist. The third factor is your own characteristics, values, preferences, and culture. Many people begin psychotherapy feeling like their problem will never be resolved; however, psychotherapy helps people see that they can do things to make their situation better. Psychotherapy can help reduce a person's anxiety, depression, and maladaptive behaviours. Through psychotherapy, individuals can learn to engage in healthy behaviours designed to help them better express emotions, improve relationships, think more positively, and perform more effectively at work or school.

Many studies have explored the effectiveness of psychotherapy. For example, one large-scale study that examined 16 meta-analyses of CBT reported that it was equally effective or more effective than other therapies in treating PTSD, generalized anxiety disorder, depression, and social phobia (Butlera et al., 2006). Another study found that CBT was as effective at treating depression (43% success rate) as prescription medication (50% success rate) compared to the placebo rate of 25% (DeRubeis et al., 2005). Another meta-analysis found that psychodynamic therapy was also as effective at treating these types of psychological issues as CBT (Shedler, 2010). However, no studies have found one psychotherapeutic approach more effective than another (Abbass et al, Kisely, & Kroenke, 2006; Chorpita et al., 2011), nor have they shown any relationship between a client's treatment outcome and the level of the clinician's training or experience (Wampold, 2007). Regardless of which type of psychotherapy an individual chooses, one critical factor that determines the success of treatment is the person's relationship with the psychologist or therapist.

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under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. *Modifications: Removed the Introduction section and the section on Pharmacological treatments*

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12.3 Treatment Modalities

Once a person seeks treatment, whether voluntarily or involuntarily, he has an intake done to assess their clinical needs. An **intake** is the therapist's first meeting with the client. The therapist gathers specific information to address the client's immediate needs, such as the presenting problem, the client's support system, and insurance status. The therapist informs the client about confidentiality, fees, and what to expect in treatment. **Confidentiality** means the therapist cannot disclose confidential communications to any third party unless mandated or permitted by law to do so. During the intake, the therapist and client will work together to discuss treatment goals. Then a treatment plan will be formulated, usually with specific measurable objectives. Also, the therapist and client will discuss how treatment success will be measured and the estimated length of treatment. There are several different modalities of treatment: Individual therapy, family therapy, couples therapy, and group therapy are the most common.

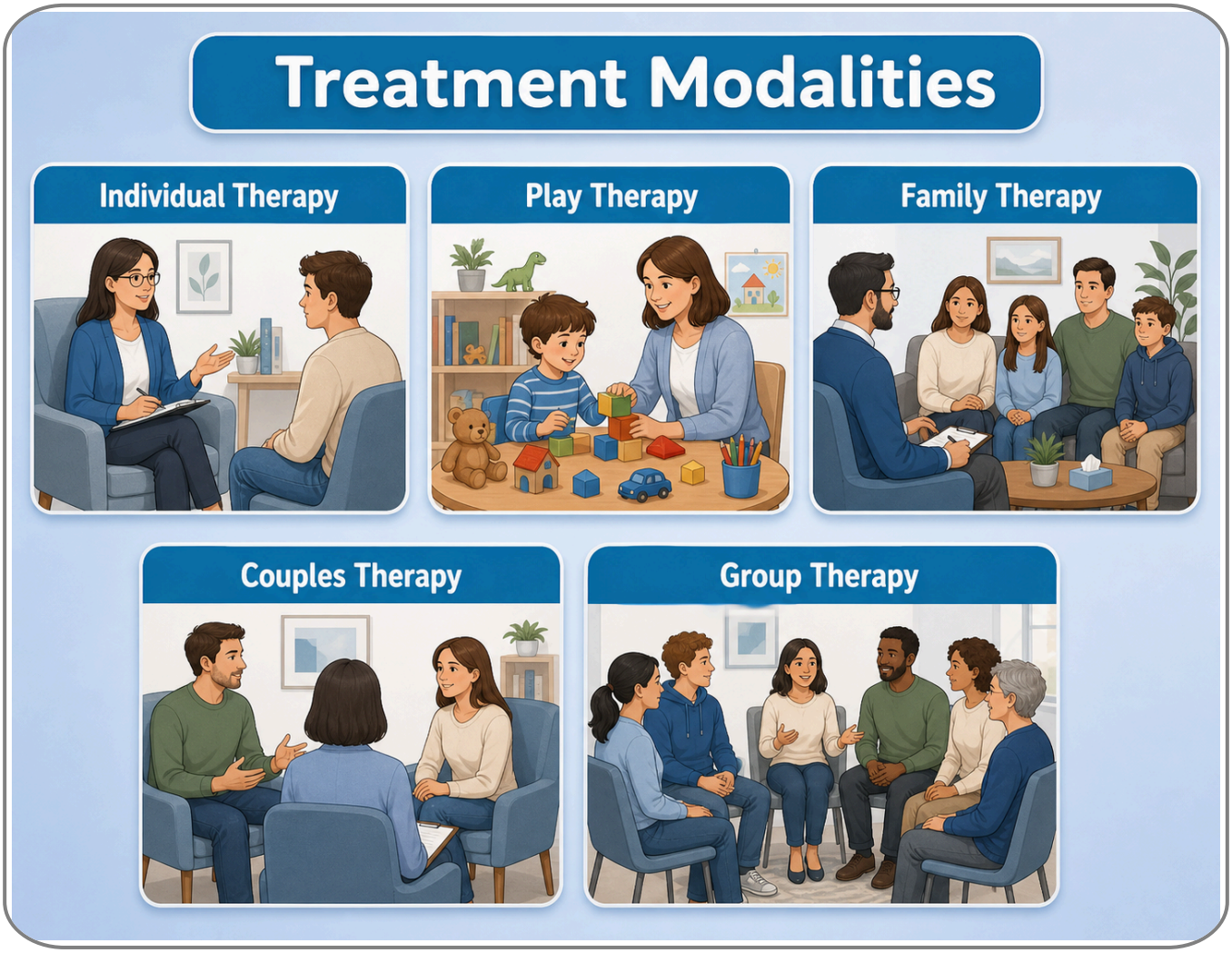

Figure 12.3.1. *Treatment Modalities: individual therapy, play therapy, , family therapy, couples therapy, and group therapy.*

Individual Therapy

In individual therapy, also known as individual psychotherapy or individual counseling, the client and clinician meet one-on-one (usually for 45 minutes to 1 hour). These meetings typically occur weekly or every other week, and sessions are conducted in a confidential and caring environment. The clinician will work with clients to help them explore their feelings, work through life challenges, identify aspects of themselves and their lives that they wish to change, and set goals to help them work towards these changes. A client might see a clinician for only a few sessions, or the client may attend individual therapy sessions for a year or longer. The amount of time spent in therapy depends on the needs of the client as well as her personal goals.

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. 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).

Group Therapy

In group therapy, a clinician meets with several clients with similar problems. When children are placed in group therapy, it is particularly important to match clients for age and problems. One benefit of group therapy is that it can help decrease a client's shame and isolation about a problem while offering needed support, both from the therapist and other members of the group (American Psychological Association, 2014). A nine-year-old sexual abuse victim, for example, may feel very embarrassed and ashamed. If he is placed in a group with other sexually abused boys, he will realize that he is not alone. A child struggling with poor social skills would likely benefit from a group with a specific curriculum to foster special skills. A woman suffering from post-partum depression could feel less guilty and more supported by being in a group with similar women.

Group therapy also has some specific limitations. Members of the group may be afraid to speak in front of other people because sharing secrets and problems with complete strangers can be stressful and overwhelming. There may be personality clashes and arguments among group members. There could also be concerns about confidentiality: Someone from the group might share what another participant said to people outside of the group.

Another benefit of group therapy is that members can confront each other about their patterns. For those with some types of problems, such as sexual abusers, group therapy is the recommended treatment. Group treatment for this population is considered to have several benefits:

Group treatment is more economical than individual, couples, or family therapy. Sexual abusers often feel more comfortable admitting and discussing their offences in a treatment group where others are modelling openness. Clients often accept feedback about their behaviour more willingly from other group members than from therapists. Finally, clients can practice social skills in group treatment settings. (McGrath, et al., 2009)

Groups that have a strong educational component are called psycho-educational groups. For example, a group for children whose parents have cancer might discuss in depth what cancer is, types of treatment for cancer, and the side effects of treatments, such as hair loss. Often, group therapy sessions with children take place in school. They are led by a school counsellor, a school psychologist, or a school social worker. Groups might focus on test anxiety, social isolation, self-esteem, bullying, or school failure (Shechtman, 2002). Whether the group is held in school or in a clinician's office, group therapy has been found to be effective with children facing numerous kinds of challenges (Shechtman, 2002).

During a group session, the entire group could reflect on an individual's problem or difficulties, and others might disclose what they have done in that situation. When a clinician is facilitating a group, the focus is always on making sure that everyone benefits and participates in the group and that no one person is the focus of the entire session. Groups can be organized in various ways: some have an overarching theme or purpose, some are time-limited, some have open membership that allows people to come and go, and some are closed. Some groups are structured with planned activities and goals, while others are unstructured: There is no specific plan, and group members themselves decide how the group will spend its time and on what goals it will focus. This can become a complex and emotionally charged process, but it is also an opportunity for personal growth (Page & Berkow, 1994).

