

Cornell PSYCH 1101: Introduction to Psychology | Summer 2021

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About Noba

The Diener Education Fund (DEF) is a non-profit organization founded with the mission of re-inventing higher education to serve the changing needs of students and professors. The initial focus of the DEF is on making information, especially of the type found in textbooks, widely available to people of all backgrounds. This mission is embodied in the Noba project.

Noba is an open and free online platform that provides high-quality, flexibly structured textbooks and educational materials. The goals of Noba are three-fold:

- To reduce financial burden on students by providing access to free educational content
- To provide instructors with a platform to customize educational content to better suit their curriculum
- To present material written by a collection of experts and authorities in the field

The Diener Education Fund is co-founded by Drs. Ed and Carol Diener. Ed is the Joseph Smiley Distinguished Professor of Psychology (Emeritus) at the University of Illinois. Carol Diener is the former director of the Mental Health Worker and the Juvenile Justice Programs at the University of Illinois. Both Ed and Carol are award-winning university teachers.

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Introduction

1

Why Science?

Edward Diener

Scientific research has been one of the great drivers of progress in human history, and the dramatic changes we have seen during the past century are due primarily to scientific findings—modern medicine, electronics, automobiles and jets, birth control, and a host of other helpful inventions. Psychologists believe that scientific methods can be used in the behavioral domain to understand and improve the world. Although psychology trails the biological and physical sciences in terms of progress, we are optimistic based on discoveries to date that scientific psychology will make many important discoveries that can benefit humanity. This module outlines the characteristics of the science, and the promises it holds for understanding behavior. The ethics that guide psychological research are briefly described. It concludes with the reasons you should learn about scientific psychology.

Learning Objectives

- Describe how scientific research has changed the world.
- Describe the key characteristics of the scientific approach.
- Discuss a few of the benefits, as well as problems that have been created by science.
- Describe several ways that psychological science has improved the world.
- Describe a number of the ethical guidelines that psychologists follow.

Scientific Advances and World Progress

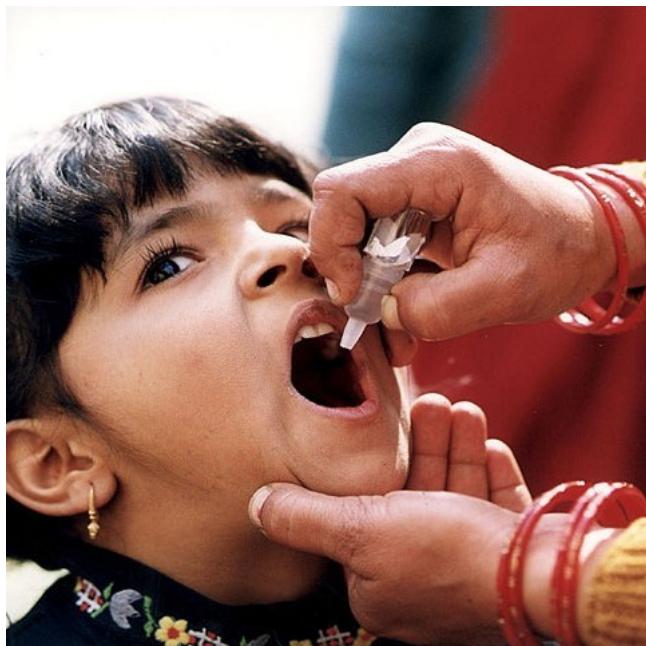
There are many people who have made positive contributions to humanity in modern times.

Take a careful look at the names on the following list. Which of these individuals do you think has helped humanity the most?

1. Mother Teresa
2. Albert Schweitzer
3. Edward Jenner
4. Norman Borlaug
5. Fritz Haber

The usual response to this question is "Who on earth are Jenner, Borlaug, and Haber?" Many people know that Mother Teresa helped thousands of people living in the slums of Kolkata (Calcutta). Others recall that Albert Schweitzer opened his famous hospital in Africa and went on to earn the Nobel Peace Prize. The other three historical figures, on the other hand, are far less well known. Jenner, Borlaug, and Haber were scientists whose research discoveries saved millions, and even billions, of lives. Dr. Edward Jenner is often considered the "father of immunology" because he was among the first to conceive of and test vaccinations. His pioneering work led directly to the eradication of smallpox. Many other diseases have been

greatly reduced because of vaccines discovered using science—measles, pertussis, diphtheria, tetanus, typhoid, cholera, polio, hepatitis—and all are the legacy of Jenner. Fritz Haber and Norman Borlaug saved more than a billion human lives. They created the "Green Revolution" by producing hybrid agricultural crops and synthetic fertilizer. Humanity can now produce food for the seven billion people on the planet, and the starvation that does occur is related to political and economic factors rather than our collective ability to produce food.



Due to the breakthrough work of Dr. Edward Jenner, millions of vaccinations are now administered around the world every year preventing the spread of many treatable diseases while saving the lives of people of all ages. [Image: CDC Global Health, <https://goo.gl/hokiWz>, CC BY 2.0, <https://goo.gl/9uSnqN>]

If you examine major social and technological changes over the past century most of them can be directly attributed to science. The world in 1914 was very different than the one we see

today (Easterbrook, 2003). There were few cars and most people traveled by foot, horseback, or carriage. There were no radios, televisions, birth control pills, artificial hearts or antibiotics. Only a small portion of the world had telephones, refrigeration or electricity. These days we find that 80% of all households have television and 84% have electricity. It is estimated that three quarters of the world's population has access to a mobile phone! Life expectancy was 47 years in 1900 and 79 years in 2010. The percentage of hungry and malnourished people in the world has dropped substantially across the globe. Even average levels of I.Q. have risen dramatically over the past century due to better nutrition and schooling.

All of these medical advances and technological innovations are the direct result of scientific research and understanding. In the modern age it is easy to grow complacent about the advances of science but make no mistake about it—science has made fantastic discoveries, and continues to do so. These discoveries have completely changed our world.

What Is Science?

What is this process we call “science,” which has so dramatically changed the world? Ancient people were more likely to believe in magical and supernatural explanations for natural phenomena such as solar eclipses or thunderstorms. By contrast, scientifically minded people try to figure out the natural world through testing and observation. Specifically, science is the use of **systematic observation** in order to acquire knowledge. For example, children in a science class might combine vinegar and baking soda to observe the bubbly chemical reaction. These **empirical methods** are wonderful ways to learn about the physical and biological world. Science is not magic—it will not solve all human problems, and might not answer all our questions about behavior. Nevertheless, it appears to be the most powerful method we have for acquiring knowledge about the observable world. The essential elements of science are as follows:

1. *Systematic observation is the core of science.* Scientists observe the world, in a very organized way. We often measure the phenomenon we are observing. We record our observations so that memory biases are less likely to enter in to our conclusions. We are systematic in that we try to observe under controlled conditions, and also systematically vary the conditions of our observations so that we can see variations in the phenomena and understand when they occur and do not occur.
2. *Observation leads to hypotheses we can test.* When we develop **hypotheses** and **theories**, we state them in a way that can be tested. For example, you might make the claim that candles made of paraffin wax burn more slowly than do candles of the exact same size and shape made from bee's wax. This claim can be readily tested by timing the burning speed of

candles made from these materials.

3. *Science is democratic.* People in ancient times may have been willing to accept the views of their kings or pharaohs as absolute truth. These days, however, people are more likely to want to be able to form their own opinions and debate conclusions. Scientists are skeptical and have open discussions about their observations and theories. These debates often occur as scientists publish competing findings with the idea that the best data will win the argument.
4. *Science is cumulative.* We can learn the important truths discovered by earlier scientists and build on them. Any physics student today knows more about physics than Sir Isaac Newton did even though Newton was possibly the most brilliant physicist of all time. A crucial aspect of scientific progress is that after we learn of earlier advances, we can build upon them and move farther along the path of knowledge.



Systematic observation is the core of science. [Image: CvL Neuro, <https://goo.gl/Avbju7>, CC BY-SA 3.0, <https://goo.gl/uhHola>]

Psychology as a Science

Even in modern times many people are skeptical that psychology is really a science. To some degree this doubt stems from the fact that many psychological phenomena such as depression, intelligence, and prejudice do not seem to be directly observable in the same way that we can observe the changes in ocean tides or the speed of light. Because thoughts and feelings are invisible many early psychological researchers chose to focus on behavior. You might have noticed that some people act in a friendly and outgoing way while others appear to be shy and withdrawn. If you have made these types of observations then you are acting just like early psychologists who used behavior to draw inferences about various types of personality. By using behavioral measures and rating scales it is possible to measure thoughts and feelings. This is similar to how other researchers explore “invisible” phenomena such as the way that educators measure academic performance or economists measure quality of life.

One important pioneering researcher was Francis Galton, a cousin of Charles Darwin who lived in England during the late 1800s. Galton used patches of color to test people's ability to distinguish between them. He also invented the self-report questionnaire, in which people

offered their own expressed judgments or opinions on various matters. Galton was able to use self-reports to examine—among other things—people's differing ability to accurately judge distances.



In 1875 Francis Galton did pioneering studies of twins to determine how much the similarities and differences in twins were affected by their life experiences. In the course of this work he coined the phrase "Nature versus Nurture". [Image: XT Inc., <https://goo.gl/F1Wvu7>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

problems with this. People might lie about their happiness, might not be able to accurately report on their own happiness, or might not use the numerical scale in the same way. With these limitations in mind modern psychologists employ a wide range of methods to assess happiness. They use, for instance, "peer report measures" in which they ask close friends and family members about the happiness of a target individual. Researchers can then compare these ratings to the self-report ratings and check for discrepancies. Researchers also use memory measures, with the idea that dispositionally positive people have an easier time recalling pleasant events and negative people have an easier time recalling unpleasant events. Modern psychologists even use biological measures such as saliva cortisol samples (cortisol is a stress related hormone) or fMRI images of brain activation (the left pre-frontal cortex is one area of brain activity associated with good moods).

Despite our various methodological advances it is true that psychology is still a very young science. While physics and chemistry are hundreds of years old psychology is barely a hundred

Although he lacked a modern understanding of genetics Galton also had the idea that scientists could look at the behaviors of identical and fraternal twins to estimate the degree to which genetic and social factors contribute to personality; a puzzling issue we currently refer to as the "nature-nurture question."

In modern times psychology has become more sophisticated. Researchers now use better measures, more sophisticated study designs and better statistical analyses to explore human nature. Simply take the example of studying the emotion of happiness. How would you go about studying happiness? One straightforward method is to simply ask people about their happiness and to have them use a numbered scale to indicate their feelings. There are, of course, several

and fifty years old and most of our major findings have occurred only in the last 60 years. There are legitimate limits to psychological science but it is a science nonetheless.

Psychological Science is Useful

Psychological science is useful for creating interventions that help people live better lives. A growing body of research is concerned with determining which therapies are the most and least effective for the treatment of psychological disorders.

For example, many studies have shown that cognitive behavioral therapy can help many people suffering from depression and anxiety disorders (Butler, Chapman, Forman, & Beck, 2006; Hoffman & Smits, 2008). In contrast, research reveals that some types of therapies actually might be harmful on average (Lilienfeld, 2007).

In organizational psychology, a number of psychological interventions have been found by researchers to produce greater productivity and satisfaction in the workplace (e.g., Guzzo, Jette, & Katzell, 1985). Human factor engineers have greatly increased the safety and utility of the products we use. For example, the human factors psychologist Alphonse Chapanis and other researchers redesigned the cockpit controls of aircraft to make them less confusing and easier to respond to, and this led to a decrease in pilot errors and crashes.

Forensic sciences have made courtroom decisions more valid. We all know of the famous cases of imprisoned persons who have been exonerated because of DNA evidence. Equally dramatic cases hinge on psychological findings. For instance, psychologist Elizabeth Loftus has conducted research demonstrating the limits and unreliability of eyewitness testimony and memory. Thus, psychological findings are having practical importance in the world outside the laboratory. Psychological science has experienced enough success to demonstrate that it works, but there remains a huge amount yet to be learned.



Cognitive Behavioral Therapy has shown to be effective in treating a variety of conditions, including depression. [Image: SalFalco, <https://goo.gl/3knLoJ>, CC BY-NC 2.0, <https://goo.gl/HEXbAA>]

Ethics of Scientific Psychology

Psychology differs somewhat from the natural sciences such as chemistry in that researchers conduct studies with human research participants. Because of this there is a natural tendency to want to guard research participants against potential psychological harm. For example, it might be interesting to see how people handle ridicule but it might not be advisable to ridicule research participants.

Scientific psychologists follow a specific set of guidelines for research known as a code of **ethics**. There are extensive ethical guidelines for how human participants should be treated in psychological research (Diener & Crandall, 1978; Sales & Folkman, 2000). Following are a few highlights:

1. ***Informed consent.*** In general, people should know when they are involved in research, and understand what will happen to them during the study. They should then be given a free choice as to whether to participate.
2. ***Confidentiality.*** Information that researchers learn about individual participants should not be made public without the consent of the individual.
3. ***Privacy.*** Researchers should not make observations of people in private places such as their bedrooms without their knowledge and consent. Researchers should not seek confidential information from others, such as school authorities, without consent of the participant or his or her guardian.
4. ***Benefits.*** Researchers should consider the benefits of their proposed research and weigh these against potential risks to the participants. People who participate in psychological studies should be exposed to risk only if they fully understand these risks and only if the likely benefits clearly outweigh the risks.
5. ***Deception.*** Some researchers need to deceive participants in order to hide the true nature of the study. This is typically done to prevent participants from modifying their behavior

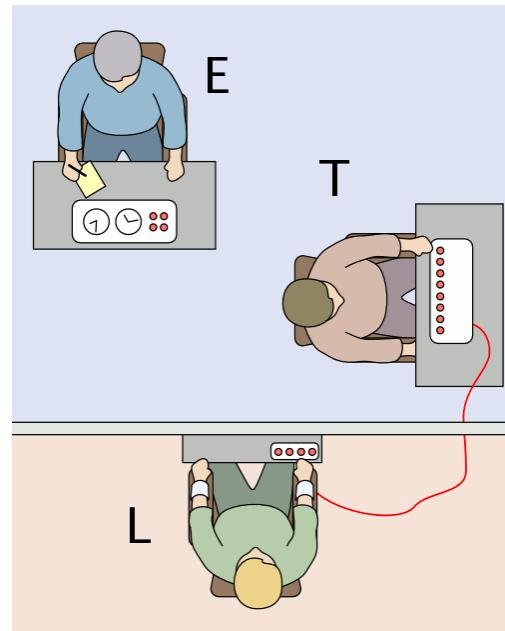


Diagram of the Milgram Experiment in which the "teacher" (T) was asked to deliver a (supposedly) painful electric shock to the "learner"(L). Would this experiment be approved by a review board today? [Image: Fred the Oyster, <https://goo.gl/ZlbQz1>, CC BY-SA 4.0, <https://goo.gl/X3i0tq>]

in unnatural ways. Researchers are required to “debrief” their participants after they have completed the study. Debriefing is an opportunity to educate participants about the true nature of the study.

Why Learn About Scientific Psychology?

I once had a psychology professor who asked my class why we were taking a psychology course. Our responses give the range of reasons that people want to learn about psychology:

1. To understand ourselves
2. To understand other people and groups
3. To be better able to influence others, for example, in socializing children or motivating employees
4. To learn how to better help others and improve the world, for example, by doing effective psychotherapy
5. To learn a skill that will lead to a profession such as being a social worker or a professor
6. To learn how to evaluate the research claims you hear or read about
7. Because it is interesting, challenging, and fun! People want to learn about psychology because this is exciting in itself, regardless of other positive outcomes it might have. Why do we see movies? Because they are fun and exciting, and we need no other reason. Thus, one good reason to study psychology is that it can be rewarding in itself.

Conclusions

The science of psychology is an exciting adventure. Whether you will become a scientific psychologist, an applied psychologist, or an educated person who knows about psychological research, this field can influence your life and provide fun, rewards, and understanding. My hope is that you learn a lot from the modules in this e-text, and also that you enjoy the experience! I love learning about psychology and neuroscience, and hope you will too!

Outside Resources

Web: Science Heroes- A celebration of people who have made lifesaving discoveries.

http://www.scienceheroes.com/index.php?option=com_content&view=article&id=258&Itemid=27

Discussion Questions

1. Some claim that science has done more harm than good. What do you think?
2. Humanity is faced with many challenges and problems. Which of these are due to human behavior, and which are external to human actions?
3. If you were a research psychologist, what phenomena or behaviors would most interest you?
4. Will psychological scientists be able to help with the current challenges humanity faces, such as global warming, war, inequality, and mental illness?
5. What can science study and what is outside the realm of science? What questions are impossible for scientists to study?
6. Some claim that science will replace religion by providing sound knowledge instead of myths to explain the world. They claim that science is a much more reliable source of solutions to problems such as disease than is religion. What do you think? Will science replace religion, and should it?
7. Are there human behaviors that should not be studied? Are some things so sacred or dangerous that we should not study them?

Vocabulary

Empirical methods

Approaches to inquiry that are tied to actual measurement and observation.

Ethics

Professional guidelines that offer researchers a template for making decisions that protect research participants from potential harm and that help steer scientists away from conflicts of interest or other situations that might compromise the integrity of their research.

Hypotheses

A logical idea that can be tested.

Systematic observation

The careful observation of the natural world with the aim of better understanding it. Observations provide the basic data that allow scientists to track, tally, or otherwise organize information about the natural world.

Theories

Groups of closely related phenomena or observations.

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Methods

2

Research Designs

Christie Napa Scollon

Psychologists test research questions using a variety of methods. Most research relies on either correlations or experiments. With correlations, researchers measure variables as they naturally occur in people and compute the degree to which two variables go together. With experiments, researchers actively make changes in one variable and watch for changes in another variable. Experiments allow researchers to make causal inferences. Other types of methods include longitudinal and quasi-experimental designs. Many factors, including practical constraints, determine the type of methods researchers use. Often researchers survey people even though it would be better, but more expensive and time consuming, to track them longitudinally.

Learning Objectives

- Articulate the difference between correlational and experimental designs.
- Understand how to interpret correlations.
- Understand how experiments help us to infer causality.
- Understand how surveys relate to correlational and experimental research.
- Explain what a longitudinal study is.
- List a strength and weakness of different research designs.

Research Designs

In the early 1970's, a man named Uri Geller tricked the world: he convinced hundreds of thousands of people that he could bend spoons and slow watches using only the power of his mind. In fact, if you were in the audience, you would have likely believed he had psychic powers. Everything looked authentic—this man had to have paranormal abilities! So, why have you probably never heard of him before? Because when Uri was asked to perform his miracles in line with scientific experimentation, he was no longer able to do them. That is, even though it seemed like he was doing the impossible, when he was tested by science, he proved to be nothing more than a clever magician.

When we look at dinosaur bones to make educated guesses about extinct life, or systematically chart the heavens to learn about the relationships between stars and planets, or study magicians to figure out how they perform their tricks, we are forming observations—the foundation of science. Although we are all familiar with the saying “seeing is believing,” conducting science is more than just what your eyes perceive. Science is the result of systematic and intentional study of the natural world. And psychology is no different. In the movie *Jerry Maguire*, Cuba Gooding, Jr. became famous for using the phrase, “Show me the money!” In psychology, as in all sciences, we might say, “Show me the data!”

One of the important steps in scientific inquiry is to test our research questions, otherwise known as hypotheses. However, there are many ways to test hypotheses in psychological research. Which method you choose will depend on the type of questions you are asking, as well as what resources are available to you. All methods have limitations, which is why the best research uses a variety of methods.

Most psychological research can be divided into two types: experimental and correlational research.

Experimental Research

If somebody gave you \$20 that absolutely had to be spent today, how would you choose to spend it? Would you spend it on an item you've been eyeing for weeks, or would you donate the money to charity? Which option do you think would bring you the most happiness? If you're like most people, you'd choose to spend the money on yourself (duh, right?). Our intuition is that we'd be happier if we spent the money on ourselves.

