

1.1 Psychology as a Science

Learning Objectives

1. Explain why using our intuition about everyday behaviour is insufficient for a complete understanding of the causes of behaviour.
2. Describe the difference between values and facts and explain how the scientific method is used to differentiate between the two.

Despite the differences in their interests, areas of study, and approaches, all psychologists have one thing in common: they rely on scientific methods. **Research psychologists** *use scientific methods to create new knowledge about the causes of behaviour*, whereas **psychologist-practitioners**, such as clinical, counselling, industrial-organizational, and school psychologists, *use existing research to enhance the everyday life of others*. The science of psychology is important for both researchers and practitioners.

In a sense all humans are scientists. We all have an interest in asking and answering questions about our world. We want to know why things happen, when and if they are likely to happen again, and how to reproduce or change them. Such knowledge enables us to predict our own behaviour and that of others. We may even collect **data** (i.e., *any information collected through formal observation or measurement*) to aid us in this undertaking. It has been argued that people are “everyday scientists” who conduct research projects to answer questions about behaviour (Nisbett & Ross, 1980). When we perform poorly on an important test, we try to understand what caused our failure to remember or understand the material and what might help us do better the next time. When our good friends Monisha and Charlie break up, despite the fact that they appeared to have a relationship made in heaven, we try to determine what happened. When we contemplate the rise of terrorist acts around the world, we try to investigate the causes of this problem by looking at the terrorists themselves, the situation around them, and others’ responses to them.

The Problem of Intuition

The results of these “everyday” research projects can teach us many principles of human behaviour. We learn through experience that if we give someone bad news, he or she may blame us even though the news was not our fault. We learn that people may become depressed after they fail at an important task. We see that aggressive behaviour occurs frequently in our society, and we develop theories to explain why this is so. These insights are part of everyday social life. In fact, much research in psychology involves the scientific study of everyday behaviour (Heider, 1958; Kelley, 1967).

The problem, however, with the way people collect and interpret data in their everyday lives is that they are not always particularly thorough. Often, when one explanation for an event seems right, we adopt that explanation as the truth even when other explanations are possible and potentially more accurate. For example, eyewitnesses to violent crimes are often extremely confident in their identifications of the perpetrators of these crimes. But research finds that eyewitnesses are no less confident in their identifications when they are incorrect than when they are correct (Cutler & Wells, 2009; Wells & Hasel, 2008). People may also become convinced of the existence of extrasensory perception (ESP), or the predictive value of astrology, when there is no evidence for either (Gilovich, 1993). Furthermore, psychologists have also found that there are a variety of cognitive and motivational biases that frequently influence our perceptions and lead us to draw erroneous conclusions (Fiske & Taylor, 2007; Hsee & Hastie, 2006). In summary, accepting explanations for events without testing them thoroughly may lead us to think that we know the causes of things when we really do not.

Research Focus: Unconscious Preferences for the Letters of Our Own Name

A study reported in the *Journal of Consumer Research* (Brendl, Chattopadhyay, Pelham, & Carvallo, 2005) demonstrates the extent to which people can be unaware of the causes of their own behaviour. The research demonstrated that, at least under certain conditions (and although they do not know it), people frequently prefer brand names that contain the letters of their own name to brand names that do not contain the letters of their own name.

The research participants were recruited in pairs and were told that the research was a taste test of different types of tea. For each pair of participants, the experimenter created two teas and named them by adding the word stem “oki” to the first three letters of each participant’s first name. For example, for Jonathan and Elisabeth, the names of the teas would have been Jonoki and Elioki.

The participants were then shown 20 packets of tea that were supposedly being tested. Eighteen packets were labelled with made-up Japanese names (e.g., Matakui; Somuta), and two were labelled with the brand names constructed from the participants’ names. The experimenter explained that each participant would taste only two teas and would be allowed to choose one packet of these two to take home.

One of the two participants was asked to draw slips of paper to select the two brands that would be tasted at this session. However, the drawing was rigged so that the two brands containing the participants’ name stems were always chosen for tasting. Then, while the teas were being brewed, the participants completed a task designed to heighten their need for self-esteem, and that was expected to increase their desire to choose a brand that had the letters of their own name. Specifically, the participants all wrote about an aspect of themselves that they would like to change.

After the teas were ready, the participants tasted them and then chose to take a packet of one of the teas home with them. After they made their choice, the participants were asked why they chose the tea they had chosen, and then the true purpose of the study was explained to them.

The results of this study found that participants chose the tea that included the first three letters of their own name significantly more frequently (64% of the time) than they chose the tea that included the first three letters of their partner’s name (only 36% of the time). Furthermore, the decisions were made unconsciously; the participants did not know why they chose the tea they chose. When they were asked, more than 90% of the participants thought that they had chosen on the basis of taste, whereas only 5% of them mentioned the real cause — that the brand name contained the letters of their name.