Couples Therapy

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 primary therapeutic orientation used in couples counselling is cognitive-behavioural therapy (Rathus & Sanderson, 1999). Couples meet with a therapist to discuss conflicts and/or aspects of their relationship that they want to change. The therapist helps them see how their individual backgrounds, beliefs, and actions are affecting their relationship. Often, a therapist tries to help the couple resolve these problems, as well as implement strategies that will lead to a healthier and happier relationship, such as how to listen, how to argue, and how to express feelings. However, sometimes, after working with a therapist, a couple will realize that they are too incompatible and will decide to separate. Some couples seek therapy to work out their problems, while others attend therapy to determine whether staying together is the best solution. Counselling couples in a high-conflict and volatile relationship can be difficult. In fact, psychologists Peter Pearson and Ellyn Bader, who founded the Couples Institute in Palo Alto, California, have compared the experience of the clinician in couples' therapy to being like "piloting a helicopter in a hurricane" (Weil, 2012, para. 7).

Family Therapy

Family therapy is a special form of group therapy, consisting of one or more families. Although there are many theoretical orientations in family therapy, one of the most predominant is the systems approach.

The family is viewed as an organized system, and each individual within the family is a contributing member who creates and maintains processes within the system that shape behavior (Minuchin, 1985). Each member of the family influences and is influenced by the others. The goal of this approach is to enhance the growth of each family member as well as that of the family as a whole.

Often, dysfunctional patterns of communication that develop between family members can lead to conflict. A family with this dynamic might wish to attend therapy together rather than individually. In many cases, one member of the family has problems that detrimentally affect everyone. For example, a mother's depression, teen daughter's eating disorder, or father's alcohol dependence could affect all members of the family. The therapist would work with all members of the family to help them cope with the issue, and to encourage resolution and growth in the case of the individual family member with the problem.

With family therapy, the nuclear family (i.e., parents and children) or the nuclear family plus whoever lives in the household (e.g., grandparent) come into treatment. Family therapists work with the whole family unit to heal the family. There are several different types of family therapy. In structural family therapy, the therapist examines and discusses the boundaries and structure of the family: who makes the rules, who sleeps in the bed with whom, how decisions are made, and what are the boundaries within the family. In some families, the parents do not work together to make rules, or one parent may undermine the other, leading the children to act out. The therapist helps them resolve these issues and learn to communicate more effectively.

In strategic family therapy, the goal is to address specific problems within the family that can be dealt with in a relatively short amount of time. Typically, the therapist would guide what happens in the therapy session and design a detailed approach to resolving each member's problem (Madanes, 1991).

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OpenAI. (2026). ChatGPT (5.4) [Large multimodal model]. https://chatgpt.com/
Prompt

Figure 12.3.1. "Using the same look and feel as previous images in this book, create an illustration graphic of the 5 treatment modalities. Consider the attached information from the chapter when creating the image."

12.4 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 are also 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.

Different types and classes of medications are prescribed for different disorders. A depressed person might be given an antidepressant, a bipolar individual might be given a mood stabilizer, and a schizophrenic individual might be given an antipsychotic. These medications treat the symptoms of a psychological disorder. 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.

Commonly Prescribed Psychotropic Medications

Table 12.4 Prescribed 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 lea tardive dyskinesia, involuntary movement the arms, legs, tongue facial muscles, resultin Parkinson's-like tremor
Atypical Antipsychotics (developed in the late 1980s)	Schizophrenia and other types of severe thought disorders	Abilify, Risperdal, Clozaril	Treat the negative symptoms of schizophrenia, such as withdrawal and apathy, by targeting both dopamine and serotonin receptors; newer medications may treat both positive and negative symptoms	Can increase the risk o obesity and diabetes a as elevate cholesterol l constipation, dry mout blurred vision, drowsin and dizziness
Anti-depressants	Depression and anxiety are increasingly common	Paxil, Prozac, Zoloft (selective serotonin reuptake inhibitors, [SSRIs]); Tofranil and Elavil (tricyclics)	Alter levels of neurotransmitters such as serotonin and norepinephrine	SSRIs: headache, nause weight gain, drowsines reduced sex drive Tricyclics: dry mouth, c pation, blurred vision, drowsiness, reduced se drive, increased risk of cide
Anti-anxiety agents	Anxiety and agitation that occur in OCD, PTSD, panic disorder, and social phobia	Xanax, Valium, Ativan	Depresses the central nervous system activity	Drowsiness, dizziness, headache, fatigue, lightheadedness
Mood Stabilizers	Bipolar disorder	Lithium, Depakote, Lamictal, Tegretol	Treat episodes of mania as well as depression	Excessive thirst, irregul heartbeat, itching/rash swelling (face, mouth, extremities), nausea, lo appetite
Stimulants	ADHD	Adderall, Ritalin	Improve ability to focus on a task and maintain attention	Decreased appetite, difficulty sleeping, stomachache, headach

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 et al., 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 et al., 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).

Evidence-based Practice

A buzzword in therapy today is evidence-based practice. However, it's not a novel concept but one that has been used in medicine for at least two decades. **Evidence-based practice** is used to reduce errors in treatment selection by making clinical decisions based on research (Sackett & Rosenberg, 1995). In any case, evidence-based treatment is on the rise in the field of psychology. So what is it, and why does it matter? In an effort to determine which treatment methodologies are evidence-based, professional organizations such as the American Psychological Association (APA) have recommended that specific psychological treatments be used to treat certain psychological disorders (Chambless & Ollendick, 2001). According to the APA (2005), "Evidence-based practice in psychology (EBPP) is the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences" (p. 1).

The foundational idea behind evidence-based treatment is that best practices are determined by research evidence that has been compiled by comparing various forms of treatment (Charman & Barkham, 2005). These treatments are then operationalized and placed in treatment manuals—trained therapists follow these manuals. The benefits are that evidence-based treatment can reduce variability between therapists to ensure that a specific approach is delivered with integrity (Charman & Barkham, 2005). Therefore, clients have a higher chance of receiving therapeutic interventions that are effective at treating their specific disorder. While EBPP is based on randomized control trials, critics of EBPP reject it, stating that the results of trials cannot be applied to individuals and instead determinations regarding treatment should be based on a therapist's judgment (Mullen & Streiner, 2004).

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12.5 Chapter Summary

Let's Reflect

In this chapter, we learned that the treatment of psychological disorders has changed significantly over time. In the past, people with psychological disorders, or those who displayed unusual behaviour, were often believed to be possessed by demons. As a result, they were subjected to exorcisms, imprisonment, or execution. Later, asylums were established to house people with mental illness, but these institutions generally provided little to no real treatment, and many of the methods used there were cruel. Over time, reformers such as Philippe Pinel and Dorothea Dix advocated for more humane treatment. In the mid-1960s, the deinstitutionalization movement gained support, leading to the closure of many asylums and allowing people with mental illness to return to their communities for treatment. Although some were able to return to family homes, many others became homeless because of inadequate resources and support systems.

We also learned that, today, psychiatric care is more commonly provided through psychiatric hospitals operated by state governments and through local community hospitals, with an emphasis on short-term stays rather than long-term institutionalization. However, most people experiencing mental illness are not hospitalized. Instead, someone experiencing symptoms may first speak with a primary care physician, who will often refer them to a mental health specialist. Outpatient mental health services can be provided by a range of professionals, including psychologists, psychiatrists, marriage and family therapists, school counsellors, clinical social workers, and religious personnel. These services may be funded through insurance, government programs, or private payment.

The chapter also emphasized that many forms of therapy have been shown to be effective, including psychodynamic therapies, person-centred therapy, mindfulness-based treatments, and acceptance and commitment therapy. In addition, ongoing advances in research and technology are helping clinicians improve these therapies and extend effective treatment to more people than ever before. Ultimately, one of the most important points is that individuals seek help from mental health professionals when they are experiencing difficulties.

Finally, we learned that there are several common treatment modalities. In individual therapy, a client works one-on-one with a trained therapist. Children may participate in play therapy, which allows them to express themselves in ways other than traditional talk therapy. In group therapy, usually five to ten people meet with a trained therapist to discuss a shared concern, such as divorce, grief, eating disorders, substance abuse, or anger management. Couples therapy involves two people in an intimate relationship who are experiencing difficulties and want to resolve them; the therapist helps them address problems and develop strategies for a healthier and happier relationship. Family therapy is a specialized form of group therapy in which one or more families participate together, with the goal of supporting the growth of each family member as well as the family unit as a whole.