Knowing that our intuition can sometimes be wrong, Professor Elizabeth Dunn (2008) at the University of British Columbia set out to conduct an experiment on spending and happiness. She gave each of the participants in her experiment \$20 and then told them they had to spend



At the Corner Perk Cafe customers routinely pay for the drinks of strangers. Is this the way to get the most happiness out of a cup of coffee? Elizabeth Dunn's research shows that spending money on others may affect our happiness differently than spending money on ourselves. [Image: The Island Packet, <https://goo.gl/DMxA5n>]

(more information on specific measurement strategies.)

In an experiment, researchers manipulate, or cause changes, in the independent variable, and observe or measure any impact of those changes in the dependent variable. The independent variable is the one under the experimenter's control, or the variable that is intentionally altered between groups. In the case of Dunn's experiment, the independent variable was whether participants spent the money on themselves or on others. The dependent variable is the variable that is not manipulated at all, or the one where the effect happens. One way to help remember this is that the dependent variable "depends" on what happens to the independent variable. In our example, the participants' happiness (the dependent variable in this experiment) depends on how the participants spend their money (the independent variable). Thus, any observed changes or group differences in happiness can be attributed to whom the money was spent on. What Dunn and her colleagues found was that, after all the spending had been done, the people who had spent the money on others were happier than those who had spent the money on themselves. In other words, spending on others causes us to be happier than spending on ourselves. Do you find this surprising?

But wait! Doesn't happiness depend on a lot of different factors—for instance, a person's upbringing or life circumstances? What if some people had happy childhoods and that's why they're happier? Or what if some people dropped their toast that morning and it fell jam-side down and ruined their whole day? It is correct to recognize that these factors and many more

the money by the end of the day. Some of the participants were told they must spend the money on themselves, and some were told they must spend the money on others (either charity or a gift for someone). At the end of the day she measured participants' levels of happiness using a self-report questionnaire. (But wait, how do you measure something like happiness when you can't really see it? Psychologists measure many abstract concepts, such as happiness and intelligence, by beginning with operational definitions of the concepts. See the Noba modules on Intelligence [<http://noba.to/ncb2h79v>] and Happiness [<http://noba.to/qnw7g32t>], respectively, for

can easily affect a person's level of happiness. So how can we accurately conclude that spending money on others causes happiness, as in the case of Dunn's experiment?

The most important thing about experiments is **random assignment**. Participants don't get to pick which condition they are in (e.g., participants didn't choose whether they were supposed to spend the money on themselves versus others). The experimenter assigns them to a particular condition based on the flip of a coin or the roll of a die or any other random method. Why do researchers do this? With Dunn's study, there is the obvious reason: you can imagine which condition most people would choose to be in, if given the choice. But another equally important reason is that random assignment makes it so the groups, on average, are similar on all characteristics except what the experimenter manipulates.

By randomly assigning people to conditions (self-spending versus other-spending), some people with happy childhoods should end up in each condition. Likewise, some people who had dropped their toast that morning (or experienced some other disappointment) should end up in each condition. As a result, the distribution of all these factors will generally be consistent across the two groups, and this means that on average the two groups will be relatively equivalent on all these factors. Random assignment is critical to experimentation because if the only difference between the two groups is the independent variable, we can infer that the independent variable is the cause of any observable difference (e.g., in the amount of happiness they feel at the end of the day).

Here's another example of the importance of random assignment: Let's say your class is going to form two basketball teams, and you get to be the captain of one team. The class is to be divided evenly between the two teams. If you get to pick the players for your team first, whom will you pick? You'll probably pick the tallest members of the class or the most athletic. You probably won't pick the short, uncoordinated people, unless there are no other options. As a result, your team will be taller and more athletic than the other team. But what if we want the teams to be fair? How can we do this when we have people of varying height and ability? All we have to do is randomly assign players to the two teams. Most likely, some tall and some short people will end up on your team, and some tall and some short people will end up on the other team. The average height of the teams will be approximately the same. That is the power of random assignment!

Other considerations

In addition to using random assignment, you should avoid introducing confounds into your experiments. **Confounds** are things that could undermine your ability to draw causal

inferences. For example, if you wanted to test if a new happy pill will make people happier, you could randomly assign participants to take the happy pill or not (the independent variable) and compare these two groups on their self-reported happiness (the dependent variable). However, if some participants know they are getting the happy pill, they might develop expectations that influence their self-reported happiness. This is sometimes known as a **placebo effect**. Sometimes a person just knowing that he or she is receiving special treatment or something new is enough to actually cause changes in behavior or perception: In other words, even if the participants in the happy pill condition were to report being happier, we wouldn't know if the pill was actually making them happier or if it was the placebo effect—an example of a confound. A related idea is **participant demand**. This occurs when participants try to behave in a way they think the experimenter wants them to behave. Placebo effects and participant demand often occur unintentionally. Even **experimenter expectations** can influence the outcome of a study. For example, if the experimenter knows who took the happy pill and who did not, and the dependent variable is the experimenter's observations of people's happiness, then the experimenter might perceive improvements in the happy pill group that are not really there.

One way to prevent these confounds from affecting the results of a study is to use a double-blind procedure. In a double-blind procedure, neither the participant nor the experimenter knows which condition the participant is in. For example, when participants are given the happy pill or the fake pill, they don't know which one they are receiving. This way the participants shouldn't experience the placebo effect, and will be unable to behave as the researcher expects (participant demand). Likewise, the researcher doesn't know which pill each participant is taking (at least in the beginning—later, the researcher will get the results for data-analysis purposes), which means the researcher's expectations can't influence his or her observations. Therefore, because both parties are "blind" to the condition, neither will be able to behave in a way that introduces a confound. At the end of the day, the only difference between groups will be which pills the participants received, allowing the researcher to determine if the happy pill actually caused people to be happier.

Correlational Designs

When scientists passively observe and measure phenomena it is called correlational research. Here, we do not intervene and change behavior, as we do in experiments. In correlational research, we identify patterns of relationships, but we usually cannot infer what causes what. Importantly, with correlational research, you can examine only two variables at a time, no more and no less.

So, what if you wanted to test whether spending on others is related to happiness, but you don't have \$20 to give to each participant? You could use a correlational design—which is exactly what Professor Dunn did, too. She asked people how much of their income they spent on others or donated to charity, and later she asked them how happy they were. Do you think these two variables were related? Yes, they were! The more money people reported spending on others, the happier they were.

More details about the correlation

To find out how well two variables correspond, we can plot the relation between the two scores on what is known as a scatterplot (Figure 1). In the scatterplot, each dot represents a data point. (In this case it's individuals, but it could be some other unit.) Importantly, each dot provides us with two pieces of information—in this case, information about how good the person rated the past month (x-axis) and how happy the person felt in the past month (y-axis). Which variable is plotted on which axis does not matter.

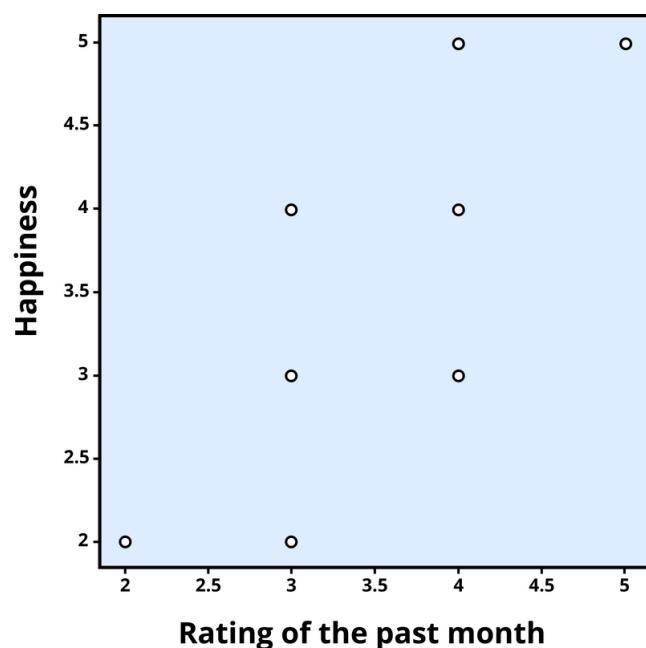


Figure 1. Scatterplot of the association between happiness and ratings of the past month, a positive correlation ($r = .81$). Each dot represents an individual.

The value for a positive correlation is indicated by a positive number (although, the positive sign is usually omitted). Here, the r value is .81.

The association between two variables can be summarized statistically using the correlation coefficient (abbreviated as r). A correlation coefficient provides information about the direction and strength of the association between two variables. For the example above, the direction of the association is positive. This means that people who perceived the past month as being good reported feeling more happy, whereas people who perceived the month as being bad reported feeling less happy.

With a positive correlation, the two variables go up or down together. In a scatterplot, the dots form a pattern that extends from the bottom left to the upper right (just as they do in Figure 1). The r

A negative correlation is one in which the two variables move in opposite directions. That is, as one variable goes up, the other goes down. Figure 2 shows the association between the average height of males in a country (y-axis) and the pathogen prevalence (or commonness of disease; x-axis) of that country. In this scatterplot, each dot represents a country. Notice how the dots extend from the top left to the bottom right. What does this mean in real-world terms? It means that people are shorter in parts of the world where there is more disease. The r value for a negative correlation is indicated by a negative number—that is, it has a minus (-) sign in front of it. Here, it is $-.83$.

The strength of a correlation has to do with how well the two variables align. Recall that in Professor Dunn's correlational study, spending on others positively correlated with happiness: The more money people reported spending on others, the happier they reported to be. At this point you may be thinking to yourself, I know a very generous person who gave away lots of money to other people but is miserable! Or maybe you know of a very stingy person who is happy as can be. Yes, there might be exceptions. If an association has many exceptions, it is considered a weak correlation. If an association has few or no exceptions, it is considered a strong correlation. A strong correlation is one in which the two variables always, or almost always, go together. In the example of happiness and how good the month has been, the association is strong. The stronger a correlation is, the tighter the dots in the scatterplot will be arranged along a sloped line.

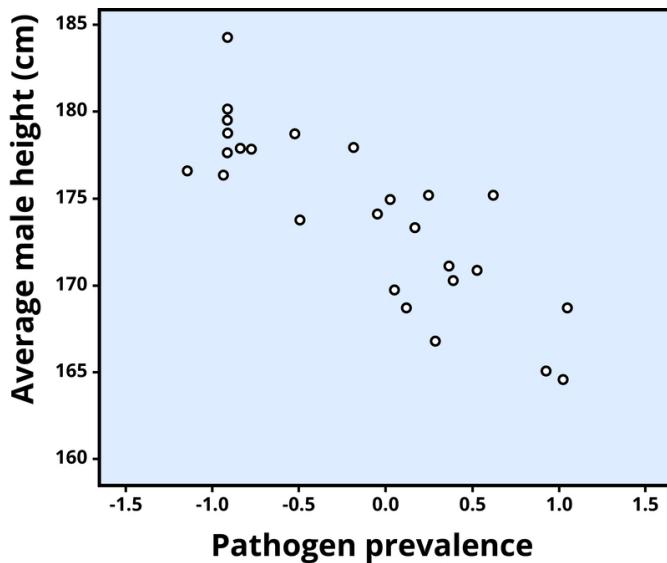


Figure 2. Scatterplot showing the association between average male height and pathogen prevalence, a negative correlation ($r = -.83$).

Each dot represents a country. (Chiao, 2009)

The r value of a strong correlation will have a high absolute value. In other words, you disregard whether there is a negative sign in front of the r value, and just consider the size of the numerical value itself. If the absolute value is large, it is a strong correlation. A weak correlation is one in which the two variables correspond some of the time, but not most of the time. Figure 3 shows the relation between valuing happiness and grade point average (GPA). People who valued happiness more tended to earn slightly lower grades, but there were lots of exceptions to this. The r value for a weak correlation will have a low absolute value. If two variables are so weakly related as to be unrelated, we say they are uncorrelated, and the r

value will be zero or very close to zero. In the previous example, is the correlation between height and pathogen prevalence strong? Compared to Figure 3, the dots in Figure 2 are tighter and less dispersed. The absolute value of $-.83$ is large. Therefore, it is a strong negative correlation.

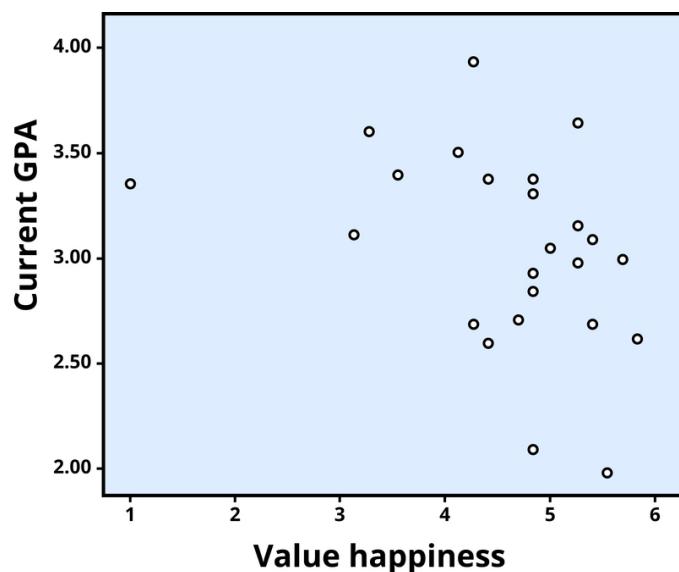


Figure 3. Scatterplot showing the association between valuing happiness and GPA, a weak negative correlation ($r = -.32$). Each dot represents an individual.

positively correlated, should we conclude that being generous causes happiness? Similarly, if height and pathogen prevalence are negatively correlated, should we conclude that disease causes shortness? From a correlation alone, we can't be certain. For example, in the first case it may be that happiness causes generosity, or that generosity causes happiness. Or, a third variable might cause both happiness *and* generosity, creating the illusion of a direct link between the two. For example, wealth could be the third variable that causes both greater happiness and greater generosity. This is why correlation does not mean causation—an often repeated phrase among psychologists.

Qualitative Designs

Just as correlational research allows us to study topics we can't experimentally manipulate (e.g., whether you have a large or small income), there are other types of research designs that allow us to investigate these harder-to-study topics. Qualitative designs, including participant observation, case studies, and narrative analysis are examples of such methodologies. Although something as simple as "observation" may seem like it would be a part of all research

Can you guess the strength and direction of the correlation between age and year of birth? If you said this is a strong negative correlation, you are correct! Older people always have lower years of birth than younger people (e.g., 1950 vs. 1995), but at the same time, the older people will have a higher age (e.g., 65 vs. 20). In fact, this is a perfect correlation because there are no exceptions to this pattern. I challenge you to find a 10-year-old born before 2003! You can't.

Problems with the correlation

If generosity and happiness are positively correlated, should we conclude that being generous causes happiness? Similarly, if height and pathogen prevalence are negatively correlated, should we conclude that disease causes shortness? From a correlation alone, we can't be certain. For example, in the first case it may be that happiness causes generosity, or that generosity causes happiness. Or, a third variable might cause both happiness *and* generosity, creating the illusion of a direct link between the two. For example, wealth could be the third variable that causes both greater happiness and greater generosity. This is why correlation does not mean causation—an often repeated phrase among psychologists.

methods, participant observation is a distinct methodology that involves the researcher embedding him- or herself into a group in order to study its dynamics. For example, Festinger, Riecken, and Shacter (1956) were very interested in the psychology of a particular cult. However, this cult was very secretive and wouldn't grant interviews to outside members. So, in order to study these people, Festinger and his colleagues pretended to be cult members, allowing them access to the behavior and psychology of the cult. Despite this example, it should be noted that the people being observed in a participant observation study usually know that the researcher is there to study them.

Another qualitative method for research is the case study, which involves an intensive examination of specific individuals or specific contexts. Sigmund Freud, the father of psychoanalysis, was famous for using this type of methodology; however, more current examples of case studies usually involve brain injuries. For instance, imagine that researchers want to know how a very specific brain injury affects people's experience of happiness. Obviously, the researchers can't conduct experimental research that involves inflicting this type of injury on people. At the same time, there are too few people who have this type of injury to conduct correlational research. In such an instance, the researcher may examine only one person with this brain injury, but in doing so, the researcher will put the participant through a very extensive round of tests. Hopefully what is learned from this one person can be applied to others; however, even with thorough tests, there is the chance that something unique about this individual (other than the brain injury) will affect his or her happiness. But with such a limited number of possible participants, a case study is really the only type of methodology suitable for researching this brain injury.

The final qualitative method to be discussed in this section is narrative analysis. Narrative analysis centers around the study of stories and personal accounts of people, groups, or cultures. In this methodology, rather than engaging with participants directly, or quantifying their responses or behaviors, researchers will analyze the themes, structure, and dialogue of each person's narrative. That is, a researcher will examine people's personal testimonies in order to learn more about the psychology of those individuals or groups. These stories may be written, audio-recorded, or video-recorded, and allow the researcher not only to study *what* the participant says but *how* he or she says it. Every person has a unique perspective on the world, and studying the way he or she conveys a story can provide insight into that perspective.

Quasi-Experimental Designs

What if you want to study the effects of marriage on a variable? For example, does marriage

make people happier? Can you randomly assign some people to get married and others to remain single? Of course not. So how can you study these important variables? You can use a quasi-experimental design.

A quasi-experimental design is similar to experimental research, except that random assignment to conditions is not used. Instead, we rely on existing group memberships (e.g., married vs. single). We treat these as the independent variables, even though we don't assign people to the conditions and don't manipulate the variables. As a result, with quasi-experimental designs causal inference is more difficult. For example, married people might differ on a variety of characteristics from unmarried people. If we find that married participants are happier than single participants, it will be hard to say that marriage causes happiness, because the people who got married might have already been happier than the people who have remained single.



What is a reasonable way to study the effects of marriage on happiness? [Image: Nina Matthews Photography, <https://goo.gl/lcmLqg>, CC BY-NC-SA, <https://goo.gl/HSisdg>]

Because experimental and quasi-experimental designs can seem pretty similar, let's take another example to distinguish them. Imagine you want to know who is a better professor: Dr. Smith or Dr. Khan. To judge their ability, you're going to look at their students' final grades. Here, the independent variable is the professor (Dr. Smith vs. Dr. Khan) and the dependent variable is the students' grades. In an experimental design, you would randomly assign students to one of the two professors and then compare the students' final grades. However, in real life, researchers can't randomly force students to take one professor over the other; instead, the researchers would just have to use the preexisting classes and study them as-is (quasi-experimental design). Again, the key difference is random assignment to the conditions of the independent variable. Although the quasi-experimental design (where the students choose which professor they want) may seem random, it's most likely not. For example, maybe students heard Dr. Smith sets low expectations, so slackers prefer this class, whereas Dr. Khan sets higher expectations, so smarter students prefer that one. This now introduces a confounding variable (student intelligence) that will almost certainly have an effect on students' final grades, regardless of how skilled the professor is. So, even though a quasi-

experimental design is similar to an experimental design (i.e., both have independent and dependent variables), because there's no random assignment, you can't reasonably draw the same conclusions that you would with an experimental design.

Longitudinal Studies

Another powerful research design is the **longitudinal study**. Longitudinal studies track the same people over time. Some longitudinal studies last a few weeks, some a few months, some a year or more. Some studies that have contributed a lot to psychology followed the same people over decades. For example, one study followed more than 20,000 Germans for two decades. From these longitudinal data, psychologist Rich Lucas (2003) was able to determine that people who end up getting married indeed start off a bit happier than their peers who never marry. Longitudinal studies like this provide valuable evidence for testing many theories in psychology, but they can be quite costly to conduct, especially if they follow many people for many years.

Surveys

A survey is a way of gathering information, using old-fashioned questionnaires or the Internet. Compared to a study conducted in a psychology laboratory, surveys can reach a larger number of participants at a much lower cost. Although surveys are typically used for correlational research, this is not always the case. An experiment can be carried out using surveys as well. For example, King and Napa (1998) presented participants with different types of stimuli on paper: either a survey completed by a happy person or a survey completed by an unhappy person. They wanted to see whether happy people were judged as more likely to get into heaven compared to unhappy people. Can you figure out the independent and dependent variables in this study? Can you guess what the results were? Happy people (vs. unhappy people; the independent variable) were



Surveys provide researchers with some significant advantages in gathering data. They make it possible to reach large numbers of people while keeping costs to the researchers and the time commitments of participants relatively low.

judged as more likely to go to heaven (the dependent variable) compared to unhappy people!