Once we learn about the outcome of a given event (e.g., when we read about the results of a research project), we frequently believe that we would have been able to predict the outcome ahead of time. For instance, if half of a class of students is told that research concerning attraction between people has demonstrated that “opposites attract” and the other half is told that research has demonstrated that “birds of a feather flock together,” most of the students will report believing that the outcome that they just read about is true, and that they would have predicted the outcome before they had read about it. Of course, both of these contradictory outcomes cannot be true. (In fact, psychological research finds that “birds of a feather flock together” is generally the case.) The problem is that just reading a description of research findings leads us to think of the many cases we know that support the findings, and thus makes them seem believable. *The tendency to think that we could have predicted something that has already occurred that we probably would not have been able to predict* is called the **hindsight bias**.

Why Psychologists Rely on Empirical Methods

All scientists, whether they are physicists, chemists, biologists, sociologists, or psychologists, use *empirical methods* to study the topics that interest them. **Empirical methods** include the processes of collecting and organizing data and drawing conclusions about those data. The empirical methods used by scientists have developed over many years and provide a basis for collecting, analyzing, and interpreting data within a common framework in which information can be shared. We can label the **scientific method** as the set of assumptions, rules, and procedures that scientists use to conduct empirical research.

Although scientific research is an important method of studying human behaviour, not all questions can be answered using scientific approaches. Statements that cannot be objectively measured or objectively determined to be true or false are not within the domain of scientific inquiry. Scientists therefore draw a distinction between values and facts. *Values* are personal statements such as “Abortion should not be permitted in this country,” “I will go to heaven when I die,” or “It is important to study psychology.” **Facts** are *objective statements determined to be accurate*

through empirical study. Examples are “There were more than 21,000 homicides in Canada in 2009” or “Research demonstrates that individuals who are exposed to highly stressful situations over long periods of time develop more health problems than those who are not.”

Because values cannot be considered to be either true or false, science cannot prove or disprove them. Nevertheless, as shown in Table 1.1, research can sometimes provide facts that can help people develop their values. For instance, science may be able to objectively measure the impact of unwanted children on a society or the psychological trauma suffered by women who have abortions. The effect of imprisonment on the crime rate in Canada may also be determinable. This factual information can and should be made available to help people formulate their values about abortion and incarceration, as well as to enable governments to articulate appropriate policies. Values also frequently come into play in determining what research is appropriate or important to conduct. For instance, the Canadian government has recently increased funding for university research, designating \$37 million annually to the three major research councils dealing with health, social science, and the sciences (Research Canada, 2014).

Table 1.1 Examples of Values and Facts in Scientific Research.^{III}

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Personal value	Scientific fact
The environment should be protected.	The Canadian government has reduced environmental funding by \$200 million but annually pays more than \$1.4 billion in subsidies to the oil and gas industry.
Practical work experience helps to develop skilled workers.	More than \$100 million for interest-free loans will be available in 2014 through the Canada Apprentice Loan program, an expansion of the Canada Student Loans Program.
Technology is increasingly necessary.	The federal government in Canada will invest \$305 million over five years to extend high-speed broadband to some 280,000 homes in 2014.
It is important to quit smoking.	The Canadian government will raise the cost of cigarettes by more than \$4 on a carton in 2014.

Although scientists use research to help establish facts, the distinction between values and facts is not always clear-cut. Sometimes statements that scientists consider to be factual turn out later, on the basis of further research, to be partially or even entirely incorrect. Although scientific procedures do not necessarily guarantee that the answers to questions will be objective and unbiased, science is still the best method for drawing objective conclusions about the world around us. When old facts are discarded, they are replaced with new facts based on newer and more correct data. Although science is not perfect, the requirements of empiricism and objectivity result in a much greater chance of producing an accurate understanding of human behaviour than is available through other approaches.

Levels of Explanation in Psychology

The study of psychology spans many different topics at many different **levels of explanation**, which are *the perspectives that are used to understand behaviour*. Lower levels of explanation are more closely tied to biological influences, such as genes, neurons, neurotransmitters, and hormones, whereas the middle levels of explanation refer to the abilities and characteristics of individual people, and the highest levels of explanation relate to social groups, organizations, and cultures (Cacioppo, Berntson, Sheridan, & McClintock, 2000).