Key Terms

- **Acceptance and Commitment Therapy**: a therapeutic approach designed to foster nonjudgmental observation of one's own mental processes.
- **Asylum**: an institution created for the specific purpose of housing people with psychological disorders.
- **Automatic Thoughts**: thoughts that occur spontaneously; often used to describe problematic thoughts that maintain mental disorders.
- **Biomedical Therapy**: treatment that involves medication and/or medical procedures to treat psychological disorders.
- **Cognitive Bias Modification**: using exercises (e.g., computer games) to change problematic thinking habits.
- **Cognitive-Behavioural Therapy (CBT)**: a family of approaches with the goal of changing the thoughts and behaviours that influence psychopathology.
- **Confidentiality**: the therapist cannot disclose confidential communications to any third party, unless mandated or permitted by law.
- **Couples Therapy**: two people in an intimate relationship who are having difficulties and are trying to resolve them with therapy.
- **Deinstitutionalization**: the process of closing large asylums and integrating people back into the community where they can be treated locally.
- **Dialectical Behaviour Therapy (DBT)**: a treatment often used for borderline personality disorder that incorporates both cognitive-behavioural and mindfulness elements.
- **Dialectical Worldview**: a perspective in DBT that emphasizes the joint importance of change and acceptance.
- **Electroconvulsive Therapy (ECT)**: type of biomedical therapy that involves using an electrical current to induce seizures in a person to help alleviate the effects of severe depression.
- **Exposure Therapy**: a form of intervention in which the patient engages with a problematic (usually feared) situation without avoidance or escape.
- **Family Therapy**: a special form of group therapy consisting of one or more families.
- **Free Association**: in psychodynamic therapy, a process in which the patient reports all thoughts that come to mind without censorship, and these thoughts are interpreted by the therapist.
- **Group Therapy**: a treatment modality in which 5–10 people with the same issue or concern meet together with a trained clinician.
- **Individual Therapy**: a treatment modality in which the client and clinician meet one-on-one.
- **Intake**: therapist's first meeting with the client in which the therapist gathers specific information to address the client's immediate need.
- **Integrative or Eclectic Psychotherapy**: also called integrative psychotherapy, this term refers to approaches combining multiple orientations (e.g., CBT with psychoanalytic elements).
- **Involuntary Treatment**: therapy that is mandated by the courts or other systems.
- **Mindfulness**: a process that reflects a nonjudgmental, yet attentive, mental state.
- **Mindfulness-Based Therapy**: a form of psychotherapy grounded in mindfulness theory and practice, often involving meditation, yoga, body scan, and other features of mindfulness exercises.

- **Person-Centred Therapy**: a therapeutic approach focused on creating a supportive environment for self-discovery.
- **Psychoanalytic Therapy**: Sigmund Freud's therapeutic approach focusing on resolving unconscious conflicts.
- **Psychodynamic Therapy**: treatment applying psychoanalytic principles in a briefer, more individualized format.
- **Reappraisal, or Cognitive Restructuring**: the process of identifying, evaluating, and changing maladaptive thoughts in psychotherapy.
- **Schema**: a mental representation or set of beliefs about something.
- **Strategic Family Therapy**: the therapist guides the therapy sessions and develops treatment plans for each family member for specific problems that can addressed in a short amount of time.
- **Structural Family Therapy**: the therapist examines and discusses with the family the boundaries and structure of the family: who makes the rules, who sleeps in the bed with whom, how decisions are made, and what the boundaries are within the family.
- **Unconditional Positive Regard**: in person-centred therapy, an attitude of warmth, empathy, and acceptance adopted by the therapist in order to foster feelings of inherent worth in the patient.
- **Voluntary Treatment**: therapy that a person chooses to attend in order to obtain relief from her symptoms.

Questions for Further Discussion

Critical Thinking Question

1. Compare and contrast individual and group therapies.
   Hint
   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, such as divorce, grief, eating disorder, substance abuse, or anger management.

Personal Application Questions

1. What are some places in your community that offer mental health services? Would you feel comfortable seeking assistance at one of these facilities? Why or why not?
2. If you were to choose a therapist practicing one of the techniques presented in this section, which kind of therapist would you choose and why?
3. What is your attitude toward mental health treatment? Would you seek treatment if you were experiencing symptoms or having trouble functioning in your life? Why or why not? In what ways do you think your cultural and/or religious beliefs influence your attitude toward psychological intervention?

Activities: Let's Review

Activity 1

Quiz Text Description

1. MultiChoice Activity

Who of the following does not support the humane and improved treatment of mentally ill persons?

a. Dorothea Dix
b. All of the above
c. medieval priests
d. Philippe Pinel

2. MultiChoice Activity

The process of closing large asylums and providing for people to stay in the community to be treated locally is known as _____.

a. deinstitutionalization
b. exorcism
c. deactivation
d. decentralization

3. MultiChoice Activity

Joey was convicted of domestic violence. As part of his sentence, the judge has ordered that he attend therapy for anger management. This is considered _____ treatment.

a. involuntary
b. forced
c. mandatory
d. voluntary

4. MultiChoice Activity

Today, most people with psychological problems are not hospitalized. Typically they are only hospitalized if they _____.

a. have schizophrenia
b. are an imminent threat to themselves or others
c. require therapy
d. have insurance

Solution:

1. c. medieval priests
2. a. deinstitutionalization
3. a. involuntary
4. b. are an imminent threat to themselves or others

Activity 2

Quiz Text Description

1. MultiChoice Activity

Mood stabilizers, such as lithium, are used to treat _____.

a. ADHD
b. bipolar disorder
c. anxiety disorders
d. depression

2. MultiChoice Activity

Clay is in a therapy session. The therapist asks him to relax and say whatever comes to his mind at the moment. This therapist is using _____, which is a technique of _____.

a. transference; psychoanalysis
b. active listening; client-centered therapy
c. free association; psychoanalysis
d. systematic desensitization; behavior therapy

Solution:

1. b. bipolar disorder
2. c. free association; psychoanalysis

Activity 3

Quiz Text Description

1. MultiChoice Activity

A treatment modality in which 5–10 people with the same issue or concern meet together with a trained clinician is known as _____.

a. group therapy

b. family therapy
c. couples therapy
d. self-help group

2. MultiChoice Activity

What happens during an intake?

a. The therapist gathers specific information to address the client's immediate needs such as the presenting problem, the client's support system, and insurance status. The therapist informs the client about confidentiality, fees, and what to expect in a therapy session.
b. The therapist examines and discusses with the family the boundaries and structure of the family: For example, who makes the rules, who sleeps in the bed with whom, and how decisions are made.
c. The therapist meets with a couple to help them see how their individual backgrounds, beliefs, and actions are affecting their relationship.
d. The therapist guides what happens in the therapy session and designs a detailed approach to resolving each member's presenting problem.

Solution:

1. a. group therapy
2. a. The therapist gathers specific information to address the client's immediate needs, such as the presenting problem, the client's support system, and insurance status. The therapist informs the client about confidentiality, fees, and what to expect in a therapy session.

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APPENDIX: SENSATION AND PERCEPTION

Appendix Overview

A1.0 Learning Objectives
A1.1 Sensation and Perception
A1.2 Vision
A1.3 Hearing (Audition)
A1.4: Touch
A1.5 Smell and Taste: The Chemical Senses
A1.6 Appendix Summary

A1.0 Learning Objectives

Learning Objectives

By the end of this appendic content, you will be able to:

1. Differentiate the processes of sensation and perception.
2. Explain the basic principles of sensation and perception.
3. Describe the function of each of our senses.
4. Outline the anatomy of the sense organs and their projections to the nervous system.
5. Apply knowledge of sensation and perception to real world examples.
6. Explain the consequences of multimodal perception.

Appendix Overview

In this appendix, we will learn about the body's nervous system. First, we will identify the functions of the peripheral nervous system, including the body's "fight or flight" response. Next, we will examine the functions of the brain and spinal cord. We will explore the building blocks of the nervous system – neurons – and how they communicate with one another. We will consider the ways in which psychoactive drugs alter neural activity and the impact this has on behaviour and mental processes. Finally, we will explore the methods that researchers use to study the structure and function of the brain.

This chapter has been adapted from Sensation and Perception by Adam John Privitera, which is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License except where otherwise noted. *Modifications: Omitted hyperlinks to references and highlighted key terms.*

A1.1 Sensation and Perception

> “Once I was hiking at Cape Lookout State Park in Tillamook, Oregon. After passing through a vibrantly colored, pleasantly scented, temperate rainforest, I arrived at a cliff overlooking the Pacific Ocean. I grabbed the cold metal railing near the edge and looked out at the sea. Below me, I could see a pod of sea lions swimming in the deep blue water. All around me, I could smell the salt from the sea and the scent of wet, fallen leaves.”

This description of a single memory highlights the way a person’s senses are so important to our experience of the world around us.

Our senses combine to create our perceptions of the world. Image: Adam John Privitera, CC BY-NC-SA 4.0.

Before discussing each of our extraordinary senses individually, it is necessary to cover some basic concepts that apply to all of them. It is probably best to start with one very important distinction that can often be confusing: the difference between sensation and perception. The *physical* process during which our sensory organs—those involved with hearing and taste, for example—respond to external stimuli is called **sensation**.

Sensation happens when you eat noodles or feel the wind on your face, or hear a car horn honking in the distance. During sensation, our sense organs are engaging in **transduction**, the conversion of one form of energy into another. Physical energy, such as light or a sound wave, is converted into a form of energy that the brain can understand: electrical stimulation. After our brain receives the electrical signals, we make sense of all this stimulation and begin to appreciate the complex world around us. This *psychological* process—making sense of the stimuli—is called **perception**. It is during this process that you are able to *identify* a gas leak in your home or a song that reminds you of a specific afternoon spent with friends.