Likewise, correlational research can be conducted without the use of surveys. For instance, psychologists LeeAnn Harker and Dacher Keltner (2001) examined the smile intensity of women's college yearbook photos. Smiling in the photos was correlated with being married 10 years later!

Tradeoffs in Research

Even though there are serious limitations to correlational and quasi-experimental research, they are not poor cousins to experiments and longitudinal designs. In addition to selecting a method that is appropriate to the question, many practical concerns may influence the decision to use one method over another. One of these factors is simply resource availability —how much time and money do you have to invest in the research? (Tip: If you're doing a senior honor's thesis, do not embark on a lengthy longitudinal study unless you are prepared to delay graduation!) Often, we survey people even though it would be more precise—but much more difficult—to track them longitudinally. Especially in the case of exploratory research, it may make sense to opt for a cheaper and faster method first. Then, if results from the initial study are promising, the researcher can follow up with a more intensive method.

Beyond these practical concerns, another consideration in selecting a research design is the ethics of the study. For example, in cases of brain injury or other neurological abnormalities, it would be unethical for researchers to inflict these impairments on healthy participants. Nonetheless, studying people with these injuries can provide great insight into human psychology (e.g., if we learn that damage to a particular region of the brain interferes with emotions, we may be able to develop treatments for emotional irregularities). In addition to brain injuries, there are numerous other areas of research that could be useful in understanding the human mind but which pose challenges to a true experimental design—such as the experiences of war, long-term isolation, abusive parenting, or prolonged drug use. However, none of these are conditions we could ethically experimentally manipulate and randomly assign people to. Therefore, ethical considerations are another crucial factor in determining an appropriate research design.

Research Methods: Why You Need Them

Just look at any major news outlet and you'll find research routinely being reported. Sometimes the journalist understands the research methodology, sometimes not (e.g., correlational evidence is often incorrectly represented as causal evidence). Often, the media are quick to

draw a conclusion for you. After reading this module, you should recognize that the strength of a scientific finding lies in the strength of its methodology. Therefore, in order to be a savvy consumer of research, you need to understand the pros and cons of different methods and the distinctions among them. Plus, understanding how psychologists systematically go about answering research questions will help you to solve problems in other domains, both personal and professional, not just in psychology.

Outside Resources

Article: Harker and Keltner study of yearbook photographs and marriage
<http://psycnet.apa.org/journals/psp/80/1/112/>

Article: Rich Lucas's longitudinal study on the effects of marriage on happiness
<http://psycnet.apa.org/journals/psp/84/3/527/>

Article: Spending money on others promotes happiness. Elizabeth Dunn's research
<https://www.sciencemag.org/content/319/5870/1687.abstract>

Article: What makes a life good?
<http://psycnet.apa.org/journals/psp/75/1/156/>

Discussion Questions

1. What are some key differences between experimental and correlational research?
2. Why might researchers sometimes use methods other than experiments?
3. How do surveys relate to correlational and experimental designs?

Vocabulary

Confounds

Factors that undermine the ability to draw causal inferences from an experiment.

Correlation

Measures the association between two variables, or how they go together.

Dependent variable

The variable the researcher measures but does not manipulate in an experiment.

Experimenter expectations

When the experimenter's expectations influence the outcome of a study.

Independent variable

The variable the researcher manipulates and controls in an experiment.

Longitudinal study

A study that follows the same group of individuals over time.

Operational definitions

How researchers specifically measure a concept.

Participant demand

When participants behave in a way that they think the experimenter wants them to behave.

Placebo effect

When receiving special treatment or something new affects human behavior.

Quasi-experimental design

An experiment that does not require random assignment to conditions.

Random assignment

Assigning participants to receive different conditions of an experiment by chance.

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3

Conducting Psychology Research in the Real World

Matthias R. Mehl

Because of its ability to determine cause-and-effect relationships, the laboratory experiment is traditionally considered the method of choice for psychological science. One downside, however, is that as it carefully controls conditions and their effects, it can yield findings that are out of touch with reality and have limited use when trying to understand real-world behavior. This module highlights the importance of also conducting research outside the psychology laboratory, within participants' natural, everyday environments, and reviews existing methodologies for studying daily life

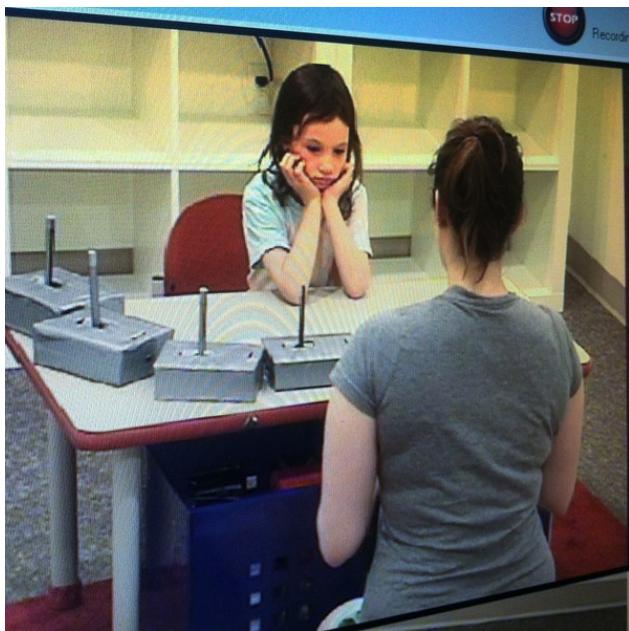
Learning Objectives

- Identify limitations of the traditional laboratory experiment.
- Explain ways in which daily life research can further psychological science.
- Know what methods exist for conducting psychological research in the real world.

Introduction

The laboratory experiment is traditionally considered the “gold standard” in psychology research. This is because only laboratory experiments can clearly separate cause from effect and therefore establish causality. Despite this unique strength, it is also clear that a scientific field that is mainly based on controlled laboratory studies ends up lopsided. Specifically, it

accumulates a lot of knowledge on what *can* happen—under carefully isolated and controlled circumstances—but it has little to say about what actually *does* happen under the circumstances that people actually encounter in their daily lives.



Do the research results obtained in isolated, carefully controlled laboratory conditions generalize into the real world? [Image: Nessen Marshall, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

to a charitable cause? Would all kinds of happy movies produce this behavior, or only this one? What about other positive experiences that might boost mood, like receiving a compliment or a good grade? And what if you were watching the movie with friends, in a crowded theatre, rather than in a sterile research lab? Taking research out into the real world can help answer some of these sorts of important questions.

As one of the founding fathers of social psychology remarked, "Experimentation in the laboratory occurs, socially speaking, on an island quite isolated from the life of society" (Lewin, 1944, p. 286). This module highlights the importance of going beyond experimentation and also conducting research outside the laboratory (Reis & Gosling, 2010), directly within participants' natural environments, and reviews existing methodologies for studying daily life.

Rationale for Conducting Psychology Research in the Real World

One important challenge researchers face when designing a study is to find the right balance

For example, imagine you are a participant in an experiment that looks at the effect of being in a good mood on generosity, a topic that may have a good deal of practical application. Researchers create an internally-valid, carefully-controlled experiment where they randomly assign you to watch either a happy movie or a neutral movie, and then you are given the opportunity to help the researcher out by staying longer and participating in another study. If people in a good mood are more willing to stay and help out, the researchers can feel confident that – since everything else was held constant – your positive mood led you to be more helpful. However, what does this tell us about helping behaviors in the real world? Does it **generalize** to other kinds of helping, such as donating money

between ensuring **internal validity**, or the degree to which a study allows unambiguous causal inferences, and **external validity**, or the degree to which a study ensures that potential findings apply to settings and samples other than the ones being studied (Brewer, 2000). Unfortunately, these two kinds of validity tend to be difficult to achieve at the same time, in one study. This is because creating a controlled setting, in which all potentially influential factors (other than the experimentally-manipulated variable) are controlled, is bound to create an environment that is quite different from what people naturally encounter (e.g., using a happy movie clip to promote helpful behavior). However, it is the degree to which an experimental situation is comparable to the corresponding real-world situation of interest that determines how generalizable potential findings will be. In other words, if an experiment is very far-off from what a person might normally experience in everyday life, you might reasonably question just how useful its findings are.

Because of the incompatibility of the two types of validity, one is often—by design—prioritized over the other. Due to the importance of identifying true causal relationships, psychology has traditionally emphasized internal over external validity. However, in order to make claims about human behavior that apply across populations and environments, researchers complement traditional laboratory research, where participants are brought into the lab, with field research where, in essence, the psychological laboratory is brought to participants. Field studies allow for the important test of how psychological variables and processes of interest “behave” under real-world circumstances (i.e., what *actually does happen* rather than what *can happen*). They can also facilitate “downstream” operationalizations of constructs that measure life outcomes of interest *directly* rather than indirectly.

Take, for example, the fascinating field of psychoneuroimmunology, where the goal is to understand the interplay of psychological factors - such as personality traits or one's stress level - and the immune system. Highly sophisticated and carefully controlled experiments offer ways to isolate the variety of neural, hormonal, and cellular mechanisms that link psychological variables such as chronic stress to biological outcomes such as immunosuppression (a state of impaired immune functioning; Sapolsky, 2004). Although these studies demonstrate impressively how psychological factors can affect health-relevant biological processes, they—because of their research design—remain mute about the degree to which these factors actually do undermine people's everyday health in real life. It is certainly important to show that laboratory stress can alter the number of natural killer cells in the blood. But it is equally important to test to what extent the levels of stress that people experience on a day-to-day basis result in them catching a cold more often or taking longer to recover from one. The goal for researchers, therefore, must be to complement traditional laboratory experiments with less controlled studies under real-world circumstances. The term **ecological validity** is used to refer the degree to which an effect has been obtained under

conditions that are typical for what happens in everyday life (Brewer, 2000). In this example, then, people might keep a careful daily log of how much stress they are under as well as noting physical symptoms such as headaches or nausea. Although many factors beyond stress level may be responsible for these symptoms, this more correlational approach can shed light on how the relationship between stress and health plays out outside of the laboratory.

An Overview of Research Methods for Studying Daily Life

Capturing “life as it is lived” has been a strong goal for some researchers for a long time. Wilhelm and his colleagues recently published a comprehensive review of early attempts to systematically document daily life (Wilhelm, Perrez, & Pawlik, 2012). Building onto these original methods, researchers have, over the past decades, developed a broad toolbox for measuring experiences, behavior, and physiology directly in participants’ daily lives (Mehl & Conner, 2012). Figure 1 provides a schematic overview of the methodologies described below.

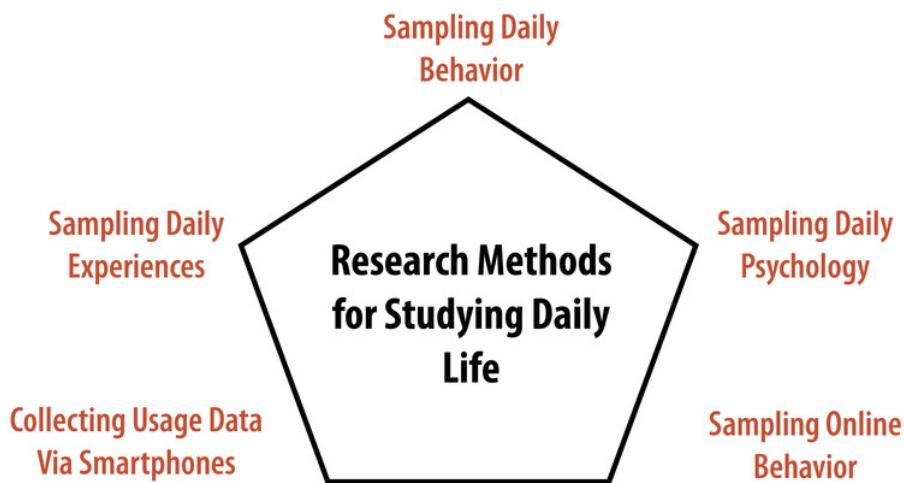


Figure 1. Schematic Overview of Research Methods for Studying Daily Life

Studying Daily Experiences

Starting in the mid-1970s, motivated by a growing skepticism toward highly-controlled laboratory studies, a few groups of researchers developed a set of new methods that are now commonly known as the experience-sampling method (Hektner, Schmidt, & Csikszentmihalyi, 2007), ecological momentary assessment (Stone & Shiffman, 1994), or the

diary method (Bolger & Rafaeli, 2003). Although variations within this set of methods exist, the basic idea behind all of them is to collect in-the-moment (or, close-to-the-moment) self-report data directly from people as they go about their daily lives. This is typically accomplished by asking participants' repeatedly (e.g., five times per day) over a period of time (e.g., a week) to report on their current thoughts and feelings. The momentary questionnaires often ask about their location (e.g., "Where are you now?"), social environment (e.g., "With whom are you now?"), activity (e.g., "What are you currently doing?"), and experiences (e.g., "How are you feeling?"). That way, researchers get a snapshot of what was going on in participants' lives at the time at which they were asked to report.

Technology has made this sort of research possible, and recent technological advances have altered the different tools researchers are able to easily use. Initially, participants wore electronic wristwatches that beeped at preprogrammed but seemingly random times, at which they completed one of a stack of provided paper questionnaires. With the mobile computing revolution, both the prompting and the questionnaire completion were gradually replaced by handheld devices such as smartphones. Being able to collect the momentary questionnaires digitally and time-stamped (i.e., having a record of exactly when participants responded) had major methodological and practical advantages and contributed to experience sampling going mainstream (Conner, Tennen, Fleeson, & Barrett, 2009).

Over time, experience sampling and related momentary self-report methods have become very popular, and, by now, they are effectively the gold standard for studying daily life. They have helped make progress in almost all areas of psychology (Mehl & Conner, 2012). These methods ensure receiving many measurements from many participants, and has further inspired the development of novel statistical methods (Bolger & Laurenceau, 2013). Finally, and maybe most importantly, they accomplished what they sought out to accomplish: to bring attention to what psychology ultimately wants and needs to know about, namely "what people actually do, think, and feel in the various contexts of their lives" (Funder, 2001, p. 213). In short, these approaches have allowed researchers to do research that



Using modern technology like smartphones allows for more widespread experience sampling of research participants. Whether at home, work, or just sitting in a coffee shop technology makes it easier than ever to participate in psychology research. [Image: Vladimir Yaitskiy, <https://goo.gl/7sjXfq>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

is more externally valid, or more generalizable to real life, than the traditional laboratory experiment.

To illustrate these techniques, consider a classic study, Stone, Reed, and Neale (1987), who tracked positive and negative experiences surrounding a respiratory infection using daily experience sampling. They found that undesirable experiences peaked and desirable ones dipped about four to five days prior to participants coming down with the cold. More recently, Killingsworth and Gilbert (2010) collected momentary self-reports from more than 2,000 participants via a smartphone app. They found that participants were less happy when their mind was in an idling, mind-wandering state, such as surfing the Internet or multitasking at work, than when it was in an engaged, task-focused one, such as working diligently on a paper. These are just two examples that illustrate how experience-sampling studies have yielded findings that could not be obtained with traditional laboratory methods.

Recently, the **day reconstruction method (DRM)** (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004) has been developed to obtain information about a person's daily experiences without going through the burden of collecting momentary experience-sampling data. In the DRM, participants report their experiences of a given day retrospectively after engaging in a systematic, experiential reconstruction of the day on the following day. As a participant in this type of study, you might look back on yesterday, divide it up into a series of episodes such as "made breakfast," "drove to work," "had a meeting," etc. You might then report who you were with in each episode and how you felt in each. This approach has shed light on what situations lead to moments of positive and negative mood throughout the course of a normal day.

Studying Daily Behavior

Experience sampling is often used to study everyday behavior (i.e., daily social interactions and activities). In the laboratory, behavior is best studied using direct behavioral observation (e.g., video recordings). In the real world, this is, of course, much more difficult. As Funder put it, it seems it would require a "detective's report [that] would specify in exact detail everything the participant said and did, and with whom, in all of the contexts of the participant's life" (Funder, 2007, p. 41).

As difficult as this may seem, Mehl and colleagues have developed a naturalistic observation methodology that is similar in spirit. Rather than following participants—like a detective—with a video camera (see Craik, 2000), they equip participants with a portable audio recorder that is programmed to periodically record brief snippets of ambient sounds (e.g., 30 seconds every 12 minutes). Participants carry the recorder (originally a microcassette recorder, now a

smartphone app) on them as they go about their days and return it at the end of the study. The recorder provides researchers with a series of sound bites that, together, amount to an acoustic diary of participants' days as they naturally unfold—and that constitute a representative sample of their daily activities and social encounters. Because it is somewhat similar to having the researcher's ear at the participant's lapel, they called their method the **electronically activated recorder, or EAR** (Mehl, Pennebaker, Crow, Dabbs, & Price, 2001). The ambient sound recordings can be coded for many things, including participants' locations (e.g., at school, in a coffee shop), activities (e.g., watching TV, eating), interactions (e.g., in a group, on the phone), and emotional expressions (e.g., laughing, sighing). As unnatural or intrusive as it might seem, participants report that they quickly grow accustomed to the EAR and say they soon find themselves behaving as they normally would.

In a cross-cultural study, Ramírez-Esparza and her colleagues used the EAR method to study sociability in the United States and Mexico. Interestingly, they found that although American participants rated themselves significantly higher than Mexicans on the question, "I see myself as a person who is talkative," they actually spent almost 10 percent less time talking than Mexicans did (Ramírez-Esparza, Mehl, Álvarez Bermúdez, & Pennebaker, 2009). In a similar way, Mehl and his colleagues used the EAR method to debunk the long-standing myth that women are considerably more talkative than men. Using data from six different studies, they showed that both sexes use on average about 16,000 words per day. The estimated sex difference of 546 words was trivial compared to the immense range of more than 46,000 words between the least and most talkative individual (695 versus 47,016 words; Mehl, Vazire, Ramírez-Esparza, Slatcher, & Pennebaker, 2007). Together, these studies demonstrate how naturalistic observation can be used to study objective aspects of daily behavior and how it can yield findings quite different from what other methods yield (Mehl, Robbins, & Deters, 2012).

A series of other methods and creative ways for assessing behavior directly and unobtrusively in the real world are described in a seminal book on real-world, subtle measures (Webb, Campbell, Schwartz, Sechrest, & Grove, 1981). For example, researchers have used time-lapse photography to study the flow of people and the use of space in urban public places (Whyte, 1980). More recently, they have observed people's personal (e.g., dorm rooms) and professional (e.g., offices) spaces to understand how personality is expressed and detected in everyday environments (Gosling, Ko, Mannarelli, & Morris, 2002). They have even systematically collected and analyzed people's garbage to measure what people actually consume (e.g., empty alcohol bottles or cigarette boxes) rather than what they say they consume (Rathje & Murphy, 2001). Because people often cannot and sometimes may not want to accurately report what they do, the direct—and ideally nonreactive—assessment of real-world behavior is of high importance for psychological research (Baumeister, Vohs, &

Funder, 2007).

Studying Daily Physiology

In addition to studying how people think, feel, and behave in the real world, researchers are also interested in how our bodies respond to the fluctuating demands of our lives. What are the daily experiences that make our “blood boil”? How do our neurotransmitters and hormones respond to the stressors we encounter in our lives? What physiological reactions do we show to being loved—or getting ostracized? You can see how studying these powerful experiences in real life, as they actually happen, may provide more rich and informative data than one might obtain in an artificial laboratory setting that merely mimics these experiences.



Real world stressors may result in very different physiological responses than the same stressors simulated in a lab environment.
[Image: State Farm, <https://goo.gl/FGYyVz>, CC BY 2.0, <https://goo.gl/9uSnqN>]

have high blood pressure in the doctor's office but not in their home environment—the so-called **white coat hypertension** (White, Schulman, McCabe, & Dey, 1989).