The same topic can be studied within psychology at different levels of explanation, as shown in Table 1.2, “Levels of Explanation.” For instance, the psychological disorder known as **depression** affects millions of people worldwide and is known *to be caused by biological, social, and cultural factors*. Studying and helping alleviate depression can be accomplished at low levels of explanation by investigating how chemicals in the brain influence the experience of depression. This approach has allowed psychologists to develop and prescribe drugs, such as Prozac, which may decrease depression in many individuals (Williams, Simpson, Simpson, & Nahas, 2009). At the middle levels of explanation, psychological therapy is directed at helping individuals cope with negative life experiences that may cause depression. And at the highest level, psychologists study differences in the prevalence of depression between men and women and across cultures. The occurrence of psychological disorders, including depression, is substantially higher for women than for men, and it is also higher in Western cultures, such as in Canada, the United States, and Europe, than in Eastern cultures, such as in India, China, and Japan (Chen, Wang, Poland, & Lin, 2009; Seedat et al., 2009). These sex and cultural differences provide insight into the factors that cause depression. The study of depression in psychology helps remind us that no one level of explanation can explain everything. All levels of explanation, from biological to personal to cultural, are essential for a better understanding of human behaviour.

Table 1.2 Levels of Explanation

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Level of Explanation	Underlying Process	Examples
Lower	Biological	Depression is in part genetically influenced. Depression is influenced by the action of neurotransmitters in the brain.
Middle	Interpersonal	People who are depressed may interpret the events that occur to them too negatively. Psychotherapy can be used to help people talk about and combat depression
Higher	Cultural and social	Women experience more depression than do men. The prevalence of depression varies across cultures and historical time periods.

The Challenges of Studying Psychology

Understanding and attempting to alleviate the costs of psychological disorders such as depression is not easy because psychological experiences are extremely complex. The questions psychologists pose are as difficult as those posed by doctors, biologists, chemists, physicists, and other scientists, if not more so (Wilson, 1998).

A major goal of psychology is to predict behaviour by understanding its causes. Making predictions is difficult, in part because people vary and respond differently in different situations. **Individual differences** are *the variations among people on physical or psychological dimensions*. For instance, although many people experience at least some symptoms of depression at some times in their lives, the experience varies dramatically among people. Some people experience major negative events, such as severe physical injuries or the loss of significant others, without experiencing much depression, whereas other people experience severe depression for no apparent reason. Other important individual differences that we will discuss in the chapters to come include differences in extraversion, intelligence, self-esteem, anxiety, aggression, and conformity.

Because of the many individual difference variables that influence behaviour, we cannot always predict who will become aggressive or who will perform best in graduate school or on the job. The predictions made by psychologists (and most other scientists) are only probabilistic. We can say, for instance, that people who score higher on an intelligence test will, on average, do better than people who score lower on the same test, but we cannot make very accurate predictions about exactly how any one person will perform.

Another reason that it is difficult to predict behaviour is that almost all behaviour is **multiply determined**, or *produced by many factors*. And these factors occur at different levels of explanation. We have seen, for instance, that depression is caused by lower-level genetic factors, by medium-level personal factors, and by higher-level social and cultural factors. You should always be skeptical about people who attempt to explain important human behaviours, such as violence, child abuse, poverty, anxiety, or depression, in terms of a single cause.

Furthermore, these multiple causes are not independent of one another; they are associated such that when one cause is present, other causes tend to be present as well. This overlap makes it difficult to pinpoint which cause or causes are operating. For instance, some people may be depressed because of biological imbalances in neurotransmitters in their brain. The resulting depression may lead them to act more negatively toward other people around them, which then leads those other people to respond more negatively to them, which then increases their depression. As a result, the biological determinants of depression become intertwined with the social responses of other people, making it difficult to disentangle the effects of each cause.

Another difficulty in studying psychology is that much human behaviour is caused by factors that are outside our conscious awareness, making it impossible for us, as individuals, to really understand them. The role of unconscious processes was emphasized in the theorizing of the Austrian neurologist Sigmund Freud (1856-1939), who argued that many psychological disorders were caused by memories that we have **repressed** and thus *remain outside our consciousness*. Unconscious processes will be an important part of our study of psychology, and we will see that current research has supported many of Freud's ideas about the importance of the unconscious in guiding behaviour.

Key Takeaways

- Psychology is the scientific study of mind and behaviour.
- Though it is easy to think that everyday situations have commonsense answers, scientific studies have found that people are not always as good at predicting outcomes as they think they are.
- The hindsight bias leads us to think that we could have predicted events that we actually could not have predicted.
- People are frequently unaware of the causes of their own behaviours.
- Psychologists use the scientific method to collect, analyze, and interpret evidence.
- Employing the scientific method allows the scientist to collect empirical data objectively, which adds to the accumulation of scientific knowledge.

- Psychological phenomena are complex, and making predictions about them is difficult because of individual differences and because they are multiply determined at different levels of explanation.

Exercises and Critical Thinking

1. Can you think of a time when you used your intuition to analyze an outcome, only to be surprised later to find that your explanation was completely incorrect? Did this surprise help you understand how intuition may sometimes lead us astray?
2. Describe the scientific method in a way that someone who knows nothing about science could understand it.
3. Consider a behaviour that you find to be important and think about its potential causes at different levels of explanation. How do you think psychologists would study this behaviour?