Regardless of whether we are talking about sight or taste, or any of the individual senses, there are a number of basic principles that influence the way our sense organs work. The first of these influences is our ability to detect an external stimulus. Each sense organ—our eyes or tongue, for instance—requires a minimal amount of stimulation in order to detect a stimulus. This **absolute threshold** explains why you don’t smell the perfume someone is wearing in a classroom unless they are somewhat close to you. Because absolute threshold changes throughout the day and based on what other stimuli you have recently experienced, researchers define absolute threshold as the minimum amount of stimulation needed to detect a stimulus 50% of the time.

The way we measure absolute thresholds is by using a method called **signal detection**. This process involves presenting stimuli of varying intensities to a research participant in order to determine the level at which he or she can reliably detect stimulation in a given sense. During one type of hearing test, for example, a person lis-

tens to increasingly louder tones (starting from silence). This type of test is called *the method of limits*, and it is an effort to determine the point, or threshold, at which a person begins to hear a stimulus. In the example of louder tones, the method of limits test uses *ascending trials*. Some methods of limit tests use *descending trials*, such as making a light grow dimmer until a person can no longer see it. Correctly indicating that a sound was heard is called a hit; failing to do so is called a miss. Additionally, indicating that a sound was heard when one wasn't played is called a *false alarm*, and correctly identifying when a sound wasn't played is a *correct rejection*.

Through these and other studies, we have been able to gain an understanding of just how remarkable our senses are. For example, the human eye is capable of detecting candlelight from 30 miles away in the dark. We are also capable of hearing the ticking of a watch in a quiet environment from 20 feet away. If you think that's amazing, I encourage you to read more about the extreme sensory capabilities of nonhuman animals; many animals possess what we would consider super-human abilities.

A similar principle to the absolute threshold discussed above underlies our ability to detect the difference between two stimuli of different intensities. The **differential threshold** (or difference threshold) or **just noticeable difference (JND)**, for each sense has been studied using similar methods to signal detection. To illustrate, find a friend and a few objects of known weight (you'll need objects that weigh 1, 2, 10 and 11 lbs.—or in metric terms: 1, 2, 5 and 5.5 kg). Have your friend hold the lightest object (1 lb. or 1 kg). Then, replace this object with the next heaviest and ask him or her to tell you which one weighs more. Reliably, your friend will say the second object every single time. It's extremely easy to tell the difference when something weighs double what another weighs! However, it is not so easy when the difference is a smaller percentage of the overall weight. It will be much harder for your friend to reliably tell the difference between 10 and 11 lbs. (or 5 versus 5.5 kg) than it is for 1 and 2 lbs. This is phenomenon is called **Weber's Law**, and it is the idea that bigger stimuli require larger differences to be noticed. As with the absolute threshold, your ability to notice differences varies throughout the day and based on what other stimuli you have recently experienced so the difference threshold is defined as the smallest difference detectable 50% of the time.

Crossing into the world of perception, it is clear that our experience influences how our brain processes things. You have tasted food that you like and food that you don't like. There are some bands you enjoy and others you can't stand. However, during the time you first eat something or hear a band, you process those stimuli using **bottom-up processing**. This is when we build up to perception from the individual pieces. Sometimes, though, stimuli we've experienced in our past will influence how we process new ones. This is called **top-down processing**. The best way to illustrate these two concepts is with our ability to read. Read the following quote out loud:

Figure A1.1.1 *An example of stimuli processing. Image: Adam John Privitera, CC BY-NC-SA 4.0.*

Notice anything odd while you were reading the text in the triangle? Did you notice the second "the"? If not, it's likely because you were reading this from a top-down approach. Having a second "the" doesn't make sense. We know this. Our brain knows this and doesn't *expect* there to be a second one, so we have a tendency to skip right over it. In other words, your past experience has changed the way you perceive the writing in the triangle! A beginning reader—one who is using a bottom-up approach by carefully attending to each piece—would be less likely to make this error.

Finally, it should be noted that when we experience a sensory stimulus that doesn't change, we stop paying attention to it. This is why we don't feel the weight of our clothing, hear the hum of a projector in a lecture hall, or see all the tiny scratches on the lenses of our glasses. When a stimulus is constant and unchanging, we experience **sensory adaptation**. This occurs because if a stimulus does not change, our receptors quit responding to it. A great example of this occurs when we leave the radio on in our car after we park it at home for the night. When we listen to the radio on the way home from work, the volume seems reasonable. However, the next morning, when we start the car, we might be startled by how loud the radio is. We don't remember it being that loud last night. What happened? We adapted to the constant stimulus (the radio volume) over the course of the previous day and increased the volume at various times.

Now that we have introduced some basic sensory principles, let us take on each one of our fascinating senses individually.

A1.2 Vision

How Vision Works

Vision is a tricky matter. When we see a pizza, a feather, or a hammer, we are actually seeing light bounce off that object and into our eyes. Light enters the eye through the **pupil,** a tiny opening behind the cornea. The pupil regulates the amount of light entering the eye by contracting (getting smaller) in bright light and dilating (getting larger) in dimmer light. Once past the pupil, light passes through the lens, which focuses an image on a thin layer of cells in the back of the eye, called the **retina**.

Because we have two eyes in different locations, the image focused on each retina is from a slightly different angle (**binocular disparity**), providing us with our perception of 3D space (**binocular vision**). You can appreciate this by holding a pen in your hand, extending your arm in front of your face, and looking at the pen while closing each eye in turn. Pay attention to the apparent position of the pen relative to objects in the background. Depending on which eye is open, the pen appears to jump back and forth! This is how video game manufacturers create the perception of 3D without special glasses; two slightly different images are presented on top of one another.

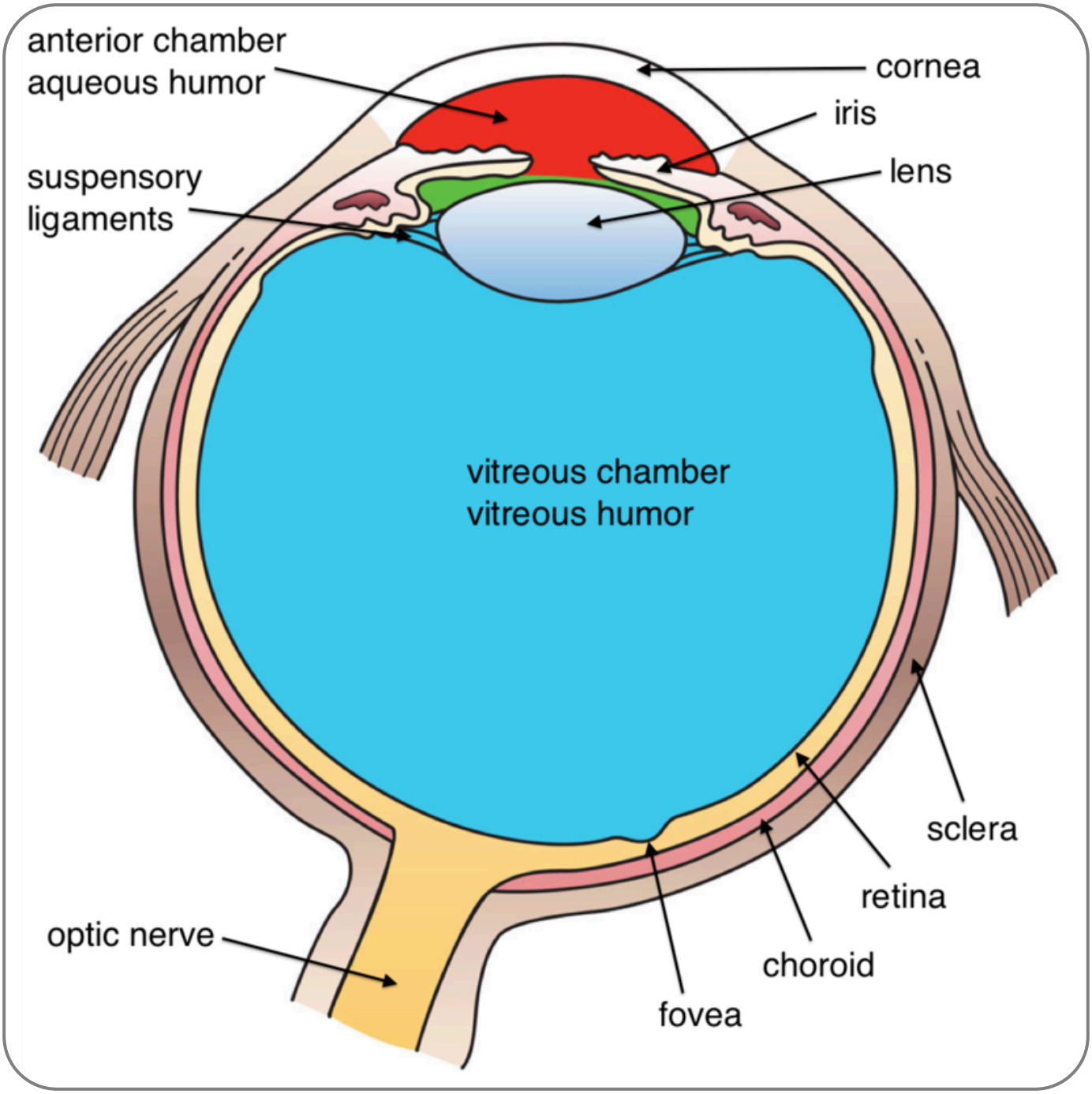

Figure A1.2.1 *Diagram of the human eye. Notice the Retina, labelled here: this is the location of the Cones and Rods in the eye. Image: "Three Internal Chambers of the Eye", by Holly Fischer, Wikimedia Commons, CC BY 3.0.*

Image Description

A cutaway side view of the eye. At the front are the cornea and iris, with the lens just behind them. The space between the cornea and lens is labelled the anterior chamber, containing aqueous humour. Suspensory ligaments attach to the lens. Most of the eyeball is a large vitreous chamber filled with vitreous humour. Along the back wall are three layers labelled (from outer to inner) sclera, choroid, and retina, with the fovea marked on the retina. The optic nerve exits from the back of the eye.