Ambulatory physiological monitoring – that is, monitoring physiological reactions as people go about their daily lives - has a long history in biomedical research and an array of monitoring devices exist (Fahrenberg & Myrtek, 1996). Among the biological signals that can now be

Also, in pursuing these questions, it is important to keep in mind that what is stressful, engaging, or boring for one person might not be so for another. It is, in part, for this reason that researchers have found only limited correspondence between how people respond physiologically to a standardized laboratory stressor (e.g., giving a speech) and how they respond to stressful experiences in their lives. To give an example, Wilhelm and Grossman (2010) describe a participant who showed rather minimal heart rate increases in response to a laboratory stressor (about five to 10 beats per minute) but quite dramatic increases (almost 50 beats per minute) later in the afternoon while watching a soccer game. Of course, the reverse pattern can happen as well, such as when patients

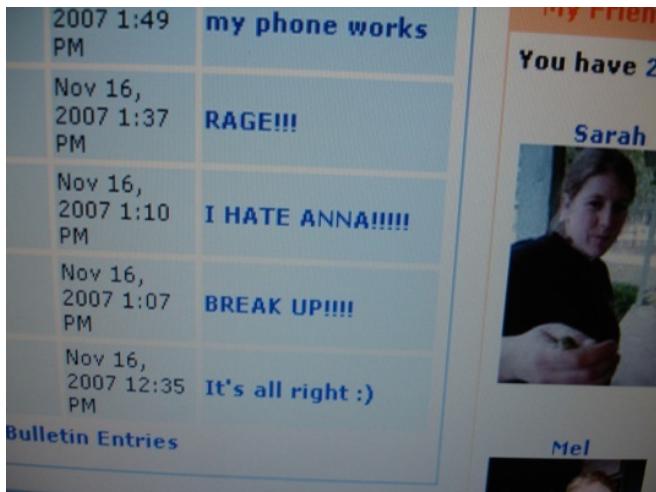
measured in daily life with portable signal recording devices are the electrocardiogram (ECG), blood pressure, electrodermal activity (or “sweat response”), body temperature, and even the electroencephalogram (EEG) (Wilhelm & Grossman, 2010). Most recently, researchers have added **ambulatory assessment** of hormones (e.g., cortisol) and other biomarkers (e.g., immune markers) to the list (Schlotz, 2012). The development of ever more sophisticated ways to track what goes on underneath our skins as we go about our lives is a fascinating and rapidly advancing field.

In a recent study, Lane, Zareba, Reis, Peterson, and Moss (2011) used experience sampling combined with ambulatory electrocardiography (a so-called Holter monitor) to study how emotional experiences can alter cardiac function in patients with a congenital heart abnormality (e.g., long QT syndrome). Consistent with the idea that emotions may, in some cases, be able to trigger a cardiac event, they found that typical—in most cases even relatively low intensity—daily emotions had a measurable effect on ventricular repolarization, an important cardiac indicator that, in these patients, is linked to risk of a cardiac event. In another study, Smyth and colleagues (1998) combined experience sampling with momentary assessment of cortisol, a stress hormone. They found that momentary reports of current or even anticipated stress predicted increased cortisol secretion 20 minutes later. Further, and independent of that, the experience of other kinds of negative affect (e.g., anger, frustration) also predicted higher levels of cortisol and the experience of positive affect (e.g., happy, joyful) predicted lower levels of this important stress hormone. Taken together, these studies illustrate how researchers can use ambulatory physiological monitoring to study how the little—and seemingly trivial or inconsequential—experiences in our lives leave objective, measurable traces in our bodily systems.

Studying Online Behavior

Another domain of daily life that has only recently emerged is virtual daily behavior or how people act and interact with others on the Internet. Irrespective of whether social media will turn out to be humanity’s blessing or curse (both scientists and laypeople are currently divided over this question), the fact is that people are spending an ever increasing amount of time online. In light of that, researchers are beginning to think of virtual behavior as being as serious as “actual” behavior and seek to make it a legitimate target of their investigations (Gosling & Johnson, 2010).

One way to study virtual behavior is to make use of the fact that most of what people do on the Web—emailing, chatting, tweeting, blogging, posting—leaves direct (and permanent) verbal traces. For example, differences in the ways in which people use words (e.g., subtle



Online activity reveals a lot of psychological information to researchers. [Image: Sarah C. Frey, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

of the first Internet blogging sites, to study how people responded socially and emotionally to the attacks of September 11, 2001. In going “the online route,” they could bypass a critical limitation of coping research, the inability to obtain baseline information; that is, how people were doing *before* the traumatic event occurred. Through access to the database of public blogs, they downloaded entries from two months prior to two months after the attacks. Their **linguistic analyses** revealed that in the first days after the attacks, participants expectedly expressed more negative emotions and were more cognitively and socially engaged, asking questions and sending messages of support. Already after two weeks, though, their moods and social engagement returned to baseline, and, interestingly, their use of cognitive-analytic words (e.g., “think,” “question”) even dropped below their normal level. Over the next six weeks, their mood hovered around their pre-9/11 baseline, but both their social engagement and cognitive-analytic processing stayed remarkably low. This suggests a social and cognitive weariness in the aftermath of the attacks. In using virtual verbal behavior as a marker of psychological functioning, this study was able to draw a fine timeline of how humans cope with disasters.

Reflecting their rapidly growing real-world importance, researchers are now beginning to investigate behavior on social networking sites such as Facebook (Wilson, Gosling, & Graham, 2012). Most research looks at psychological correlates of online behavior such as personality traits and the quality of one’s social life but, importantly, there are also first attempts to export traditional experimental research designs into an online setting. In a pioneering study of online social influence, Bond and colleagues (2012) experimentally tested the effects that peer feedback has on voting behavior. Remarkably, their sample consisted of 16 million (!) Facebook users. They found that online political-mobilization messages (e.g., “I voted” accompanied by

preferences in word choice) have been found to carry a lot of psychological information (Pennebaker, Mehl, & Niederhoffer, 2003). Therefore, a good way to study virtual social behavior is to study virtual language behavior. Researchers can download people’s—often public—verbal expressions and communications and analyze them using modern text analysis programs (e.g., Pennebaker, Booth, & Francis, 2007).

For example, Cohn, Mehl, and Pennebaker (2004) downloaded blogs of more than a thousand users of lifejournal.com, one

selected pictures of their Facebook friends) influenced real-world voting behavior. This was true not just for users who saw the messages but also for their friends and friends of their friends. Although the intervention effect on a single user was very small, through the enormous number of users and indirect social contagion effects, it resulted cumulatively in an estimated 340,000 additional votes—enough to tilt a close election. In short, although still in its infancy, research on virtual daily behavior is bound to change social science, and it has already helped us better understand both virtual and “actual” behavior.

“Smartphone Psychology” ?

A review of research methods for studying daily life would not be complete without a vision of “what’s next.” Given how common they have become, it is safe to predict that smartphones will not just remain devices for everyday online communication but will also become devices for scientific data collection and intervention (Kaplan & Stone, 2013; Yarkoni, 2012). These devices automatically store vast amounts of real-world user interaction data, and, in addition, they are equipped with sensors to track the physical (e.g., location, position) and social (e.g., wireless connections around the phone) context of these interactions. Miller (2012, p. 234) states, “The question is not whether smartphones will revolutionize psychology but how, when, and where the revolution will happen.” Obviously, their immense potential for data collection also brings with it big new challenges for researchers (e.g., privacy protection, data analysis, and synthesis). Yet it is clear that many of the methods described in this module—and many still to be developed ways of collecting real-world data—will, in the future, become integrated into the devices that people naturally and happily carry with them from the moment they get up in the morning to the moment they go to bed.

Conclusion

This module sought to make a case for psychology research conducted outside the lab. If the ultimate goal of the social and behavioral sciences is to explain human behavior, then researchers must also—in addition to conducting carefully controlled lab studies—deal with the “messy” real world and find ways to capture life as it naturally happens.

Mortensen and Cialdini (2010) refer to the dynamic give-and-take between laboratory and field research as **“full-cycle psychology”**. Going full cycle, they suggest, means that “researchers use naturalistic observation to determine an effect’s presence in the real world, theory to determine what processes underlie the effect, experimentation to verify the effect and its underlying processes, and a return to the natural environment to corroborate the experimental findings” (Mortensen & Cialdini, 2010, p. 53). To accomplish this, researchers

have access to a toolbox of research methods for studying daily life that is now more diverse and more versatile than it has ever been before. So, all it takes is to go ahead and—literally—bring science to life.

Outside Resources

Website: Society for Ambulatory Assessment

<http://www.ambulatory-assessment.org>

Discussion Questions

1. What do you think about the tradeoff between unambiguously establishing cause and effect (internal validity) and ensuring that research findings apply to people's everyday lives (external validity)? Which one of these would you prioritize as a researcher? Why?
2. What challenges do you see that daily-life researchers may face in their studies? How can they be overcome?
3. What ethical issues can come up in daily-life studies? How can (or should) they be addressed?
4. How do you think smartphones and other mobile electronic devices will change psychological research? What are their promises for the field? And what are their pitfalls?

Vocabulary

Ambulatory assessment

An overarching term to describe methodologies that assess the behavior, physiology, experience, and environments of humans in naturalistic settings.

Daily Diary method

A methodology where participants complete a questionnaire about their thoughts, feelings, and behavior of the day at the end of the day.

Day reconstruction method (DRM)

A methodology where participants describe their experiences and behavior of a given day retrospectively upon a systematic reconstruction on the following day.

Ecological momentary assessment

An overarching term to describe methodologies that repeatedly sample participants' real-world experiences, behavior, and physiology in real time.

Ecological validity

The degree to which a study finding has been obtained under conditions that are typical for what happens in everyday life.

Electronically activated recorder, or EAR

A methodology where participants wear a small, portable audio recorder that intermittently records snippets of ambient sounds around them.

Experience-sampling method

A methodology where participants report on their momentary thoughts, feelings, and behaviors at different points in time over the course of a day.

External validity

The degree to which a finding generalizes from the specific sample and context of a study to some larger population and broader settings.

Full-cycle psychology

A scientific approach whereby researchers start with an observational field study to identify an effect in the real world, follow up with laboratory experimentation to verify the effect and isolate the causal mechanisms, and return to field research to corroborate their experimental

findings.

Generalize

Generalizing, in science, refers to the ability to arrive at broad conclusions based on a smaller sample of observations. For these conclusions to be true the sample should accurately represent the larger population from which it is drawn.

Internal validity

The degree to which a cause-effect relationship between two variables has been unambiguously established.

Linguistic inquiry and word count

A quantitative text analysis methodology that automatically extracts grammatical and psychological information from a text by counting word frequencies.

Lived day analysis

A methodology where a research team follows an individual around with a video camera to objectively document a person's daily life as it is lived.

White coat hypertension

A phenomenon in which patients exhibit elevated blood pressure in the hospital or doctor's office but not in their everyday lives.

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The Brain, Sensation, and Perception

4

The Brain and Nervous System

Robert Biswas-Diener

The brain is the most complex part of the human body. It is the center of consciousness and also controls all voluntary and involuntary movement and bodily functions. It communicates with each part of the body through the nervous system, a network of channels that carry electrochemical signals.

Learning Objectives

- Name the various parts of the nervous system and their respective functions
- Explain how neurons communicate with each other
- Identify the location and function of the limbic system
- Articulate how the primary motor cortex is an example of brain region specialization
- Name at least three neuroimaging techniques and describe how they work

In the 1800s a German scientist by the name of Ernst Weber conducted several experiments meant to investigate how people perceive the world via their own bodies (Hernstein & Boring, 1966). It is obvious that we use our sensory organs—our eyes, and ears, and nose—to take in and understand the world around us. Weber was particularly interested in the sense of touch. Using a drafting compass he placed the two points far apart and set them on the skin of a volunteer. When the points were far apart the research participants could easily distinguish between them. As Weber repeated the process with ever closer points, however, most people lost the ability to tell the difference between them. Weber discovered that the ability to recognize these “just noticeable differences” depended on where on the body the

compass was positioned. Your back, for example, is far less sensitive to touch than is the skin on your face. Similarly, the tip of your tongue is extremely sensitive! In this way, Weber began to shed light on the way that nerves, the nervous system, and the brain form the biological foundation of psychological processes.



Measuring "just noticeable differences."

In this module we will explore the biological side of psychology by paying particular attention to the brain and to the nervous system. Understanding the nervous system is vital to understanding psychology in general. It is through the nervous system that we experience pleasure and pain, feel emotions, learn and use language, and plan goals, just to name a few examples. In the pages that follow we will begin by examining how the human nervous system develops and then we will learn about the parts of the brain and how they function. We will conclude with a section on how modern psychologists study the brain.

It is worth mentioning here, at the start, that an introduction to the biological aspects of psychology can be both the most interesting and most frustrating of all topics for new students of psychology. This is, in large part, due to the fact that there is so much new information to learn and new vocabulary associated with all the various parts of the brain and nervous system. In fact, there are 30 key vocabulary words presented in this module! We encourage you not to get bogged down in difficult words. Instead, pay attention to the broader concepts, perhaps even skipping over the vocabulary on your first reading. It is helpful to pass back through with a second reading, once you are already familiar with the topic, with attention to learning the vocabulary.

Nervous System development across the human lifespan

As a species, humans have evolved a complex nervous system and brain over millions of years. Comparisons of our nervous systems with those of other animals, such as chimpanzees, show some similarities (Darwin, 1859). Researchers can also use fossils to study the relationship between brain volume and human behavior over the course of evolutionary history. *Homo*

habilis, for instance, a human ancestor living about 2 million years ago shows a larger brain volume than its own ancestors but far less than modern *homo sapiens*. The main difference between humans and other animals-- in terms of brain development-- is that humans have a much more developed frontal cortex (the front part of the brain associated with planning).

Interestingly, a person's unique nervous system develops over the course of their lifespan in a way that resembles the evolution of nervous systems in animals across vast stretches of time. For example, the human nervous system begins developing even before a person is born. It begins as a simple bundle of tissue that forms into a tube and extends along the head-to-tail plane becoming the spinal cord and brain. 25 days into its development, the embryo has a distinct spinal cord, as well as hindbrain, midbrain and forebrain (Stiles & Jernigan, 2010). What, exactly, is this nervous system that is developing and what does it do?

The **nervous system** can be thought of as the body's communication network that consists of all nerve cells. There are many ways in which we can divide the nervous system to understand it more clearly. One common way to do so is by parsing it into the central nervous system and the peripheral nervous system. Each of these can be sub-divided, in turn. Let's take a closer, more in-depth look at each. And, don't worry, the nervous system is complicated with many parts and many new vocabulary words. It might seem overwhelming at first but through the figures and a little study you can get it.

The Central Nervous System (CNS): The Neurons inside the Brain

The **Central Nervous System**, or CNS for short, is made up of the brain and spinal cord (see Figure 1). The CNS is the portion of the nervous system that is encased in bone (the brain is protected by the skull and the spinal cord is protected by the spinal column). It is referred to as "central" because it is the brain and spinal cord that are primarily responsible for processing sensory information —touching a hot stove or seeing a rainbow, for example —and sending signals to the peripheral nervous system for action. It communicates largely by sending electrical signals through individual nerve cells that make up the fundamental building blocks of the nervous system, called **neurons**. There are approximately 100 billion

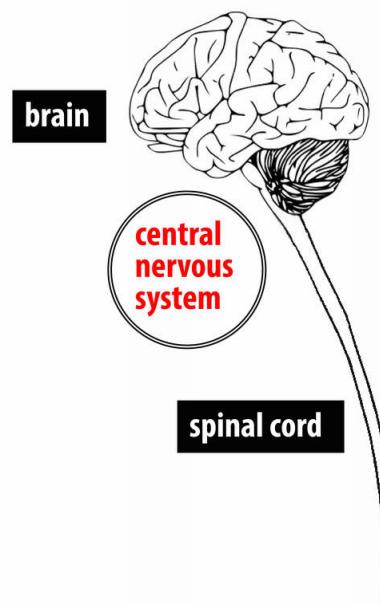


Figure 1: The central nervous system

neurons in the human brain and each has many contacts with other neurons, called **synapses** (Brodal, 1992).

If we were able to magnify a view of individual neurons we would see that they are cells made from distinct parts (see Figure 2). The three main components of a neuron are the dendrites, the soma, and the axon. Neurons communicate with one another by receiving information through the **dendrites**, which act as an antenna. When the dendrites channel this information to the **soma**, or cell body, it builds up as an electro-chemical signal. This electrical part of the signal, called an **action potential** shoots down the **axon**, a long tail that leads away from the soma and toward the next neuron. When people talk about “nerves” in the nervous system, it typically refers to bundles of axons that form long neural wires along which electrical signals can travel. Cell-to-cell communication is helped by the fact that the axon is covered by a **myelin sheath**—a layer of fatty cells that allow the signal to travel very rapidly from neuron to neuron (Kandel, Schwartz & Jessell, 2000)

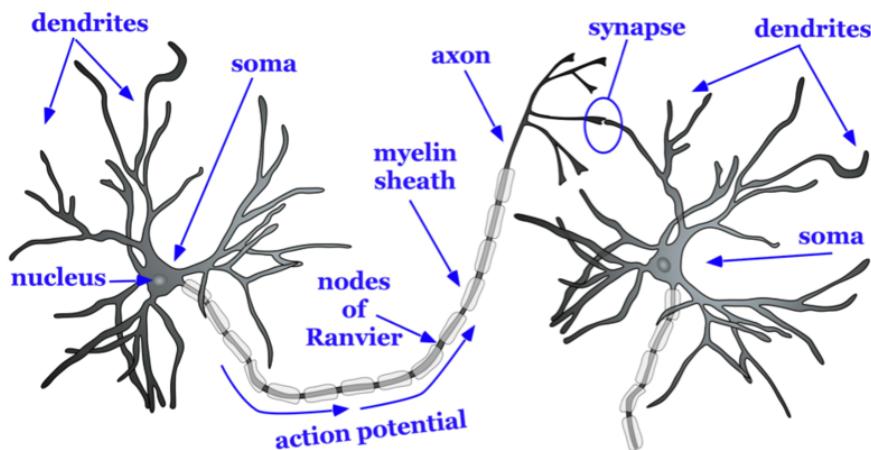


Figure 2: The parts of a neuron

If we were to zoom in still further we could take a closer look at the synapse, the space between neurons (see Figure 3). Here, we would see that there is a space between neurons, called the **synaptic gap**. To give you a sense of scale we can compare the synaptic gap to the thickness of a dime, the thinnest of all American coins (about 1.35 mm). You could stack approximately 70,000 synaptic gaps in the thickness of a single coin!

As the action potential, the electrical signal reaches the end of the axon, tiny packets of chemicals, called **neurotransmitters**, are released. This is the chemical part of the electro-chemical signal. These neurotransmitters are the chemical signals that travel from one neuron

to another, enabling them to communicate with one another. There are many different types of neurotransmitters and each has a specialized function. For example, serotonin affects sleep, hunger and mood. Dopamine is associated with attention, learning and pleasure (Kandel & Schwartz, 1982)

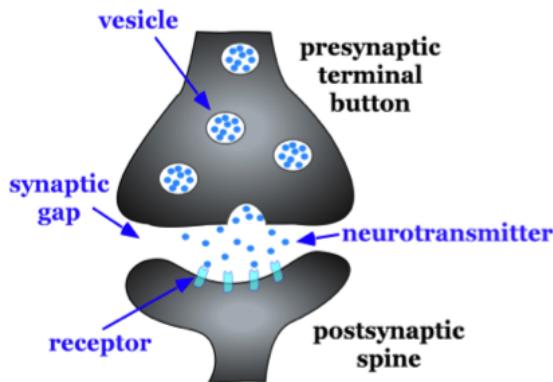


Figure 3: A view of the synapse between neurons

It is amazing to realize that when you think—when you reach out to grab a glass of water, when you realize that your best friend is happy, when you try to remember the name of the parts of a neuron—what you are experiencing is actually electro-chemical impulses shooting between nerves!

The Central Nervous System: Looking at the Brain as a Whole

If we were to zoom back out and look at the central nervous system again we would see that the brain is the largest single part of the central nervous system. The brain is the headquarters of the entire nervous system and it is here that most of your sensing, perception, thinking, awareness, emotions, and planning take place. For many people the brain is so important that there is a sense that it is there—inside the brain—that a person's sense of self is located (as opposed to being primarily in your toes, by contrast). The brain is so important, in fact, that it consumes 20% of the total oxygen and calories we consume even though it is only, on average, about 2% of our overall weight.

It is helpful to examine the various parts of the brain and to understand their unique functions to get a better sense of the role the brain plays. We will start by looking at very general areas of the brain and then we will zoom in and look at more specific parts. Anatomists and neuroscientists often divide the brain into portions based on the location and function of various brain parts. Among the simplest ways to organize the brain is to describe it as having three basic portions: the hindbrain, midbrain and forebrain. Another way to look at the brain is to consider the brain stem, the Cerebellum, and the Cerebrum. There is another part, called the Limbic System that is less well defined. It is made up of a number of structures that are "sub-cortical" (existing in the hindbrain) as well as cortical regions of the brain (see Figure 4).

The **brain stem** is the most basic structure of the brain and is located at the top of the spine and bottom of the brain. It is sometimes considered the "oldest" part of the brain because we can see similar structures in other, less evolved animals such as crocodiles. It is in charge of

a wide range of very basic “life support” functions for the human body including breathing, digestion, and the beating of the heart. Amazingly, the brain stem sends the signals to keep these processes running smoothly without any conscious effort on our behalf.

The **limbic system** is a collection of highly specialized neural structures that sit at the top of the brain stem, which are involved in regulating our emotions. Collectively, the limbic system is a term that doesn’t have clearly defined areas as it includes forebrain regions as well as hindbrain regions. These include the amygdala, the thalamus, the hippocampus, the insula cortex, the anterior cingulate cortex, and the prefrontal cortex. These structures influence hunger, the sleep-wake cycle, sexual desire, fear and aggression, and even memory.

The **cerebellum** is a structure at the very back of the brain. Aristotle referred to it as the “small brain” based on its appearance and it is principally involved with movement and posture although it is also associated with a variety of other thinking processes. The cerebellum, like the brain stem, coordinates actions without the need for any conscious awareness.

The **cerebrum** (also called the “cerebral cortex”) is the “newest,” most advanced portion of the brain. The cerebral hemispheres (the left and right hemispheres that make up each side of the top of the brain) are in charge of the types of processes that are associated with more awareness and voluntary control such as speaking and planning as well as contain our primary sensory areas (such as seeing, hearing, feeling, and moving). These two hemispheres are connected to one another by a thick bundle of axons called the **corpus callosum**. There are instances in which people—either because of a genetic abnormality or as the result of surgery—have had their corpus callosum severed so that the two halves of the brain cannot easily communicate with one another. The rare **split-brain** patients offer helpful insights into how the brain works. For example, we now understand that the brain is **contralateral**, or opposite-sided. This means that the left side of the brain is responsible for controlling a number of sensory and motor functions of the right side of the body, and vice versa.

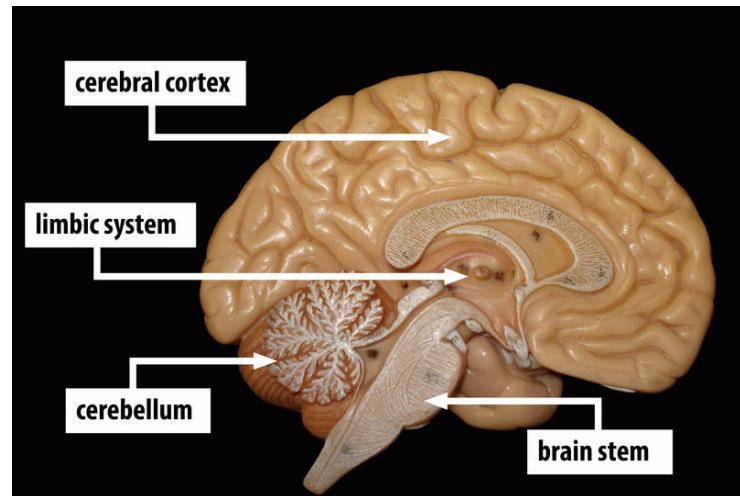


Figure 4: General areas of the brain [Image: Biology Corner, <https://goo.gl/wKxUgg>, CC-BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>, labels added]

Consider this striking example: A split brain patient is seated at a table and an object such as a car key can be placed where a split-brain patient can only see it through the right visual field. Right visual field images will be processed on the left side of the brain and left visual field images will be processed on the right side of the brain. Because language is largely associated with the left side of the brain the patient who sees car key in the right visual field when asked "What do you see?" would answer, "I see a car key." In contrast, a split-brain patient who only saw the car key in the left visual field, thus the information went to the non-language right side of the brain, might have a difficult time speaking the word "car key." In fact in this case, the patient is likely to respond "I didn't see anything at all." However, if asked to draw the item with their left hand—a process associated with the right side of the brain—the patient will be able to do so! See the outside resources below for a video demonstration of this striking phenomenon.

Besides looking at the brain as an organ that is made up of two halves we can also examine it by looking at its four various lobes of the cerebral cortex, the outer part of the brain (see Figure 5). Each of these is associated with a specific function. The occipital lobe, located at the back of the cerebral cortex, is the house of the visual area of the brain. You can see the road in front of you when you are driving, track the motion of a ball in the air thanks to the occipital lobe. The temporal lobe, located on the underside of the cerebral cortex, is where sounds and smells are processed. The parietal lobe, at the upper back of the cerebral cortex, is where touch and taste are processed. Finally, the frontal lobe, located at the forward part of the cerebral cortex is where behavioral motor plans are processed as well as a number of highly complicated processes occur including speech and language use, creative problem solving, and planning and organization.

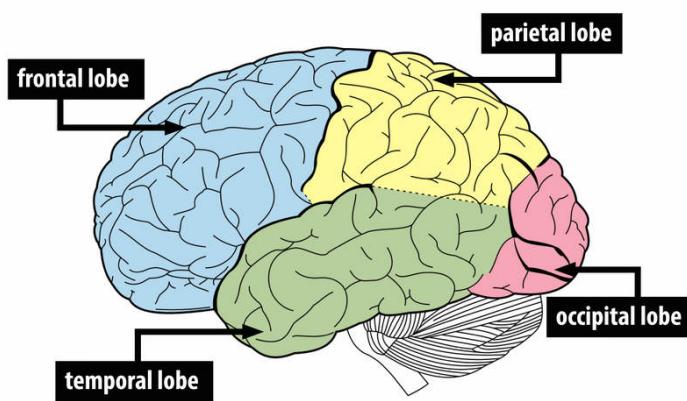


Figure 5: The 4 lobes of the cerebral cortex

One particularly fascinating area in the frontal lobe is called the "primary motor cortex". This strip running along the side of the brain is in charge of voluntary movements like waving goodbye, wiggling your eyebrows, and kissing. It is an excellent example of the way that the various regions of the brain are highly specialized. Interestingly, each of our various body parts has a unique portion of the primary motor cortex devoted to it (see Figure 6). Each individual finger has about as much dedicated brain space as your entire leg. Your lips, in turn, require about

as much dedicated brain processing as all of your fingers and your hand combined!

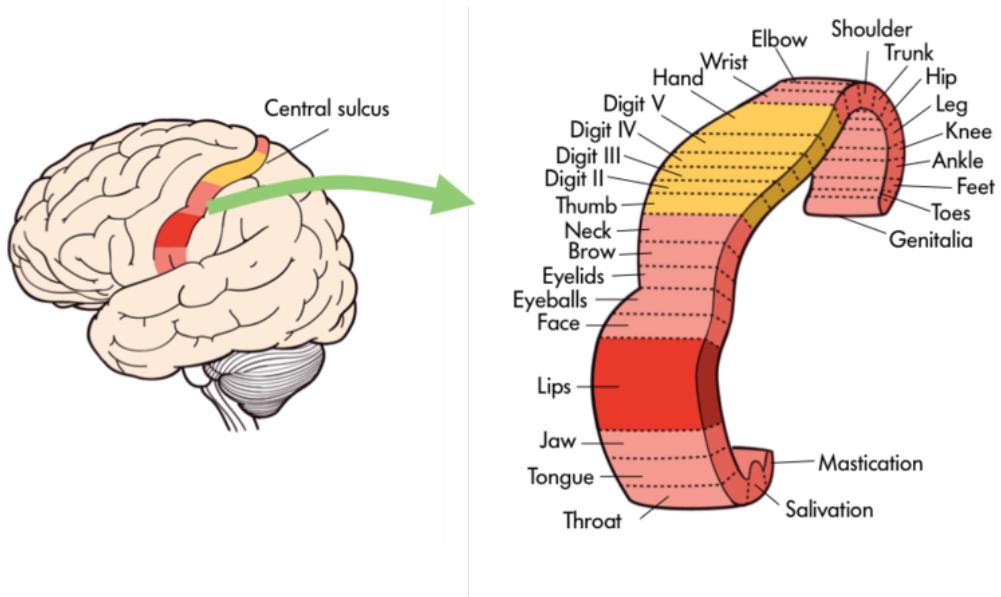


Figure 6: Specific body parts like the tongue or fingers are mapped onto certain areas of the brain including the primary motor cortex.

Because the cerebral cortex in general, and the frontal lobe in particular, are associated with such sophisticated functions as planning and being self-aware they are often thought of as a higher, less primal portion of the brain. Indeed, other animals such as rats and kangaroos while they do have frontal regions of their brain do not have the same level of development in the cerebral cortices. The closer an animal is to humans on the evolutionary tree—think chimpanzees and gorillas, the more developed is this portion of their brain.

The Peripheral Nervous System

In addition to the central nervous system (the brain and spinal cord) there is also a complex network of nerves that travel to every part of the body. This is called the **peripheral nervous system** (PNS) and it carries the signals necessary for the body to survive (see Figure 7). Some of the signals carried by the PNS are related to voluntary actions. If you want to type a message to a friend, for instance, you make conscious choices about which letters go in what order and your brain sends the appropriate signals to your fingers to do the work. Other processes, by contrast, are not voluntary. Without your awareness your brain is also sending signals to your organs, your digestive system, and the muscles that are holding you up right now with instructions about what they should be doing. All of this occurs through the pathways of your peripheral nervous system.

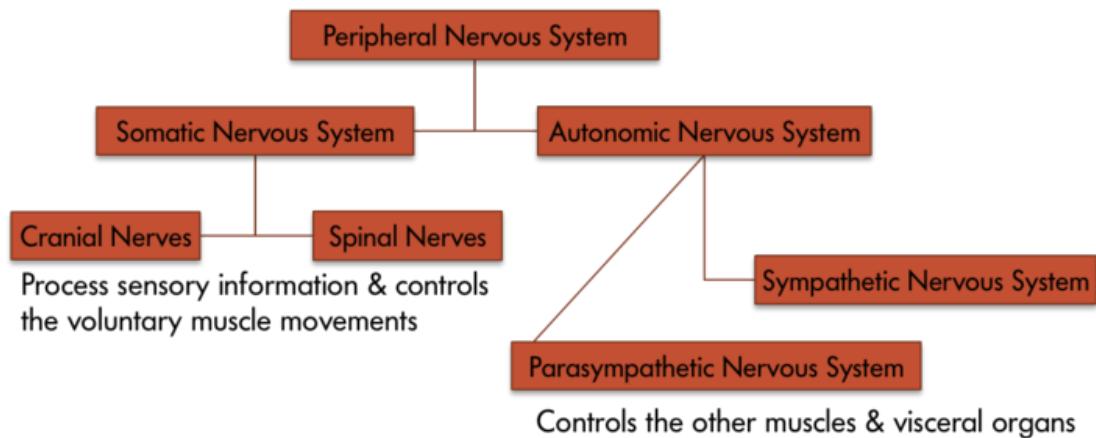


Figure 7: The peripheral nervous system

How we study the brain

The brain is difficult to study because it is housed inside the thick bone of the skull. What's more, it is difficult to access the brain without hurting or killing the owner of the brain. As a result, many of the earliest studies of the brain (and indeed this is still true today) focused on unfortunate people who happened to have damage to some particular area of their brain. For instance, in the 1880s a surgeon named Paul Broca conducted an autopsy on a former patient who had lost his powers of speech. Examining his patient's brain, Broca identified a damaged area—now called the "[Broca's Area](#)"—on the left side of the brain (see Figure 8) (AAAS, 1880). Over the years a number of researchers have been able to gain insights into the function of specific regions of the brain from these types of patients.

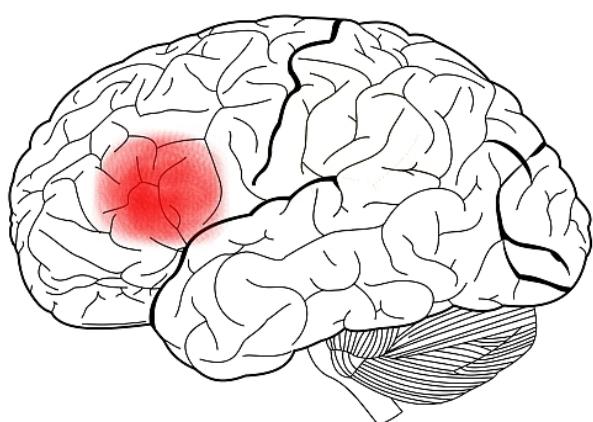


Figure 8: Broca's Area [Image: Charlyzon, <https://goo.gl/1frq7d>, CC BY-SA 3.0, <https://goo.gl/uhHola>]

An alternative to examining the brains or behaviors of humans with brain damage or surgical lesions can be found in the instance of animals. Some researchers examine the brains of other animals such as rats, dogs and monkeys. Although animals brains differ from human brains in both size and structure there are many similarities as well. The use of animals for study can yield important insights into human brain function.

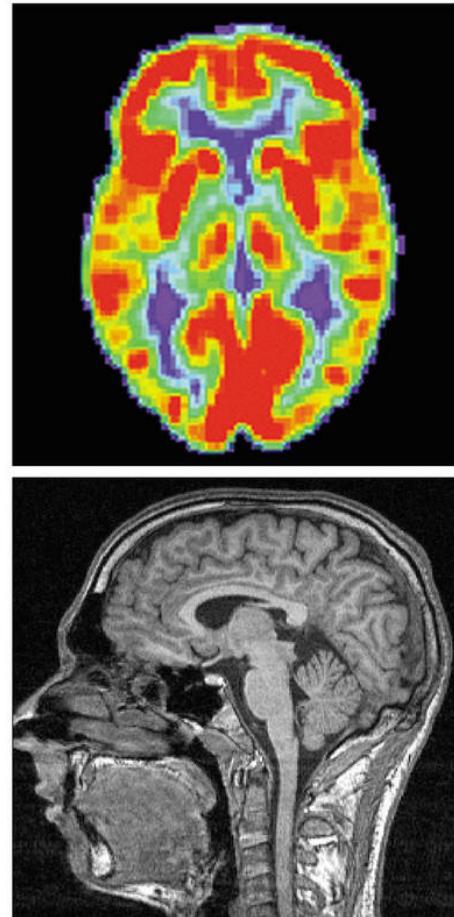
In modern times, however, we do not have to exclusively rely on the study of people

with brain lesions. Advances in technology have led to ever more sophisticated imaging techniques. Just as X-ray technology allows us to peer inside the body, neuroimaging techniques allow us glimpses of the working brain (Raichle, 1994). Each type of imaging uses a different technique and each has its own advantages and disadvantages.

Positron Emission Tomography (PET) records metabolic activity in the brain by detecting the amount of radioactive substances, which are injected into a person's bloodstream, the brain is consuming. This technique allows us to see how much an individual uses a particular part of the brain while at rest, or not performing a task. Another technique, known as **Functional Magnetic Resonance Imaging (fMRI)** relies on blood flow. This method measures changes in the levels of naturally occurring oxygen in the blood. As a brain region becomes active, it requires more oxygen. This technique measures brain activity based on this increase oxygen level. This means fMRI does not require a foreign substance to be injected into the body. Both PET and fMRI scans have poor **temporal resolution**, meaning that they cannot tell us exactly when brain activity occurred. This is because it takes several seconds for blood to arrive at a portion of the brain working on a task.

One imaging technique that has better temporal resolution is **Electroencephalography (EEG)**, which measures electrical brain activity instead of blood flow. Electrodes are placed on the scalp of participants and they are nearly instantaneous in picking up electrical activity. Because this activity could be coming from any portion of the brain, however, EEG is known to have poor **spatial resolution**, meaning that it is not accurate with regards to specific location.

Another technique, known as **Diffuse Optical Imaging (DOI)** can offer high temporal and spatial resolution. DOI works by shining infrared light into the brain. It might seem strange that light can pass through the head and brain. Light properties change as they pass through oxygenated blood and through active neurons. As a result, researchers can make inferences regarding where and when brain activity is happening.



Above: A PET scan - Below: An fMRI scan [Image: Erik1980, <https://goo.gl/YWZLji>, CC BY-SA 3.0, <https://goo.gl/X3i0tq>]

Conclusion

It has often been said that the brain studies itself. This means that humans are uniquely capable of using our most sophisticated organ to understand our most sophisticated organ. Breakthroughs in the study of the brain and nervous system are among the most exciting discoveries in all of psychology. In the future, research linking neural activity to complex, real world attitudes and behavior will help us to understand human psychology and better intervene in it to help people.

Outside Resources

Video: Animation of Neurons

<http://www.youtube.com/watch?v=-SHBnExxub8>

Video: Split Brain Patient

<http://www.youtube.com/watch?v=ZMLzP1VCANo>

Web: Animation of the Magnetic Resonance Imaging (MRI)

<http://sites.sinauer.com/neuroscience5e/animations01.01.html>

Web: Animation of the Positron Emission Tomography (PET)

<http://sites.sinauer.com/neuroscience5e/animations01.02.html>

Web: Teaching resources and videos for teaching about the brain, from Colorado State University:

<http://www.learner.org/resources/series142.html>

Web: The Brain Museum

<http://brainmuseum.org/>

Discussion Questions

1. In your opinion is learning about the functions of various parts of the brain by studying the abilities of brain damaged patients ethical. What, in your opinion, are the potential benefits and considerations?
2. Are research results on the brain more compelling to you than are research results from survey studies on attitudes? Why or why not? How does biological research such as studies of the brain influence public opinion regarding the science of psychology?
3. If humans continue to evolve what changes might you predict in our brains and cognitive abilities?
4. Which brain scanning techniques, or combination of techniques, do you find to be the best? Why? Why do you think scientists may or may not employ exactly your recommended techniques?

Vocabulary

Action Potential

A transient all-or-nothing electrical current that is conducted down the axon when the membrane potential reaches the threshold of excitation.

Axon

Part of the neuron that extends off the soma, splitting several times to connect with other neurons; main output of the neuron.

Brain Stem

The “trunk” of the brain comprised of the medulla, pons, midbrain, and diencephalon.

Broca's Area

An area in the frontal lobe of the left hemisphere. Implicated in language production.

Central Nervous System

The portion of the nervous system that includes the brain and spinal cord.

Cerebellum

The distinctive structure at the back of the brain, Latin for “small brain.”

Cerebrum

Usually refers to the cerebral cortex and associated white matter, but in some texts includes the subcortical structures.

Contralateral

Literally “opposite side”; used to refer to the fact that the two hemispheres of the brain process sensory information and motor commands for the opposite side of the body (e.g., the left hemisphere controls the right side of the body).

Corpus Callosum

The thick bundle of nerve cells that connect the two hemispheres of the brain and allow them to communicate.

Dendrites

Part of a neuron that extends away from the cell body and is the main input to the neuron.

Diffuse Optical Imaging (DOI)

A neuroimaging technique that infers brain activity by measuring changes in light as it is passed through the skull and surface of the brain.

Electroencephalography (EEG)

A neuroimaging technique that measures electrical brain activity via multiple electrodes on the scalp.

Frontal Lobe

The front most (anterior) part of the cerebrum; anterior to the central sulcus and responsible for motor output and planning, language, judgment, and decision-making.