It is in the retina that light is transduced, or converted into electrical signals, by specialized cells called photoreceptors. The retina contains two main kinds of photoreceptors: rods and cones. **Rods** are primarily responsible for our ability to see in dim light conditions, such as during the night. **Cones**, on the other hand, provide us with the ability to see colour and fine detail when the light is brighter. Rods and cones differ in their distribution across the retina, with the highest concentration of cones found in the fovea (the central region of focus), and rods dominating the periphery (see Figure A1.2.1). The difference in distribution can explain why looking directly at a dim star in the sky makes it seem to disappear; there aren't enough rods to process the dim light!

Link to Learning
Visit Eye Anatomy: Parts of the Eye and How We See from the *American Academy of Ophthalmology* to learn more.

Next, the electrical signal is sent through a layer of cells in the retina, eventually travelling down the optic nerve. After passing through the thalamus, this signal makes it to the **primary visual cortex**, where information about light orientation and movement begins to come together (Hubel & Wiesel, 1962). Information is then sent to a variety of different areas of the cortex for more complex processing. Some of these cortical regions are fairly specialized—for example, for processing faces (fusiform face area) and body parts (extrastriate body area). Damage to these areas of the cortex can potentially result in a specific kind of **agnosia**, whereby a person loses the ability to perceive visual stimuli. A great example of this is illustrated in the writing of famous neurologist Dr. Oliver Sacks; he experienced ***prosopagnosia***, the inability to recognize faces. These specialized regions for visual recognition comprise the **ventral pathway** (also called the "what" pathway). Other areas involved in processing location and movement make up the **dorsal pathway** (also called the "where" pathway). Together, these pathways process a large amount of information about visual stimuli (Goodale & Milner, 1992). Phenomena we often refer to as optical illusions provide misleading information to these "higher" areas of visual processing (see Additional Resources for websites containing amazing optical illusions).

Additional Resources

- Sacks, O. (1998). The man who mistook his wife for a hat: And other clinical tales. Simon and Schuster.
- Library with visual phenomena and optical illusions, explained.
- Further information regarding what and where pathways.
- **Video:** Acquired knowledge and its impact on our three-dimensional interpretation of the world – Anamorphic Illusions: Amazing Anamorphic Illusions!

Dark and Light Adaptation

Humans have the ability to adapt to changes in light conditions. As mentioned before, rods are primarily involved in our ability to see in dim light. They are the photoreceptors responsible for allowing us to see in a dark room. You might notice that this night vision ability takes around 10 minutes to turn on, a process called **dark adaptation**. This is because our rods become bleached in normal light conditions and require time to recover. We experience the opposite effect when we leave a dark movie theatre and head out into the afternoon sun. During **light adaptation**, a large number of rods and cones are bleached at once, causing us to be blinded for a few seconds. Light adaptation happens almost instantly compared with dark adaptation. Interestingly, some people think pirates wore a patch over one eye in order to keep it adapted to the dark while the

other was adapted to the light. If you want to turn on a light without losing your night vision, don't worry about wearing an eye patch, just use a red light; this wavelength doesn't bleach your rods.

Colour Vision

Our cones allow us to see details in normal light conditions, as well as colour. We have cones that respond *preferentially,* not exclusively, for red, green and blue (Svaetichin, 1955). This **trichromatic theory** is not new; it dates back to the early 19th century (Young, 1802; Von Helmholtz, 1867). This theory, however, does not explain the odd effect that occurs when we look at a white wall after staring at a picture for around 30 seconds. Try this: stare at the image of the flag in Figure 3 for 30 seconds and then immediately look at a sheet of white paper or a wall. According to the trichromatic theory of colour vision, you should see white when you do that. Is that what you experienced? As you can see, the trichromatic theory doesn't explain the *afterimage* you just witnessed. This is where the **opponent-process theory** comes in (Hering, 1920). This theory states that our cones send information to *retinal ganglion cells* that respond to *pairs* of colours (red-green, blue-yellow, black-white). These specialized cells take information from the cones and compute the difference between the two colours—a process that explains why we cannot see reddish-green or bluish-yellow, as well as why we see afterimages. Colour-deficient vision can result from issues with the cones or retinal ganglion cells involved in colour vision.

Figure A1.2.2. *Stare at the center of the Canadian flag for fifteen seconds. Then, shift your eyes away to a white wall or blank piece of paper. You should see an "after image" in a different colour scheme. Image: Adam John Privitera, CC BY-NC-SA 4.0.*

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Link to Learning

An optical illusion demonstration of the opponent-process theory of colour vision. Stare at the center for 30 seconds. Be patient.

A1.3 Hearing (Audition)

Some of the most well-known celebrities and top earners in the world are musicians. Our worship of musicians may seem silly when you consider that all they are doing is vibrating the air a certain way to create **sound waves**, the physical stimulus for **audition**.

People are capable of getting a large amount of information from the basic qualities of sound waves. The *amplitude* (or intensity) of a sound wave codes for the loudness of a stimulus; higher amplitude sound waves result in louder sounds. The *pitch* of a stimulus is coded in the *frequency* of a sound wave; higher frequency sounds are higher-pitched. We can also gauge the quality, or *timbre*, of a sound by the complexity of the sound wave. This allows us to tell the difference between bright and dull sounds as well as natural and synthesized instruments (Välimäki & Takala, 1996).