Functional Magnetic Resonance Imaging (fMRI)

Functional magnetic resonance imaging (fMRI): A neuroimaging technique that infers brain activity by measuring changes in oxygen levels in the blood.

Limbic System

Includes the subcortical structures of the amygdala and hippocampal formation as well as some cortical structures; responsible for aversion and gratification.

Myelin Sheath

Fatty tissue, that insulates the axons of the neurons; myelin is necessary for normal conduction of electrical impulses among neurons.

Nervous System

The body's network for electrochemical communication. This system includes all the nerves cells in the body.

Neurons

Individual brain cells

Neurotransmitters

Chemical substance released by the presynaptic terminal button that acts on the postsynaptic cell.

Occipital Lobe

The back most (posterior) part of the cerebrum; involved in vision.

Parietal Lobe

The part of the cerebrum between the frontal and occipital lobes; involved in bodily sensations, visual attention, and integrating the senses.

Peripheral Nervous System

All of the nerve cells that connect the central nervous system to all the other parts of the body.

Positron Emission Tomography (PET)

A neuroimaging technique that measures brain activity by detecting the presence of a radioactive substance in the brain that is initially injected into the bloodstream and then pulled in by active brain tissue.

Soma

Cell body of a neuron that contains the nucleus and genetic information, and directs protein synthesis.

Spatial Resolution

A term that refers to how small the elements of an image are; high spatial resolution means the device or technique can resolve very small elements; in neuroscience it describes how small of a structure in the brain can be imaged.

Split-brain Patient

A patient who has had most or all of his or her corpus callosum severed.

Synapses

Junction between the presynaptic terminal button of one neuron and the dendrite, axon, or soma of another postsynaptic neuron.

Synaptic Gap

Also known as the synaptic cleft; the small space between the presynaptic terminal button and the postsynaptic dendritic spine, axon, or soma.

Temporal Lobe

The part of the cerebrum in front of (anterior to) the occipital lobe and below the lateral fissure; involved in vision, auditory processing, memory, and integrating vision and audition.

Temporal Resolution

A term that refers to how small a unit of time can be measured; high temporal resolution means capable of resolving very small units of time; in neuroscience it describes how precisely in time a process can be measured in the brain.

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5

Sensation and Perception

Adam John Privitera

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.

Learning Objectives

- Differentiate the processes of sensation and perception.
- Explain the basic principles of sensation and perception.
- Describe the function of each of our senses.
- Outline the anatomy of the sense organs and their projections to the nervous system.
- Apply knowledge of sensation and perception to real world examples.
- Explain the consequences of multimodal perception.

Introduction

"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.

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 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.



Our senses combine to create our perceptions of the world.

[Image: Adam John Privitera, CC BY-NC-SA 4.0, <https://goo.gl/H2QaA8>]

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 listens 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 (see Additional Resources for a video demonstration). In the example of louder tones, the method of limits test is using *ascending trials*. Some method of limits 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 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 1. An example of stimuli processing.

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.

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 eye. 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

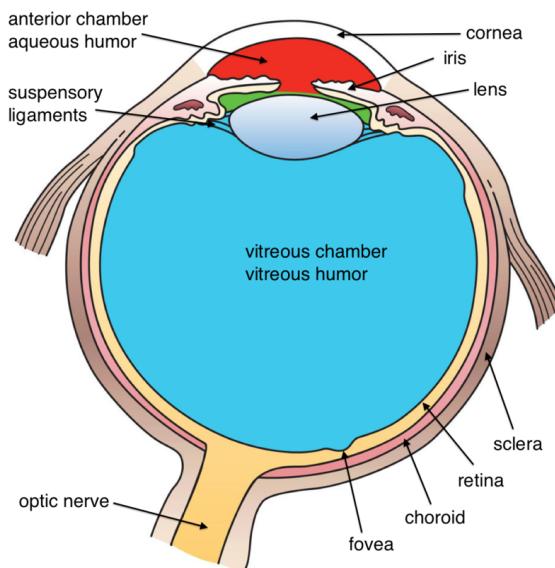


Figure 2. Diagram of the human eye. Notice the Retina, labeled here: this is the location of the Cones and Rods in the eye. [Image: Holly Fischer, <https://goo.gl/ozUG0Q>, CC BY 3.0, <https://goo.gl/TSIsIq>]

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.

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 color 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 2). 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!

Next, the electrical signal is sent through a layer of cells in the retina, eventually traveling 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 begin 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).

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.

Color vision



Figure 3. 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 color scheme.

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 color 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 colors (red-green, blue-yellow, black-white). These specialized cells take information from the cones and compute the difference between the two colors—a process that explains why we cannot see reddish-green or bluish-yellow, as well as why we see afterimages. Color deficient vision can result from issues with the cones or retinal ganglion cells involved in color vision.

Our cones allow us to see details in normal light conditions, as well as color. 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

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).

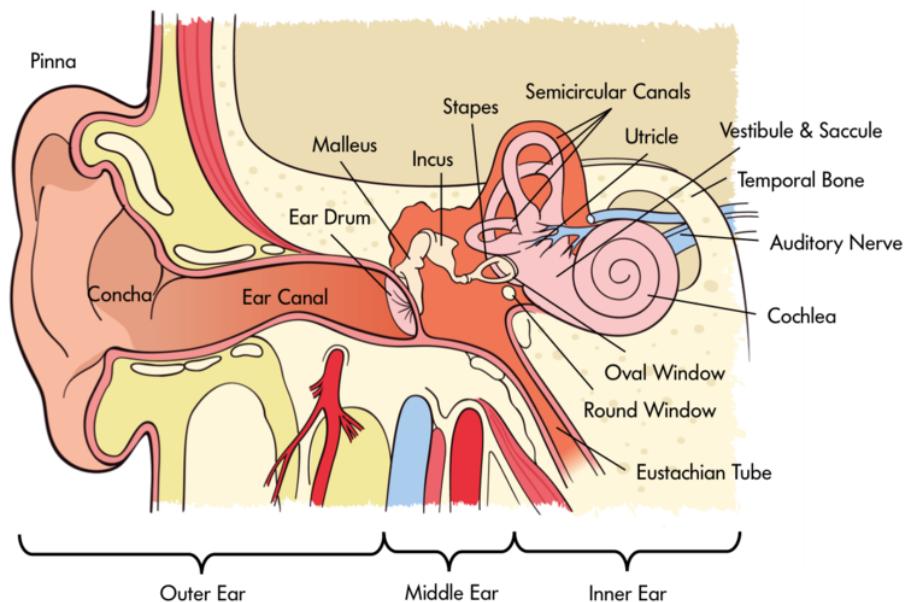


Figure 4. Diagram of the human ear. Notice the Cochlea labeled here: it is the location of the auditory Hair Cells that are tonotopically organized.

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 funneled and amplified during this journey. Initially, sound waves are funneled 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 4)

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.

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 the primary auditory cortex of the temporal lobe. Interestingly, the tonotopic organization of the cochlea is maintained in this area of the cortex (Merzenich, Knight, & Roth, 1975; Romani, Williamson, & Kaufman, 1982). However, the role of the primary auditory cortex in processing the wide range of features of sound is still being explored (Walker, Bizley, & Schnupp, 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.

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.

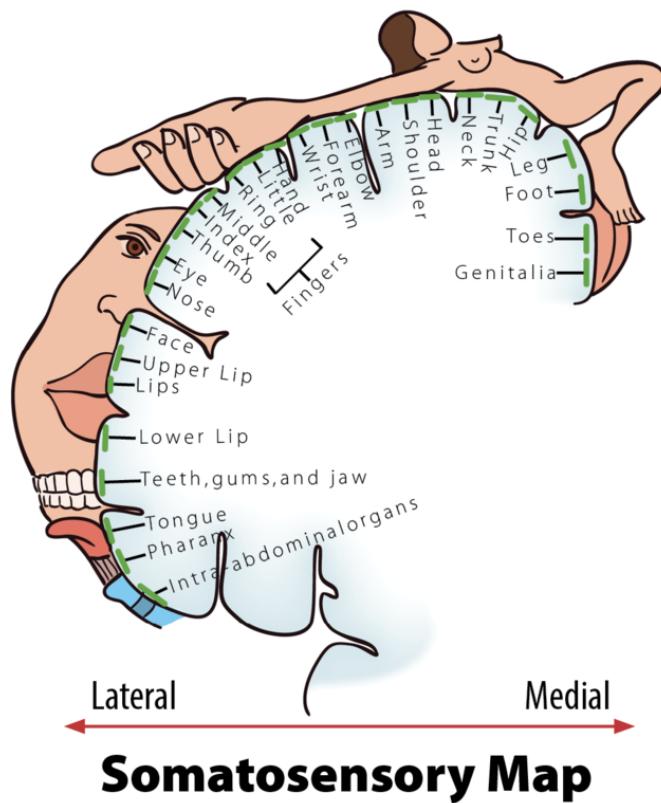


Figure 5. A drawing of the somatosensory cortex in the brain and the areas in the human body that correspond to it - they are drawn in proportion to the most sensitive or the most innervated parts of the body.

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 5.

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 the 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).

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 favorite 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 operates, 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 *crista ampullaris* 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)

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 (savory)—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



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: Richard Elzey, <https://goo.gl/suJHNg>, CC BY 2.0, <https://goo.gl/9uSnqN>]

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 (Chandrashekhar, Hoon, Ryba, & Zuker, 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 flavor. If you have doubts about the interaction between these two senses, I encourage you to think back to consider how the flavors of your favorite 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 module 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-90's 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, Hansen, Iversen, & Brammer, 2001). 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").

Conclusion

Our impressive sensory abilities allow us to experience the most enjoyable and most miserable experiences, as well as everything in between. Our eyes, ears, nose, tongue and skin provide an interface for the brain to interact with the world around us. While there is simplicity in covering each sensory modality independently, we are organisms that have evolved the ability to process multiple modalities as a unified experience.

Outside Resources

Audio: Auditory Demonstrations from Richard Warren's lab at the University of Wisconsin, Milwaukee

<http://www4.uwm.edu/APL/demonstrations.html>

Audio: Auditory Demonstrations. CD published by the Acoustical Society of America (ASA). You can listen to the demonstrations here

<http://www.feilding.net/sfuad/musi3012-01/demos/audio/>

Book: Ackerman, D. (1990). A natural history of the senses. Vintage.

<http://www.dianeackerman.com/a-natural-history-of-the-senses-by-diane-ackerman>

Book: Sacks, O. (1998). The man who mistook his wife for a hat: And other clinical tales. Simon and Schuster.

<http://www.oliversacks.com/books-by-oliver-sacks/man-mistook-wife-hat/>

Video: Acquired knowledge and its impact on our three-dimensional interpretation of the world - 3D Street Art

<https://youtu.be/GwNeukAmxJw>

Video: Acquired knowledge and its impact on our three-dimensional interpretation of the world - Anamorphic Illusions

<https://youtu.be/tBNHPk-Lnkk>

Video: Cybersenses

https://www.youtube.com/watch?v=_8rPD6xLB4A

Video: Seeing Sound, Tasting Color

<https://www.youtube.com/watch?v=FTr1VnXKr4A>

Video: The Phantom Limb Phenomenon

<https://www.youtube.com/watch?v=1mHlv5ToMTM>

Web: A regularly updated website covering some of the amazing sensory capabilities of non-human animals.

<http://phenomena.nationalgeographic.com/category/animal-senses/>

Web: A special ringtone that is only audible to younger people.

<https://www.youtube.com/watch?v=lrewnzQYrPI>

Web: Amazing library with visual phenomena and optical illusions, explained

<http://michaelbach.de/ot/index.html>

Web: An article on the discoveries in echolocation: the use of sound in locating people and things

<http://www.psychologicalscience.org/index.php/publications/observer/2015/december-15/using-sound-to-get-around.html>

Web: An optical illusion demonstration the opponent-process theory of color vision.

<https://www.youtube.com/watch?v=qA2brNUo7WA>

Web: Anatomy of the eye

<http://www.eyecareamerica.org/eyecare/anatomy/>

Web: Animation showing tonotopic organization of the basilar membrane.

<https://www.youtube.com/watch?v=dyenMluFaUw>

Web: Best Illusion of the Year Contest website

<http://illusionoftheyear.com/>

Web: Demonstration of contrast gain adaptation

http://www.michaelbach.de/ot/lum_contrast-adapt/

Web: Demonstration of illusory contours and lateral inhibition. Mach bands

<http://michaelbach.de/ot/lum-MachBands/index.html>

Web: Demonstration of illusory contrast and lateral inhibition. The Hermann grid

http://michaelbach.de/ot/lum_herGrid/

Web: Demonstrations and illustrations of cochlear mechanics can be found here

<http://lab.rockefeller.edu/hudspeth/graphicalSimulations>

Web: Double Flash Illusion

<https://vimeo.com/39138252>

Web: Further information regarding what and where/how pathways

http://www.scholarpedia.org/article/What_and_where_pathways

Web: Great website with a large collection of optical illusions

<http://www.michaelbach.de/ot/>

Web: McGurk Effect Video

<https://www.youtube.com/watch?v=G-IN8vWm3m0>

Web: More demonstrations and illustrations of cochlear mechanics

<http://www.neurophys.wisc.edu/animations/>

Web: Scientific American Frontiers: Cybersenses

<http://www.pbs.org/saf/1509/>

Web: The Genetics of Taste

<http://www.smithsonianmag.com/arts-culture/the-genetics-of-taste-88797110/?no-ist>

Web: The Monell Chemical Sense Center website

<http://www.monell.org/>

Web: The Rubber Hand Illusion

<https://www.youtube.com/watch?v=sxwn1w7MJvk>

Web: The Tongue Map: Tasteless Myth Debunked

<http://www.livescience.com/7113-tongue-map-tasteless-myth-debunked.html>

Discussion Questions

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?

Vocabulary

Absolute threshold

The smallest amount of stimulation needed for detection by a sense.

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 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.

Flavor

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 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 color vision as influenced by cells responsive to pairs of colors.

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 on the response gained by simultaneously processing the other components of the stimulus 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 sensitivity of a receptor to a stimulus after constant stimulation.

Shape theory of olfaction

Theory proposing that odorants of different size and shape 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 influencing the perception of stimuli.

Transduction

The conversion of one form of energy into another.

Trichromatic theory

Theory proposing color 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 just noticeable difference is proportional to the magnitude of the initial stimulus.

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Consciousness

6

States of Consciousness

Robert Biswas-Diener & Jake Teeny

No matter what you're doing--solving homework, playing a video game, simply picking out a shirt--all of your actions and decisions relate to your consciousness. But as frequently as we use it, have you ever stopped to ask yourself: What really is consciousness? In this module, we discuss the different levels of consciousness and how they can affect your behavior in a variety of situations. As well, we explore the role of consciousness in other, "altered" states like hypnosis and sleep.

Learning Objectives

- Define consciousness and distinguish between high and low conscious states
- Explain the relationship between consciousness and bias
- Understand the difference between popular portrayals of hypnosis and how it is currently used therapeutically

Introduction

Have you ever had a fellow motorist stopped 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.



This guy is singing his heart out in his one-man mobile music studio. Have you ever done this? [Image: Joshua Ommen, <https://goo.gl/Za97c3>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

—understood that even while we are awake, many things lay 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

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,

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

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. For 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 he or she 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 behaviors? In a landmark study, Bargh, Chen, and Burrows (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!

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

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.

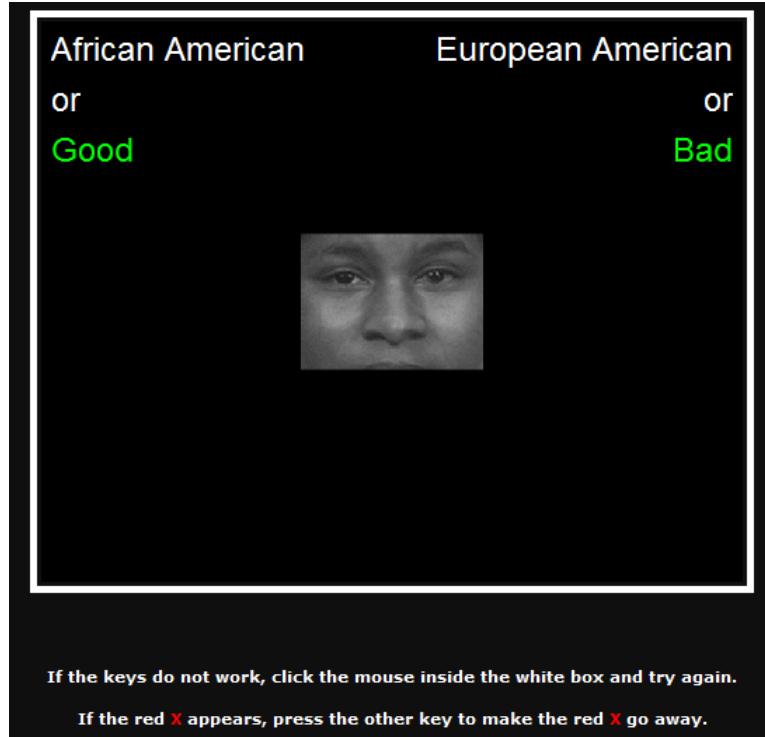
conscious awareness, they still have a significant effect on one’s subsequent thoughts and behaviors.

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 side-stepping this difficulty can be found in the implicit associations test, or IAT (Greenwald, McGhee & Schwartz, 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 Caucasian 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, Banaji & Greenwald, 2002) as well as self-esteem (Greenwald & Farnam, 2000). This method can help uncover non-conscious biases as well as those that we are motivated to suppress.

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.



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: Courtesy of Anthony Greenwald from Project Implicit]

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 deliberate 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're paying 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 behavior 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 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).

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 traveling 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 like sleeping, daydreaming, or hypnosis? How are these related to our conscious awareness?



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: Indrek Torilo, <https://goo.gl/Bc5lw>, CC BY-NC 2.0, <https://goo.gl/Fllc2e>]

	Costs	Benefits
Low Awareness	<i>Influenced by subtle factors</i>	<i>Saves mental effort</i>
High Awareness	<i>Uses mental effort</i>	<i>Can overcome some biases</i>

Table 1: States of Consciousness

Other States of Consciousness

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, <https://goo.gl/FWgBqs>, CC BY-NC-SA 2.0, <https://goo.gl/FI1c2e>]

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

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

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 his or her own thoughts and behaviors. 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 s/he will do anything that's ordered. To be hypnotized, you must first *want* to be hypnotized (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, Rhue, & Weekes, 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.

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.

Sleep

You may have experienced the sensation--as you are falling asleep--of falling and then found yourself physically jerking forward and grabbing out as if you were really falling. Sleep is a unique state of consciousness; it lacks full awareness but the brain is still active. People generally follow a “biological clock” that impacts when they naturally become drowsy, when they fall asleep, and the time they naturally awaken. The hormone **melatonin** increases at night and is associated with becoming sleepy. Your natural daily rhythm, or **Circadian Rhythm**, can be influenced by the amount of daylight to which you are exposed as well as your work and activity schedule. Changing your location, such as flying from Canada to England, can disrupt your natural sleep rhythms, and we call this **jet lag**. You can overcome jet lag by synchronizing yourself to the local schedule by exposing yourself to daylight and forcing yourself to stay awake even though you are naturally sleepy.