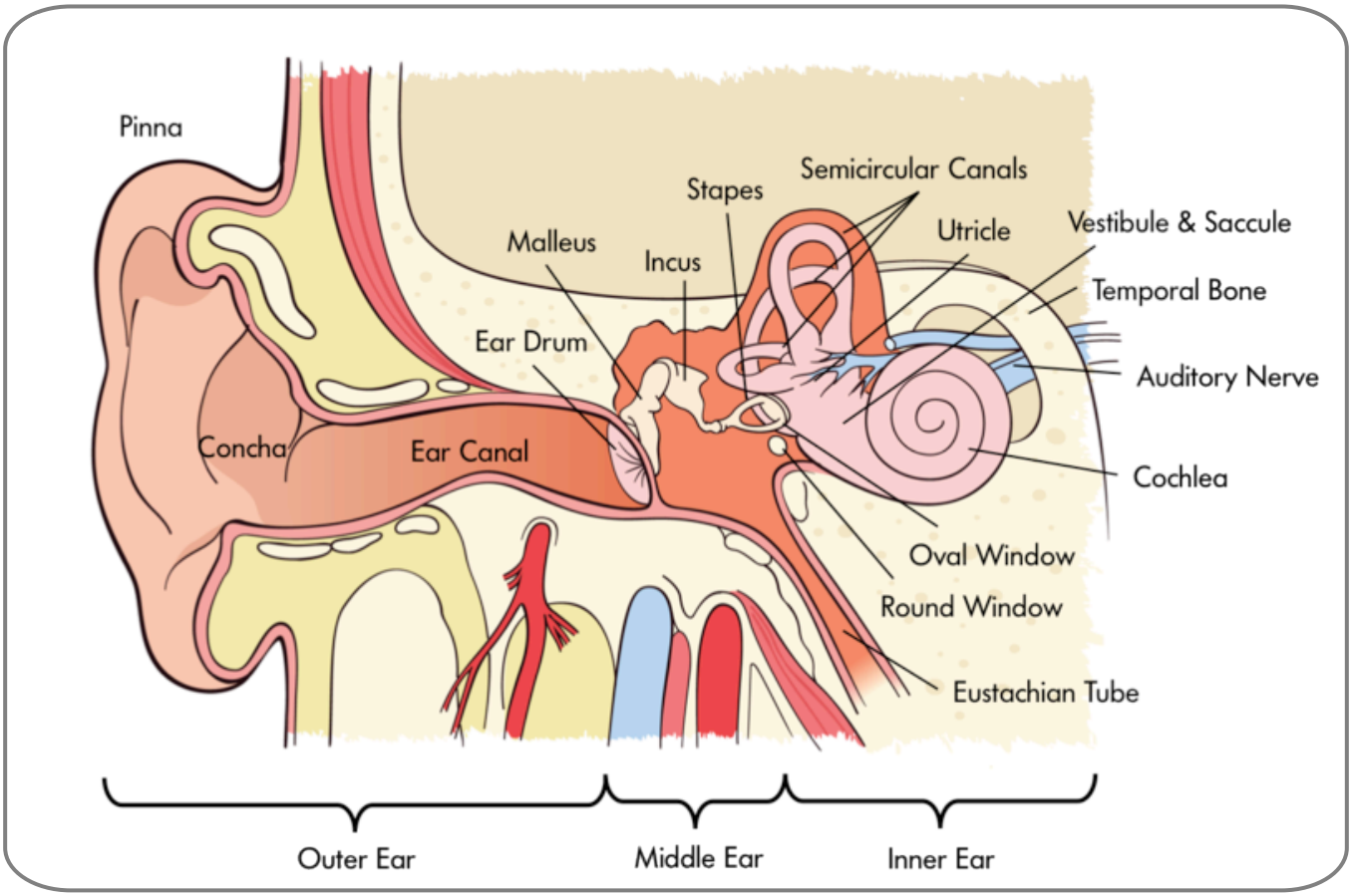

Figure A1.3.1. *Diagram of the human ear. Notice the Cochlea labelled here: it is the location of the auditory Hair Cells that are tonotopically organized. Image: Adam John Privitera, CC BY-NC-SA 4.0.*

Image Description

Labelled cross-sectional diagram of the human ear showing the outer ear (pinna, concha, ear canal), middle ear (eardrum and ossicles: malleus, incus, stapes), and inner ear (semicircular canals, utricle/vestibule, cochlea), including the oval window, round window, and Eustachian tube.

In order for us to sense sound waves from our environment, they must reach our inner ear. Lucky for us, we have evolved tools that allow those waves to be funnelled and amplified during this journey. Initially, sound waves are funnelled by your **pinna** (the external part of your ear that you can actually see) into your **auditory canal** (the hole you stick Q-tips into despite the box advising against it). During their journey, sound waves eventually reach a thin, stretched membrane called the **tympanic membrane** (eardrum), which vibrates against the three smallest bones in the body—the malleus (hammer), the incus (anvil), and the stapes (stirrup)—collectively called the **ossicles**. Both the tympanic membrane and the ossicles amplify the sound waves before they enter the fluid-filled **cochlea**, a snail-shell-like bone structure containing **auditory hair cells** arranged on the basilar membrane (see Figure A1.3.1) according to the frequency they respond to (called tonotopic organization). Depending on age, humans can normally detect sounds between 20 Hz and 20 kHz. It is inside the cochlea that sound waves are converted into an electrical message.

Because we have an ear on each side of our head, we are capable of localizing sound in 3D space pretty well (in the same way that having two eyes produces 3D vision). Have you ever dropped something on the floor without seeing where it went? Did you notice that you were somewhat capable of locating this object based on the sound it made when it hit the ground? We can reliably locate something based on which ear receives the sound first. What about the height of a sound? If both ears receive a sound at the same time, how are we capable of localizing sound vertically? Research in cats (Populin & Yin, 1998) and humans (Middlebrooks & Green, 1991) has pointed to differences in the quality of sound waves depending on vertical positioning.

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Link to Learning
View an article on the discoveries in echolocation (the use of sound in locating people and things): Using Sound to Get Around.

After being processed by auditory hair cells, electrical signals are sent through the *cochlear nerve* (a division of the vestibulocochlear nerve) to the thalamus and then to the **primary auditory cortex** of the temporal lobe. Interestingly, the tonotopic organization of the cochlea is maintained in this area of the cortex (Merzenich et al., 1975; Romani et al., 1982). However, the role of the primary auditory cortex in processing the wide range of features of sound is still being explored (Walker et al., 2011).

Balance and the Vestibular System

The inner ear isn't only involved in hearing; it's also associated with our ability to balance and detect where we are in space. The **vestibular system** is comprised of three semicircular canals—fluid-filled bone structures containing cells that respond to changes in the head's orientation in space. Information from the vestibular system is sent through the vestibular nerve (the other division of the vestibulocochlear nerve) to muscles involved in the movement of our eyes, neck, and other parts of our body. This information allows us to maintain our gaze on an object while we are in motion. Disturbances in the vestibular system can result in issues with balance, including vertigo.

A1.4 Touch

Who doesn't love the softness of an old t-shirt or the smoothness of a clean shave? Who actually enjoys having sand in their swimsuit? Our skin, the body's largest organ, provides us with all sorts of information, such as whether something is smooth or bumpy, hot or cold, or even if it's painful. **Somatosensation**—which includes our ability to sense touch, temperature and pain—transduces physical stimuli, such as fuzzy velvet or scalding water, into electrical potentials that can be processed by the brain.

Tactile Sensation

Tactile stimuli—those that are associated with texture—are transduced by special receptors in the skin called **mechanoreceptors**. Just like photoreceptors in the eye and auditory hair cells in the ear, these allow for the conversion of one kind of energy into a form the brain can understand.

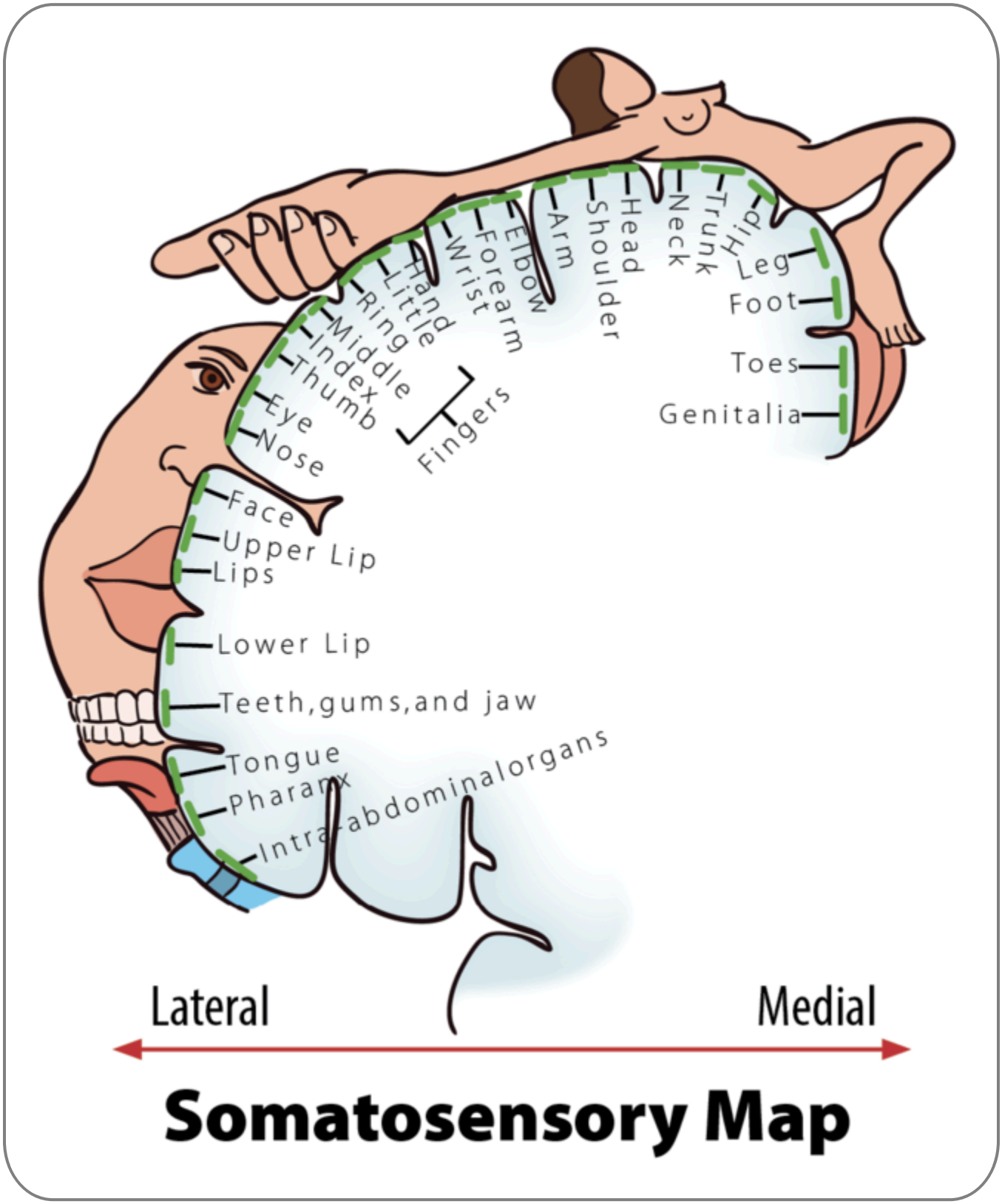

Figure A1.4.1. *A drawing of the somatosensory cortex in the brain and the areas in the human body that correspond to it – they are drawn in proportion to the most sensitive or the most innervated parts of the body.*

After tactile stimuli are converted by mechanoreceptors, information is sent through the thalamus to the **primary somatosensory cortex** for further processing. This region of the cortex is organized in a **somatotopic map** where different regions are sized based on the sensitivity of specific parts on the opposite side of the body (Penfield & Rasmussen, 1950). Put simply, various areas of the skin, such as lips and fingertips, are more sensitive than others, such as shoulders or ankles. This sensitivity can be represented with the distorted proportions of the human body shown in Figure A1.4.1.

Pain

Most people, if asked, would love to get rid of pain (**nociception**), because the sensation is very unpleasant and doesn't appear to have obvious value. But the perception of pain is our body's way of sending us a signal that something is wrong and needs our attention. Without pain, how would we know when we are accidentally touching a hot stove, or that we should rest a strained arm after a hard workout?

Phantom Limbs

Records of people experiencing **phantom limbs** after amputations have been around for centuries (Mitchell, 1871). As the name suggests, people with a phantom limb have sensations such as itching seemingly coming from their missing limb. A phantom limb can also involve **phantom limb pain**, sometimes described as the muscles of the missing limb uncomfortably clenching. While the mechanisms underlying these phenomena are not fully understood, there is evidence to support that the damaged nerves from the amputation site are still sending information to the brain (Weinstein, 1998) and that the brain is reacting to this information (Ramachandran & Rogers-Ramachandran, 2000). There is an interesting treatment for the alleviation of phantom limb pain that works by tricking the brain, using a special mirror box to create a visual representation of the missing limb. The technique allows the patient to manipulate this representation into a more comfortable position (Ramachandran & Rogers-Ramachandran, 1996).

Link to Learning
Video: The Phantom Limb Phenomenon: what they illustrate about somatosensory representation in the cortex.

A1.5 Smell and Taste: The Chemical Senses

The two most underappreciated senses can be lumped into the broad category of **chemical senses**. Both **olfaction** (smell) and **gustation** (taste) require the transduction of chemical stimuli into electrical potentials. I say these senses are underappreciated because most people would give up either one of these if they were forced to give up a sense. While this may not shock a lot of readers, take into consideration how much money people spend on the perfume industry annually ($29 billion US Dollars). Many of us pay a lot more for a favourite brand of food because we prefer the taste. Clearly, we humans care about our chemical senses.

Olfaction (Smell)

Unlike any of the other senses discussed so far, the receptors involved in our perception of both smell and taste bind directly with the stimuli they transduce. **Odorants** in our environment, very often mixtures of them, bind with olfactory receptors found in the **olfactory epithelium**. The binding of odorants to receptors is thought to be similar to how a lock and key operate, with different odorants binding to different specialized receptors based on their shape. However, the **shape theory of olfaction** isn't universally accepted, and alternative theories exist, including one that argues that the vibrations of odorant molecules correspond to their subjective smells (Turin, 1996). Regardless of how odorants bind with receptors, the result is a pattern of neural activity. It is thought that our memories of these patterns of activity underlie our subjective experience of smell (Shepherd, 2005). Interestingly, because olfactory receptors send projections to the brain through the *cribriform plate* of the skull, head trauma has the potential to cause **anosmia** due to the severing of these connections. If you are in a line of work where you constantly experience head trauma (e.g. professional boxer) and you develop anosmia, don't worry—your sense of smell will probably come back (Sumner, 1964).

Gustation (Taste)

Ghost Pepper, also known as Bhut Jolokia, is one of the hottest peppers in the world; it's 10 times hotter than a habanero, and 400 times hotter than tabasco sauce. What do you think would happen to your taste receptor cells if you took a bite out of this little guy? Image: "Caramel Bhut Jolokias." by Richard Elzey, CC BY 2.0.

Taste works in a similar fashion to smell, only with receptors found in the taste buds of the tongue, called **taste receptor cells**. To clarify a common misconception, taste buds are not the bumps on your tongue (papillae), but are located in small divots around these bumps. These receptors also respond to chemicals from the outside environment, except these chemicals, called **tastants**, are contained in the foods we eat. The binding of these chemicals with taste receptor cells results in our perception of the five basic tastes: sweet, sour, bitter, salty and umami (savoury)—although some scientists argue that there are more (Stewart et al., 2010). Researchers used to think these tastes formed the basis for a map-like organization of the tongue; there was even a clever rationale for the concept, about how the back of the tongue sensed bitter so we would know to spit out poisons, and the front of the tongue sensed sweet so we could identify high-energy foods. However, we now know that all areas of the tongue with taste receptor cells are capable of responding to every taste (Chandrashekar et al., 2006).

During the process of eating, we are not limited to our sense of taste alone. While we are chewing, food odorants are forced back up to areas that contain olfactory receptors. This combination of taste and smell gives us the perception of **flavour**. If you have doubts about the interaction between these two senses, I encourage you

to think back to consider how the flavours of your favourite foods are impacted when you have a cold; everything is pretty bland and boring, right?

Putting it all Together: Multimodal Perception

Though we have spent the majority of this chapter covering the senses individually, our real-world experience is most often multimodal, involving combinations of our senses into one perceptual experience. This should be clear after reading the description of walking through the forest at the beginning of the module; it was the combination of senses that allowed for that experience. It shouldn't shock you to find out that at some point, information from each of our senses becomes integrated. Information from one sense has the potential to influence how we perceive information from another, a process called **multimodal perception**.

Interestingly, we actually respond more strongly to multimodal stimuli compared to the sum of each single modality together, an effect called the **superadditive effect of multisensory integration**. This can explain how you're still able to understand what friends are saying to you at a loud concert, as long as you are able to get visual cues from watching them speak. If you were having a quiet conversation at a café, you likely wouldn't need these additional cues. In fact, the **principle of inverse effectiveness** states that you are *less* likely to benefit from additional cues from other modalities if the initial unimodal stimulus is strong enough (Stein & Meredith, 1993).

Because we are able to process multimodal sensory stimuli, and the results of those processes are qualitatively different from those of unimodal stimuli, it's a fair assumption that the brain is doing something qualitatively different when they're being processed. There has been a growing body of evidence since the mid-90s on the neural correlates of multimodal perception. For example, neurons that respond to both visual and auditory stimuli have been identified in the *superior temporal sulcus* (Calvert et al., 2011). Additionally, multimodal "what" and "where" pathways have been proposed for auditory and tactile stimuli (Renier et al., 2009). We aren't limited to reading about these regions of the brain and what they do; we can experience them with a few interesting examples (see Additional Resources for the "McGurk Effect," the "Double Flash Illusion," and the "Rubber Hand Illusion").

Additional Resources

- The Rubber Hand Illusion from Horizon: Is Seeing Believing? (BBC)
- Double Flash Illusion – A recreation of the experiment by Shams et al (2002).
- The McGurk Effect from Horizon: Is Seeing Believing? (BBC)
- Seeing Sound, Tasting Colour: Synesthesia from Big Think

A1.6 Appendix Summary

Let's Reflect

Our impressive sensory abilities allow us to experience the most enjoyable and most miserable moments, as well as everything in between. Our eyes, ears, nose, tongue, and skin act as an interface for the brain to connect with the world—detecting light, sound waves, pressure, temperature, and chemical signals, and then transducing that information into messages the nervous system can understand. In this chapter, we explore how sensation differs from perception: it's not just what our senses pick up, but how our brain interprets that input—shaped by thresholds for detection, the ability to notice small changes, and the way we adapt to constant stimulation. We also see how perception is built from both the "bottom up" (starting with raw sensory details) and the "top down" (using expectations, attention, and prior experience), which helps explain why two people can experience the same situation differently. While there is simplicity in covering each sensory modality independently—vision, hearing, touch, smell, and taste—we are organisms that have evolved to blend these inputs into a single, unified experience, making sense of our environment through a rich, coordinated stream of information rather than isolated sensations.

Key Terms

- **Agnosia**: Loss of the ability to perceive stimuli.
- **Anosmia**: Loss of the ability to smell.
- **Audition**: Ability to process auditory stimuli; also called hearing.
- **Auditory Canal**: Tube running from the outer ear to the middle ear.
- **Auditory Hair Cells**: Receptors in the cochlea that transduce sound into electrical potentials.
- **Binocular Disparity**: Difference in images processed by the left and right eyes.
- **Binocular Vision**: Our ability to perceive 3D and depth because of the difference between the images on each of our retinas.
- **Bottom-Up Processing**: Building up to perceptual experience from individual pieces.
- **Chemical Senses**: Our ability to process the environmental stimuli of smell and taste.
- **Cochlea**: Spiral bone structure in the inner ear containing auditory hair cells.
- **Cones**: Photoreceptors of the retina sensitive to color; located primarily in the fovea.
- **Dark Adaptation**: Adjustment of the eye to low levels of light.
- **Differential Threshold (or Difference Threshold)**: The smallest difference needed in order to differentiate two stimuli (see Just Noticeable Difference [JND]).
- **Dorsal Pathway**: Pathway of visual processing; the "where" pathway.
- **Flavour**: The combination of smell and taste.
- **Gustation**: Ability to process gustatory stimuli; also called taste.
- **Just Noticeable Difference (JND)**: The smallest difference needed in order to differentiate two stimuli (see Differential Threshold).
- **Light Adaptation**: Adjustment of the eye to high levels of light.
- **Mechanoreceptors**: Mechanical sensory receptors in the skin that respond to tactile stimulation.
- **Multimodal Perception**: The effects that concurrent stimulation in more than one sensory modality has on the perception of events and objects in the world.
- **Nociception**: Our ability to sense pain.
- **Odorants**: Chemicals transduced by olfactory receptors.
- **Olfaction**: Ability to process olfactory stimuli; also called smell.
- **Olfactory Epithelium**: Organ containing olfactory receptors.
- **Opponent-Process Theory**: Theory proposing colour vision is influenced by cells responsive to pairs of colours.
- **Ossicles**: A collection of three small bones in the middle ear that vibrate against the tympanic membrane.
- **Perception**: The psychological process of interpreting sensory information.
- **Phantom Limb**: The perception that a missing limb still exists.
- **Phantom Limb Pain**: Pain in a limb that no longer exists.
- **Pinna**: Outermost portion of the ear.
- **Primary Auditory Cortex**: Area of the cortex involved in processing auditory stimuli.
- **Primary Somatosensory Cortex**: Area of the cortex involved in processing somatosensory stimuli.
- **Primary Visual Cortex**: Area of the cortex involved in processing visual stimuli.
- **Principle of Inverse Effectiveness**: The finding that, in general, for a multimodal stimulus, if the