Sleep is necessary in order for people to function well. [Image: jaci XIII, <https://goo.gl/pog6Fr>, CC BY-NC 2.0, <https://goo.gl/FIIC2e>]

Interestingly, sleep itself is more than shutting off for the night (or for a nap). Instead of turning off like a light with a flick of a switch, your shift in consciousness is reflected in your brain’s electrical activity. While you are awake and alert your brain activity is marked by *beta* waves. Beta waves are characterized by being high in frequency but low in intensity. In addition, they are the most inconsistent brain wave and this reflects the wide variation in sensory input that a person processes during the day. As you begin to relax these change to *alpha* waves. These

waves reflect brain activity that is less frequent, more consistent and more intense. As you slip into actual sleep you transition through many stages. Scholars differ on how they characterize sleep stages with some experts arguing that there are four distinct stages (Manoach et al., 2010), while others recognize five (Šušmáková, & Krakovská, 2008) but they all distinguish between those that include rapid eye movement (REM) and those that are non-rapid eye movement (NREM). In addition, each stage is typically characterized by its own unique pattern of brain activity:

- Stage 1 (called NREM 1, or N1) is the "falling asleep" stage and is marked by theta waves.
- Stage 2 (called NREM 2, or N2) is considered a light sleep. Here, there are occasional "sleep spindles," or very high intensity brain waves. These are thought to be associated with the processing of memories. NREM 2 makes up about 55% of all sleep.
- Stage 3 (called NREM 3, or N3) makes up between 20-25% of all sleep and is marked by greater muscle relaxation and the appearance of delta waves.
- Finally, REM sleep is marked by rapid eye movement (REM). Interestingly, this stage—in

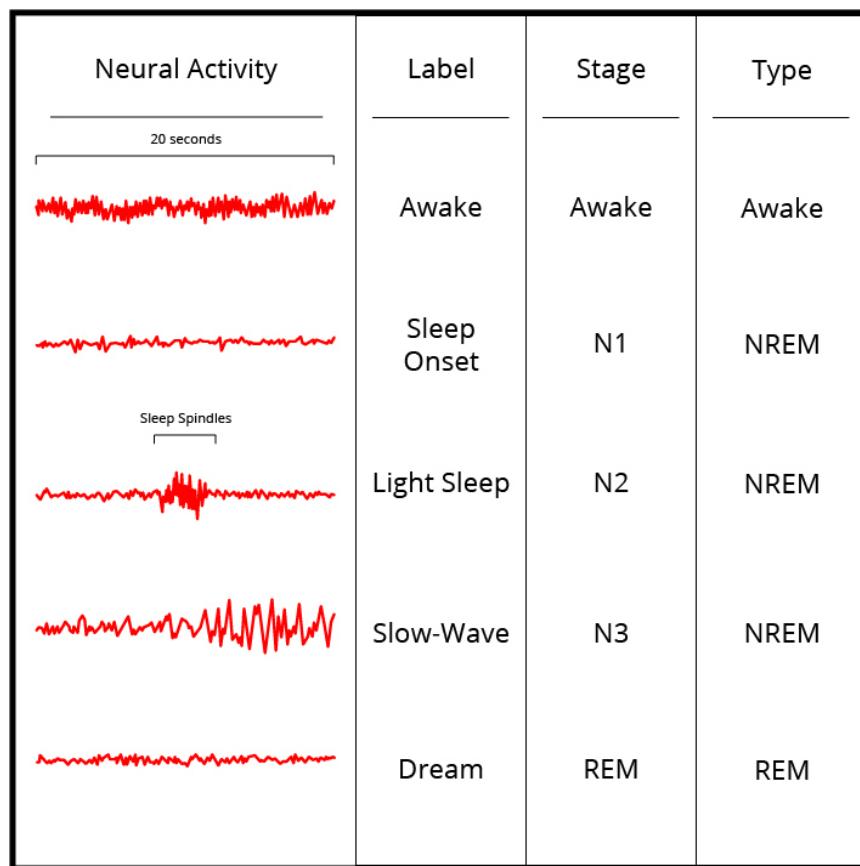


Figure 1. Changes in brain activity or brainwaves across different stages of consciousness—from being awake and throughout various stages of sleep. [Image: Noba]

terms of brain activity—is similar to wakefulness. That is, the brain waves occur less intensely than in other stages of sleep. REM sleep accounts for about 20% of all sleep and is associated with dreaming.

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 time, 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).

Psychoactive Drugs

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 colors.” 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.

Hallucinogens

It is possible that hallucinogens are the substance that have, 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, can 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.

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 behavior or dangerous behavior 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 pain killers by medical professionals. Unfortunately, because opiates such as Oxycontin so reliably produce euphoria they are increasingly used—illegally—as recreational substances. Opiates are highly addictive.

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).



Caffeine is the most widely consumed stimulant in the world. Be honest, how many cups of coffee, tea, or energy drinks have you had today? [Image: Personeelsnet, <https://goo.gl/h0GQ3R>, CC BY-SA 2.0, <https://goo.gl/iZlxAE>]

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 “re-uptake” 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. Because of this these powerful stimulants are highly addictive.

Conclusion

When you think about your daily life it is easy to get lulled into the belief that there is one "setting" for your conscious thought. That is, you likely believe that you hold the same opinions, values, and memories across the day and throughout the week. But "you" are like a dimmer switch on a light that can be turned from full darkness increasingly on up to full brightness. This switch is consciousness. At your brightest setting you are fully alert and aware; at dimmer settings you are day dreaming; and sleep or being knocked unconscious represent dimmer settings still. The degree to which you are in high, medium, or low states of conscious awareness affect how susceptible you are to persuasion, how clear your judgment is, and how much detail you can recall. Understanding levels of awareness, then, is at the heart of understanding how we learn, decide, remember and many other vital psychological processes.

Outside Resources

App: Visual illusions for the iPad.

<http://www.exploratorium.edu/explore/apps/color-uncovered>

Book: A wonderful book about how little we know about ourselves: Wilson, T. D. (2004). *Strangers to ourselves*. Cambridge, MA: Harvard University Press.

<http://www.hup.harvard.edu/catalog.php?isbn=9780674013827>

Book: Another wonderful book about free will—or its absence?: Wegner, D. M. (2002). *The illusion of conscious will*. Cambridge, MA: MIT Press.

<https://mitpress.mit.edu/books/illusion-conscious-will>

Information on alcoholism, alcohol abuse, and treatment:

<http://www.niaaa.nih.gov/alcohol-health/support-treatment>

The American Psychological Association has information on getting a good night's sleep as well as on sleep disorders

<http://www.apa.org/helpcenter/sleep-disorders.aspx>

The LSD simulator: This simulator uses optical illusions to simulate the hallucinogenic experience of LSD. Simply follow the instructions in this two minute video. After looking away you may see the world around you in a warped or pulsating way similar to the effects of LSD. The effect is temporary and will disappear in about a minute.

<https://youtu.be/fVaLddnlafc>

The National Sleep Foundation is a non-profit with videos on insomnia, sleep training in children, and other topics

<https://sleepfoundation.org/video-library>

Video: An artist who periodically took LSD and drew self-portraits:

<http://www.openculture.com/2013/10/artist-draws-nine-portraits-on-lsd-during-1950s-research-experiment.html>

Video: An interesting video on attention:

<http://www.dansimons.com/videos.html>

Video: Clip on out-of-body experiences induced using virtual reality.

https://youtu.be/4PQAc_Z2OfQ

Video: Clip on the rubber hand illusion, from the BBC science series \\\\\\"Horizon.\\\\\\\\"
<https://youtu.be/Qsmkgi7FgEo>

Video: Clip showing a patient with blindsight, from the documentary \\\\\\"Phantoms in the Brain.\\\\\\\\"

<https://youtu.be/Cy8FSffrNDI>

Video: Demonstration of motion-induced blindness - Look steadily at the blue moving pattern. One or more of the yellow spots may disappear:

<https://youtu.be/4Aye9FWgxUg>

Video: Howie Mandel from America\\\'s Got Talent being hypnotized into shaking hands with people:

<https://youtu.be/UWKDFfpdIZI>

Video: Imaging the Brain, Reading the Mind - A talk by Marsel Mesulam.

http://video.at.northwestern.edu/lores/SO_marsel.m4v

Video: Lucas Handwerker – a stage hypnotist discusses the therapeutic aspects of hypnosis:

https://www.youtube.com/watch?v=zepp_H6K5wY

Video: Ted Talk - Simon Lewis: Don\\\\\\\\\\'t take consciousness for granted

http://www.ted.com/talks/simon_lewis_don_t_take_consciousness_for_granted.html

Video: TED Talk on Dream Research:

<https://www.youtube.com/watch?v=y9ArPNAOHCo>

Video: The mind-body problem - An interview with Ned Block:

<https://vimeo.com/58254376>

Want a quick demonstration of priming? (Want a quick demonstration of how powerful these effects can be? Check out:

<https://youtu.be/QTbDy3AZ9A>

Web: A good overview of priming:

[http://en.wikipedia.org/wiki/Priming_\(psychology\)](http://en.wikipedia.org/wiki/Priming_(psychology))

Web: Definitions of Consciousness:

<http://www.consciousentities.com/definitions.htm>

Web: Learn more about motion-induced blindness on Michael Bach\\\\\\\\'s website:

<http://www.michaelbach.de/ot/mot-mib/index.html>

Discussion Questions

1. If someone were in a coma after an accident, and you wanted to better understand how "conscious" or aware s/he were, how might you go about it?
2. What are some of the factors in daily life that interfere with people's ability to get adequate sleep? What interferes with your sleep?
3. How frequently do you remember your dreams? Do you have recurring images or themes in your dreams? Why do you think that is?
4. Consider times when you fantasize or let your mind wander? Describe these times: are you more likely to be alone or with others? Are there certain activities you engage in that seem particularly prone to daydreaming?
5. A number of traditional societies use consciousness altering substances in ceremonies. Why do you think they do this?
6. Do you think attitudes toward drug use are changing over time? If so, how? Why do you think these changes occur?
7. Students in high school and college are increasingly using stimulants such as Adderol as study aids and "performance enhancers." What is your opinion of this trend?

Vocabulary

Blood Alcohol Content (BAC)

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

Circadian Rhythm: The physiological sleep-wake cycle. It is influenced by exposure to sunlight as well as daily schedule and activity. Biologically, it includes changes in body temperature, blood pressure and blood sugar.

Consciousness

Consciousness: the awareness or deliberate perception of a stimulus

Cues

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

Depressants: a class of drugs that slow down the body's physiological and mental processes.

Dissociation

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

Euphoria: an intense feeling of pleasure, excitement or happiness.

Flexible Correction Model

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

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

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

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

Implicit Associations Test (IAT): 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

Jet Lag: The state of being fatigued and/or having difficulty adjusting to a new time zone after traveling a long distance (across multiple time zones).

Melatonin

Melatonin: A hormone associated with increased drowsiness and sleep.

Mindfulness

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?)

Priming

Priming: the activation of certain thoughts or feelings that make them easier to think of and act upon

Stimulants

Stimulants: a class of drugs that speed up the body's physiological and mental processes.

Trance States

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.

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7

The Unconscious

Ap Dijksterhuis

Unconscious psychological processes have fascinated people for a very long time. The idea that people must have an unconscious is based on the idea that (a) there is so much going on in our brains, and the capacity of consciousness is so small, that there must be much more than just consciousness; and that (b) unless you believe consciousness is causally disconnected from other bodily and mental processes, conscious experiences must be prepared by other processes in the brain of which we are not conscious. Not only logic dictates that action starts unconsciously, but research strongly suggests this too. Moreover, unconscious processes are very often highly important for human functioning, and many phenomena, such as attitude formation, goal pursuit, stereotyping, creativity, and decision making are impossible to fully understand without incorporating the role of unconscious processes

Learning Objectives

- Understand the logic underlying the assumption that unconscious processes are important.
- Obtain a basic understanding of some important historical thoughts about unconscious processes.
- Learn about some of the important psychological experiments on the unconscious.
- Appreciate the distinction between consciousness and attention.

Have you ever grabbed a candy bar, chewing gum or a magazine as you purchased your

groceries? These well-known “impulse buys” raise an intriguing question: what is *really* driving your decisions? While, on the one hand, you might argue that it is your conscious mind that decides what you buy, what you eat and what you read. On the other hand you’d probably have to admit that those celebrity magazines and salted chocolates weren’t actually on your shopping list with the eggs and the bread. So where did the desire to purchase them come from? As we will see in this module, there are a number of forces that operate on your thinking and decisions that you might not even be aware of; all of them being processed by the unconscious.

A Little Bit of History

Although the term “**unconscious**” was only introduced fairly recently (in the 18th century by the German philosopher Platner, the German term being “Unbewusstsein”), the relative “unconsciousness” of human nature has evoked both marvel and frustration for more than two millennia. Socrates (490–399 BC) argued that free will is limited, or at least so it seems, after he noticed that people often do things they really do not want to do. He called this *akrasia*, which can best be translated as “the lack of control over oneself.” A few centuries

later, the Roman thinker Plotinus (AD 205–270) was presumably the first to allude to the possibility of unconscious psychological processes in writing: “The absence of a conscious perception is no proof of the absence of mental activity.”



As far back as the Ancient Greeks people have been interested in the puzzle of the seeming lack of control that we exhibit in our decision-making. What would Socrates have thought if he could see how modern people navigate a typical supermarket?

[Image: Mtaylor848, <https://goo.gl/GhuC6L>, CC BY-SA 3.0, <https://goo.gl/eLCn2O>]

These two ideas, first verbalized by Socrates and Plotinus respectively, were—and still are—hotly debated in psychology, philosophy, and neuroscience. That is, scientists still investigate the extent to which human behavior is (and/or seems) voluntary or involuntary, and scientists still investigate the relative importance of unconscious versus conscious psychological processes, or mental activity in general. And, perhaps not surprisingly, both issues are still controversial.

During the scientific revolution in Europe,

our unconscious was taken away from us, so to speak, by the French philosopher Descartes (1596–1650). Descartes's dualism entailed a strict distinction between body and mind. According to Descartes, the mind produces psychological processes and everything going on in our minds is by definition conscious. Some psychologists have called this idea, in which mental processes taking place outside conscious awareness were rendered impossible, the **Cartesian catastrophe**. It took well over two centuries for science to fully recover from the impoverishment dictated by Descartes.

This is not say that contemporaries of Descartes and later thinkers all agreed with Descartes's dualism. In fact, many of them disagreed and kept on theorizing about unconscious psychological processes. For instance, the British philosopher John Norris (1657–1711) said: "We may have ideas of which we are not conscious. . . . There are infinitely more ideas impressed on our minds than we can possibly attend to or perceive." Immanuel Kant (1724–1804) agreed: "The field of our sense-perceptions and sensations, of which we are not conscious . . . is immeasurable." Norris and Kant used a logical argument that many proponents of the importance of unconscious psychological processes still like to point at today: *There is so much going on in our brains, and the capacity of consciousness is so small, that there must be much more than just consciousness.*

The most famous advocate of the importance of unconscious processes arrived at the scene in the late 19th century: the Austrian neurologist Sigmund Freud. Most people associate Freud with psychoanalysis, with his theory on id, ego, and superego, and with his ideas on repression, hidden desires, and dreams. Such associations are fully justified, but Freud also published lesser-known general theoretical work (e.g., Freud, 1915/1963). This theoretical work sounds, in contrast to his psychoanalytic work, very fresh and contemporary. For instance, Freud already argued that human behavior never starts with a conscious process (compare this to the Libet experiment discussed below).

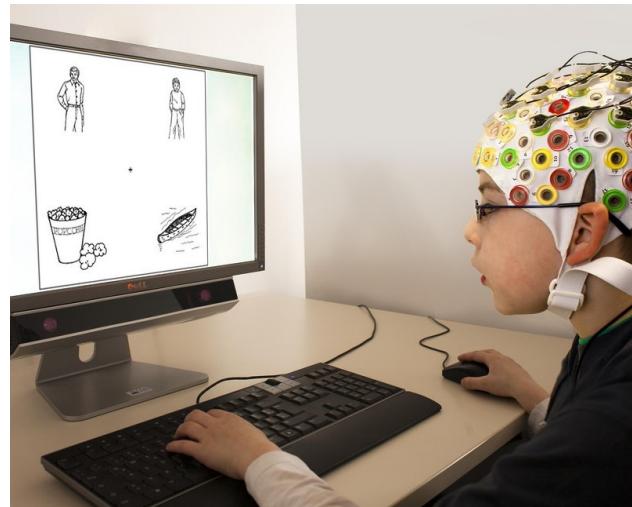
Freud, and also Wilhelm Wundt, pointed at another logical argument for the necessity of unconscious psychological processes. Wundt put it like this: "Our mind is so fortunately equipped, that it brings us the most important bases for our thoughts without our having the least knowledge of this work of elaboration. Only the results of it become conscious. This unconscious mind is for us like an unknown being who creates and produces for us, and finally throws the ripe fruits in our lap." In other words, we may become consciously aware of many different things—the taste of a glass of Burgundy, the beauty of the Taj Mahal, or the sharp pain in our toe after a collision with a bed—but these experiences do not hover in the air before they reach us. They are prepared, somehow and somewhere. *Unless you believe consciousness is causally disconnected from other bodily and mental processes (for instance if one assumes it is guided by the gods), conscious experiences must be prepared by other processes in*

the brain of which we are not conscious.

The German psychologist Watt (1905), in an appealing experiment, showed that we are only consciously aware of the results of mental processes. His participants were repeatedly presented with nouns (e.g., "oak") and had to respond with an associated word as quickly as they could. On some occasions participants were requested to name a superordinate word ("oak"- "tree"), while on other occasions they were asked to come up with a part ("oak"- "acorn") or a subordinate ("oak"- "beam") word. Hence, participants' thinking was divided into four stages: the instructions (e.g., superordinate), the presentation of the noun (e.g., "oak"), the search for an appropriate association, and the verbalization of the reply (e.g., "tree"). Participants were asked to carefully introspect on all four stages to shed light on the role of consciousness during each stage. The third stage (searching for an association) is the stage during which the actual thinking takes place and hence this was considered the most interesting stage. However, unlike the other stages, this stage was, as psychologists call it, introspectively blank: Participants could not report anything. The thinking itself was unconscious, and participants were only conscious of the answer that surfaced.

Where Action Originates

The idea that we unconsciously prepare an action before we are conscious of this action was tested in one of psychology's most famous experiments. Quite some time ago, Kornhuber and Deecke (1965) did experiments in which they asked their participants to perform a simple action, in this case flexing a finger. They also measured EEG to investigate when the brain starts to prepare the action. Their results showed that the first sign of unconscious preparation preceded an action by about 800 milliseconds. This is a serious amount of time, and it led Benjamin Libet to wonder whether conscious awareness of the decision to act appears just as long or even longer in advance as well. Libet (1985) replicated the Kornhuber and Deecke experiments while adding another measure: conscious awareness of the decision to act. He showed that conscious decisions



Using EEG in the psychology lab, experimenters have been able to show that unconscious preparation precedes conscious decision-making. [Image: SMI Eye Tracking, <https://goo.gl/xFMw5I>, CC BY 2.0, <https://goo.gl/BRvSA7>]

follow unconscious preparation and only precede the actual execution of the action by about 200 milliseconds. In other words, the unconscious decides to act, we then become consciously aware of wanting to execute the action, and finally we act.

The experiment by Libet caused quite a stir, and some people tried to save the day for the decisive role of consciousness by criticizing the experiment. Some of this criticism made sense, such as the notion that the action sequence in the Libet experiments does not start with the EEG signals in the brain, but instead before that, with the instruction of the experimenter to flex a finger. And this instruction is consciously perceived. The dust surrounding the precise meaning of this experiment has still not completely settled, and recently Soon and colleagues (Soon, Brass, Heinze, & Haynes, 2008) reported an intriguing experiment in which they circumvented an important limitation of the Libet experiment. Participants had to repeatedly make a dichotomous choice (they were to press one of two buttons) and they could freely choose which one. The experimenters measured participants' brain activity. After the participants made their simple choice many times, the experimenters could, by looking at the difference in brain activity for the two different choices in earlier trials, predict which button a participant was going to press next up to ten seconds in advance—indeed, long before a participant had consciously "decided" what button to press next.

The Unconscious in Social Psychological Processes

These days, most scientific research on unconscious processes is aimed at showing that people do not need consciousness for certain psychological processes or behaviors. One such example is attitude formation. The most basic process of attitude formation is through mere exposure (Zajonc, 1968). Merely perceiving a stimulus repeatedly, such as a brand on a billboard one passes every day or a song that is played on the radio frequently, renders it more positive. Interestingly, mere exposure does not require conscious awareness of the object of an attitude. In fact, **mere-exposure effects** occur even when novel stimuli are presented subliminally for extremely brief durations (e.g., Kunst-Wilson & Zajonc, 1980). Intriguingly, in such subliminal mere-exposure experiments, participants indicate a preference for, or a positive attitude towards, stimuli they do not consciously remember being exposed to.