response to each unimodal component (on its own) is weak, then the opportunity for multisensory enhancement is very large; however, if one component by itself is sufficient to evoke a strong response, then the effect gained by simultaneously processing the other components will be relatively small.

- **Retina**: Cell layer in the back of the eye containing photoreceptors.
- **Rods**: Photoreceptors of the retina sensitive to low levels of light; located around the fovea.
- **Sensation**: The physical processing of environmental stimuli by the sense organs.
- **Sensory Adaptation**: Decrease in the sensitivity of a receptor to a stimulus after constant stimulation.
- **Shape Theory of Olfaction**: Theory proposing that odorants of different sizes and shapes correspond to different smells.
- **Signal Detection**: Method for studying the ability to correctly identify sensory stimuli.
- **Somatosensation**: Ability to sense touch, pain, and temperature.
- **Somatotopic Map**: Organization of the primary somatosensory cortex, maintaining a representation of the arrangement of the body.
- **Sound Waves**: Changes in air pressure; the physical stimulus for audition.
- **Superadditive Effect of Multisensory Integration**: The finding that responses to multimodal stimuli are typically greater than the sum of the independent responses to each unimodal component if it were presented on its own.
- **Tastants**: Chemicals transduced by taste receptor cells.
- **Taste Receptor Cells**: Receptors that transduce gustatory information.
- **Top-Down Processing**: Experience influences the perception of stimuli.
- **Transduction**: The conversion of one form of energy into another.
- **Trichromatic Theory**: Theory proposing colour vision as influenced by three different cones responding preferentially to red, green, and blue.
- **Tympanic Membrane**: Thin, stretched membrane in the middle ear that vibrates in response to sound; also called the eardrum.
- **Ventral Pathway**: Pathway of visual processing; the “what” pathway.
- **Vestibular System**: Parts of the inner ear involved in balance.
- **Weber’s Law**: States that the just noticeable difference (JND) is proportional to the magnitude of the initial stimulus.

Questions for Further Discussion

1. There are a number of myths that exist about the sensory capabilities of infants. How would you design a study to determine what the true sensory capabilities of infants are?
2. A well-documented phenomenon experienced by millennials is the phantom vibration of a cell phone when no actual text message has been received. How can we use signal detection theory to explain this?
3. What physical features would an organism need in order to be really good at localizing sound in 3D space? Are there any organisms that currently excel in localizing sound? What features allow them to do this?
4. What issues would exist with visual recognition of an object if a research participant had his/her corpus callosum severed? What would you need to do in order to observe these deficits?

Activity: Let's Review

Quiz Text Description

1. MultiChoice Activity

Which statement best differentiates sensation and perception?

a. Perception converts energy into electrical signals; sensation labels objects.
b. Sensation is the brain's interpretation of stimuli; perception is detection by sense organs.
c. Sensation occurs only with vision; perception occurs only with hearing.
d. Sensations are physical processes in sense organs; perception is psychological interpretation in the brain.

2. MultiChoice Activity

In sensation, what does transduction refer to?

a. The comparison of two sensory inputs to find their difference.
b. The brain's ability to recognize objects and give them meaning.
c. The conversion of physical energy (e.g., light, sound) into electrical signals the brain can process.
d. A change in behavior caused by repeated exposure to a stimulus.

3. MultiChoice Activity

Researchers define the absolute threshold as the minimum stimulation needed to detect a stimulus ____.

a. 100% of the time
b. only when a person expects the stimulus
c. 50% of the time
d. 25% of the time

4. MultiChoice Activity

In signal detection terms, indicating that a sound was heard when no sound was played is called a ____.

a. hit
b. correct rejection
c. miss
d. false alarm

5. MultiChoice Activity

Weber's Law suggests that as a stimulus gets larger, the difference needed to notice a change ____.

a. gets smaller and smaller.

b. becomes unrelated to the original stimulus.
c. stays exactly the same.
d. must also get larger (the JND is proportional to the original stimulus).

6. MultiChoice Activity

Which statement about rods and cones is most accurate?

a. Cones are concentrated in the periphery; rods are concentrated in the fovea.
b. Rods and cones only work when both eyes are open.
c. Rods help us see in dim light; cones support colour and fine detail in brighter light.
d. Rods detect colour; cones detect motion in low light.

7. MultiChoice Activity

Binocular disparity (slightly different images in each eye) helps create ____.

a. depth perception / 3D vision (binocular vision)
b. sound localization
c. sensory adaptation
d. colour after images

8. MultiChoice Activity

The opponent-process theory proposes that color vision is influenced by cells responsive to paired channels such as ____.

a. red–blue and green–yellow only
b. red–green and blue–yellow (and also black–white)
c. light–dark only
d. orange–purple and pink–brown

9. MultiChoice Activity

In audition (hearing), the amplitude (intensity) of a sound wave primarily codes for ____.

a. balance
b. loudness
c. pitch
d. timbre (sound quality)

10. MultiChoice Activity

The structure that contains auditory hair cells arranged on the basilar membrane (tonotopic organization) is the ____.

a. olfactory epithelium
b. pinna
c. cochlea
d. retina

11. MultiChoice Activity

The vestibular system primarily helps us ____.

a. detect sweet and salty tastes
b. maintain balance and detect head orientation in space
c. see color in bright light
d. recognize faces

12. MultiChoice Activity

Tactile stimuli (texture) are transduced by special skin receptors called ____.

a. auditory hair cells
b. mechanoreceptors
c. photoreceptors
d. olfactory receptors

13. MultiChoice Activity

In a somatotopic map, body regions like the lips and fingertips have a larger cortical representation because they are ____.

a. closer to the brain
b. more sensitive / more densely innervated
c. less sensitive than other regions
d. responsible for balance

14. MultiChoice Activity

Which list contains the five basic tastes described in the chapter?

a. sweet, salty, umami, cool, and hot
b. bitter, spicy, metallic, sweet, and salty
c. sweet, sour, spicy, salty, and bitter
d. sweet, sour, bitter, salty, and umami (savory)

15. MultiChoice Activity

The principle of inverse effectiveness suggests that multimodal cues help the most when ____.

a. only vision is involved
b. the stimulus never changes over time
c. each single-sense (unimodal) cue is weak or hard to perceive on its own
d. each single-sense cue is already very strong and clear

Solution:

1. d. Sensations are physical processes in sense organs; perception is psychological interpretation in the brain.

2. c. The conversion of physical energy (e.g., light, sound) into electrical signals the brain can process.
3. c. 50% of the time
4. d. false alarm
5. d. must also get larger (the JND is proportional to the original stimulus).
6. c. Rods help us see in dim light; cones support color and fine detail in brighter light.
7. a. depth perception / 3D vision (binocular vision)
8. b. red–green and blue–yellow (and also black–white)
9. b. loudness
10. c. cochlea
11. b. maintain balance and detect head orientation in space
12. b. mechanoreceptors
13. b. more sensitive / more densely innervated
14. d. sweet, sour, bitter, salty, and umami (savory)
15. c. each single-sense (unimodal) cue is weak or hard to perceive on its own

Additional Resources

- **Audio:** Auditory Demonstrations. CD published by the Acoustical Society of America (ASA). You can listen to the demonstrations.
- **Book:** Ackerman, D. (1990). A natural history of the senses. Vintage.

Web Resources

- A special ringtone that is only audible to younger people.
- An optical illusion that demonstrates the opponent-process theory of colour vision.
- An animation showing tonotopic organization of the basilar membrane.
- Demonstration of contrast gain adaptation.
- Demonstration of illusory contours and lateral inhibition – Mach bands.
- Demonstration of illusory contrast and lateral inhibition – The Hermann grid.
- Demonstrations and illustrations of cochlear mechanics.
- The Genetics of Taste.
- The Monell Chemical Sense Center website.
- The Tongue Map: Tasteless Myth Debunked.

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