The research on unconscious processes also greatly improved our understanding of prejudice. People automatically categorize other people according to their race, and Patricia Devine (1989) demonstrated that categorization unconsciously leads to the activation of associated cultural stereotypes. Importantly, Devine also showed that stereotype activation was not moderated by people's level of explicit prejudice. The conclusion of this work was bleak: We

unconsciously activate cultural stereotypes, and this is true for all of us, even for people who are not explicitly prejudiced, or, in other words, for people who do not want to stereotype.

Unconscious Processing and the Role of Attention

Insight into unconscious processes has also contributed to our ideas about creativity. Creativity is usually seen as the result of a three-stage process. It begins with attending to a problem consciously. You think and read about a problem and discuss matters with others. This stage allows the necessary information to be gathered and organized, but during this stage a truly creative idea is rarely produced. The second stage is unconscious; it is the incubation stage during which people think unconsciously. The problem is put aside for a while, and conscious attention is directed elsewhere. The process of unconscious thought sometimes leads to a "**Eureka experience**" whereby the creative product enters consciousness. This third stage is one where conscious attention again plays a role. The creative product needs to be verbalized and communicated. For example, a scientific discovery needs detailed proof before it can be communicated to others.



The "Eureka experience" is that moment when an idea enters conscious awareness. [Image: Bart, <https://goo.gl/ZMnGFr>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

The idea that people think unconsciously has also been applied to decision making (Dijksterhuis & Nordgren, 2006). In a recent set of experiments (Bos, Dijksterhuis, & van Baaren, 2008), participants were presented with information about various alternatives (such as cars or roommates) differing in attractiveness. Subsequently, participants engaged in a **distractor task** before they made a decision. That is, they consciously thought about something else; in this case, they solved anagrams. However, one group was told, prior to the distractor task, that they would be later asked questions about the decision problem. A second group was instead told that they were done with the decision problem and would not be asked anything later on. In other words, the first group had the goal to further process the information, whereas the second group had no such goal. Results showed that the first group made better

decisions than the latter. Although they did the exact same thing consciously—again, solving anagrams—the first group made better decisions than the second group because the first thought unconsciously. Recently, researchers reported neuroscientific evidence for such unconscious thought processes, indeed showing that recently encoded information is further processed unconsciously when people have the goal to do so (Creswell, Bursley, & Satpute, *in press*).

People are sometimes surprised to learn that we can do so much, and so many sophisticated things, unconsciously. However, it is important to realize that there is no one-to-one relation between attention and consciousness (see e.g., Dijksterhuis & Aarts, 2010). Our behavior is largely guided by goals and motives, and these goals determine what we pay attention to—that is, how many resources our brain spends on something—but not necessarily what we become consciously aware of. We can be conscious of things that we hardly pay attention to (such as fleeting daydreams), and we can be paying a lot of attention to something we are temporarily unaware of (such as a problem we want to solve or a big decision we are facing). Part of the confusion arises because attention and consciousness are correlated. When one pays more attention to an incoming stimulus, the probability that one becomes consciously aware of it increases. However, attention and consciousness are distinct. And to understand why we can do so many things unconsciously, attention is the key. We need attention, but for quite a number of things, we do not need conscious awareness.

These days, most researchers agree that the most sensible approach to learn about unconscious and conscious processes is to consider (higher) cognitive operations as unconscious, and test what (if anything) consciousness adds (Dijksterhuis & Aarts 2010; van Gaal, Lamme, Fahrenfort, & Ridderinkhof, 2011; for an exception, see Newell & Shanks, *in press*). However, researchers still widely disagree about the relative importance or contribution of conscious and unconscious processes. Some theorists maintain the causal role of consciousness is limited or virtually nonexistent; others still believe that consciousness plays a crucial role in almost all human behavior of any consequence.

Note: The historical overview of the way people thought about the unconscious is largely based on Koestler (1964).

Outside Resources

Book: A wonderful book about how little we know about ourselves: Wilson, T. D. (2002). *Strangers to ourselves*. Cambridge, MA: Harvard University Press.

Book: Another wonderful book about free will—or its absence?: Wegner, D. M. (2002). *The illusion of conscious will*. Cambridge, MA: MIT Press.

Video: An interesting video on attention

<http://www.dansimons.com/videos.html>

Discussion Questions

1. Assess both the strengths and weaknesses of the famous Libet study.
2. Assuming that attention and consciousness are orthogonal, can you name examples of conscious processes that hardly require attention or of unconscious processes that require a lot of attention?
3. Do you think some of the priming experiments can also be explained purely by conscious processes?
4. What do you think could be the main function of consciousness?
5. Some people, scientists included, have a strong aversion to the idea that human behavior is largely guided by unconscious processes. Do you know why?

Vocabulary

Cartesian catastrophe

The idea that mental processes taking place outside conscious awareness are impossible.

Conscious

Having knowledge of something external or internal to oneself; being aware of and responding to one's surroundings.

Distractor task

A task that is designed to make a person think about something unrelated to an impending decision.

EEG

(Electroencephalography) The recording of the brain's electrical activity over a period of time by placing electrodes on the scalp.

Eureka experience

When a creative product enters consciousness.

Mere-exposure effects

The result of developing a more positive attitude towards a stimulus after repeated instances of mere exposure to it.

Unconscious

Not conscious; the part of the mind that affects behavior though it is inaccessible to the conscious mind.

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Learning and Memory

8

Conditioning and Learning

Mark E. Bouton

Basic principles of learning are always operating and always influencing human behavior. This module discusses the two most fundamental forms of learning -- classical (Pavlovian) and instrumental (operant) conditioning. Through them, we respectively learn to associate 1) stimuli in the environment, or 2) our own behaviors, with significant events, such as rewards and punishments. The two types of learning have been intensively studied because they have powerful effects on behavior, and because they provide methods that allow scientists to analyze learning processes rigorously. This module describes some of the most important things you need to know about classical and instrumental conditioning, and it illustrates some of the many ways they help us understand normal and disordered behavior in humans. The module concludes by introducing the concept of observational learning, which is a form of learning that is largely distinct from classical and operant conditioning.

Learning Objectives

- Distinguish between classical (Pavlovian) conditioning and instrumental (operant) conditioning.
- Understand some important facts about each that tell us how they work.
- Understand how they work separately and together to influence human behavior in the world outside the laboratory.
- Students will be able to list the four aspects of observational learning according to Social Learning Theory.

Two Types of Conditioning

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 political candidate, might all be a result of the same process that makes a dog drool at the sound of bell.



The Pavlov in All of Us: Does your dog learn to beg for food because you reinforce her by feeding her from the table? [Image: David Mease, <https://goo.gl/R9cQV7>, CC BY-NC 2.0, <https://goo.gl/FIIC2e>]

Around the turn of the 20th century, scientists who were interested in understanding the behavior 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).

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 behaviors. Second, because classical conditioning is always occurring in our lives, its effects on behavior have important implications for understanding normal and disordered behavior 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).

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.

Although classical conditioning is a powerful explanation for how we learn many different things, there is a second form of conditioning that also helps explain how we learn. First studied by Edward Thorndike, and later extended by B. F. Skinner, this second type of conditioning is known as **instrumental** or **operant conditioning**. Operant conditioning occurs when a *behavior* (as opposed to a stimulus) is associated with the occurrence of a significant event. In the best-known example, a rat in a laboratory learns to press a lever in a cage (called a “Skinner box”) to receive food. Because the rat has no “natural” association between pressing a lever and getting food, the rat has to learn this connection. At first, the rat may simply explore its cage, climbing on top of things, burrowing under things, in search of food. Eventually while poking around its cage, the rat accidentally presses the lever, and a food pellet drops in. This voluntary behavior is called an **operant** behavior, because it “operates” on the environment (i.e., it is an action that the animal itself makes).



Receiving a reward can condition you toward certain behaviors. For example, when you were a child, your mother may have offered you this deal: “Don’t make a fuss when we’re in the supermarket and you’ll get a treat on the way out.”

[Image: Oliver Hammond, <https://goo.gl/xFKiZL>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Now, once the rat recognizes that it receives a piece of food every time it presses the lever, the behavior of lever-pressing becomes reinforced. That is, the food pellets serve as **reinforcers** because they strengthen the rat’s desire to engage with the environment in this particular manner. In a parallel example, imagine that you’re playing a street-racing video game. As you drive through one city course multiple times, you try a number of different streets to get to the finish line. On one of these trials, you discover a shortcut that dramatically improves your overall time. You have learned this new path through operant conditioning.

That is, by engaging with your environment (operant responses), you performed a sequence of behaviors that was positively reinforced (i.e., you found the shortest distance to the finish line). And now that you've learned how to drive this course, you will perform that same sequence of driving behaviors (just as the rat presses on the lever) to receive your reward of a faster finish.

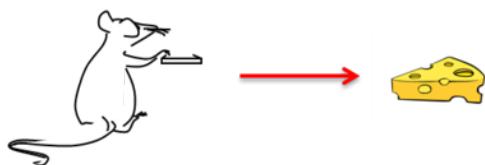
Operant conditioning research studies how the effects of a behavior influence the probability that it will occur again. For example, the effects of the rat's lever-pressing behavior (i.e., receiving a food pellet) influences the probability that it will keep pressing the lever. For, according to Thorndike's **law of effect**, when a behavior has a positive (satisfying) effect or consequence, it is likely to be repeated in the future. However, when a behavior has a negative (painful/annoying) consequence, it is less likely to be repeated in the future. Effects that increase behaviors are referred to as **reinforcers**, and effects that decrease them are referred to as **punishers**.

An everyday example that helps to illustrate operant conditioning is striving for a good grade in class—which could be considered a reward for students (i.e., it produces a positive emotional response). In order to get that reward (similar to the rat learning to press the lever), the student needs to modify his/her behavior. For example, the student may learn that speaking up in class gets him/her participation points (a reinforcer), so the student speaks up repeatedly. However, the student also learns that s/he shouldn't speak up about just anything; talking about topics unrelated to school actually costs points. Therefore, through the student's freely chosen behaviors, s/he learns which behaviors are reinforced and which are punished.

An important distinction of operant conditioning is that it provides a method for studying how consequences influence "voluntary" behavior. The rat's decision to press the lever is voluntary, in the sense that the rat is free to make and repeat that response whenever it wants. Classical



Classical or Pavlovian
Conditioning



Instrumental or Operant
Conditioning

[Image courtesy of Bernard W. Balleine]

conditioning, on the other hand, is just the opposite—depending instead on “involuntary” behavior (e.g., the dog doesn’t choose to drool; it just does). So, whereas the rat must actively participate and perform some kind of behavior to attain its reward, the dog in Pavlov’s experiment is a passive participant. One of the lessons of operant conditioning research, then, is that voluntary behavior is strongly influenced by its consequences.

The illustration above summarizes the basic elements of classical and instrumental conditioning. The two types of learning differ in many ways. However, modern thinkers often emphasize the fact that they differ—as illustrated here—in *what* is learned. In classical conditioning, the animal behaves as if it has learned to associate a *stimulus* with a significant event. In operant conditioning, the animal behaves as if it has learned to associate a *behavior* with a significant event. Another difference is that the response in the classical situation (e.g., salivation) is *elicited* by a stimulus that comes before it, whereas the response in the operant case is not elicited by any particular stimulus. Instead, operant responses are said to be *emitted*. The word “emitted” further conveys the idea that operant behaviors are essentially voluntary in nature.

Understanding classical and operant conditioning provides psychologists with many tools for understanding learning and behavior in the world outside the lab. This is in part because the two types of learning occur continuously throughout our lives. It has been said that “much like the laws of gravity, the laws of learning are always in effect” (Spreatt & Spreatt, 1982).

Useful Things to Know about Classical Conditioning

Classical Conditioning Has Many Effects on Behavior

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 behavior 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, 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. Flavors 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, flavors associated with stomach pain or illness become avoided and *disliked*. For example, a person who gets sick after drinking too much tequila may acquire a profound dislike of the taste and odor of tequila—a phenomenon called **taste aversion conditioning**. The fact that flavors 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).

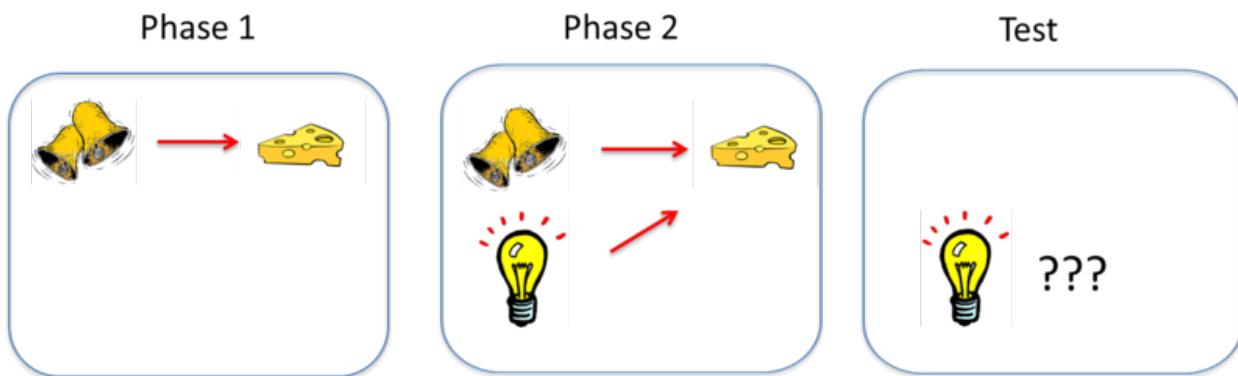
Classical conditioning occurs with a variety of significant events. If an experimenter sounds a tone just before applying a mild shock to a rat's feet, the tone will elicit fear or anxiety after one or two pairings. Similar **fear conditioning** plays a role in creating many anxiety disorders in humans, 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, odors, drug paraphernalia). In this regard, if someone associates a particular smell with the sensation induced by the drug, whenever that person smells the same odor 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, Hinson, Krank, & McCully, 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 behavior (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 behavioral phenomena.



[Image courtesy of Bernard W. Balleine]

The Learning Process

As mentioned earlier, classical conditioning provides a method for studying basic learning processes. Somewhat counterintuitively, though, studies show that pairing a CS and a US together is not sufficient for an association to be learned between them. Consider an effect called **blocking** (see Kamin, 1969). In this effect, an animal first learns to associate one CS—call it stimulus A—with a US. In the illustration above, the sound of a bell (stimulus A) is paired

with the presentation of food. Once this association is learned, in a second phase, a second stimulus—stimulus B—is presented alongside stimulus A, such that the two stimuli are paired with the US together. In the illustration, a light is added and turned on at the same time the bell is rung. However, because the animal has already learned the association between stimulus A (the bell) and the food, the animal doesn't learn an association between stimulus B (the light) and the food. That is, the conditioned response only occurs during the presentation of stimulus A, because the earlier conditioning of A "blocks" the conditioning of B when B is added to A. The reason? Stimulus A already predicts the US, so the US is not surprising when it occurs with Stimulus B.

Learning depends on such a surprise, or a discrepancy between what occurs on a conditioning trial and what is already predicted by cues that are present on the trial. To learn something through classical conditioning, there must first be some **prediction error**, or the chance that a conditioned stimulus won't lead to the expected outcome. With the example of the bell and the light, because the bell always leads to the reward of food, there's no "prediction error" that the addition of the light helps to correct. However, if the researcher suddenly requires that the bell and the light both occur in order to receive the food, the bell alone will produce a prediction error that the animal has to learn.

Blocking and other related effects indicate that the learning process tends to take in the most valid predictors of significant events and ignore the less useful ones. This is common in the real world. For example, imagine that your supermarket puts big star-shaped stickers on products that are on sale. Quickly, you learn that items with the big star-shaped stickers are cheaper. However, imagine you go into a similar supermarket that not only uses these stickers, but also uses bright orange price tags to denote a discount. Because of blocking (i.e., you already know that the star-shaped stickers indicate a discount), you don't have to learn the color system, too. The star-shaped stickers tell you everything you need to know (i.e. there's no prediction error for the discount), and thus the color system is irrelevant.

Classical conditioning is strongest if the CS and US are intense or salient. It is also best if the CS and US are relatively new and the organism hasn't been frequently exposed to them before. And it is especially strong if the organism's biology has prepared it to associate a particular CS and US. For example, rats and humans are naturally inclined to associate an illness with a flavor, rather than with a light or tone. Because foods are most commonly experienced by taste, if there is a particular food that makes us ill, associating the flavor (rather than the appearance—which may be similar to other foods) with the illness will more greatly ensure we avoid that food in the future, and thus avoid getting sick. This sorting tendency, which is set up by evolution, is called **preparedness**.

There are many factors that affect the strength of classical conditioning, and these have been the subject of much research and theory (see Rescorla & Wagner, 1972; Pearce & Bouton, 2001). Behavioral neuroscientists have also used classical conditioning to investigate many of the basic brain processes that are involved in learning (see Fanselow & Poulos, 2005; Thompson & Steinmetz, 2009).

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 behaviors. 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 behavior, and this inhibition is mainly expressed in the context in which it is learned (see "context" in the

Key Vocabulary section below).

This does not mean that extinction is a bad treatment for behavior disorders. Instead, clinicians can increase its 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.

Useful Things to Know about Instrumental Conditioning

Most of the things that affect the strength of classical conditioning also affect the strength of instrumental learning—whereby we learn to associate our actions with their outcomes. As noted earlier, the “bigger” the reinforcer (or punisher), the stronger the learning. And, if an instrumental behavior is no longer reinforced, it will also be extinguished. Most of the rules of associative learning that apply to classical conditioning also apply to instrumental learning, but other facts about instrumental learning are also worth knowing.

Instrumental Responses Come Under Stimulus Control

As you know, the classic operant response in the laboratory is lever-pressing in rats, reinforced by food. However, things can be arranged so that lever-pressing only produces pellets when a particular stimulus is present. For example, lever-pressing can be reinforced only when a light in the Skinner box is turned on; when the light is off, no food is released from lever-pressing. The rat soon learns to discriminate between the light-on and light-off conditions, and presses the lever only in the presence of the light (responses in light-off are extinguished). In everyday life, think about waiting in the turn lane at a traffic light. Although you know that green means go, only when you have the green *arrow* do you turn. In this regard, the operant behavior is now said to be under **stimulus control**. And, as is the case with the traffic light, in the real world, stimulus control is probably the rule.

The stimulus controlling the operant response is called a **discriminative stimulus**. It can be associated directly with the response, or the reinforcer (see below). However, it usually does not elicit the response the way a classical CS does. Instead, it is said to “set the occasion for” the operant response. For example, a canvas put in front of an artist does not elicit painting behavior or compel her to paint. It allows, or sets the occasion for, painting to occur.

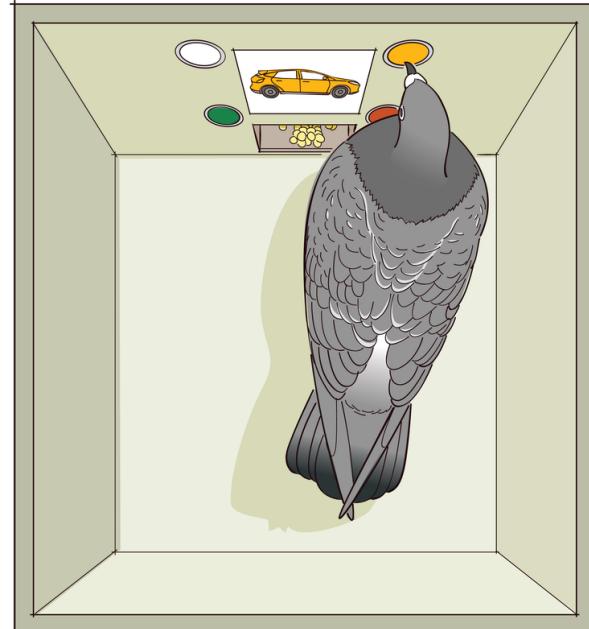
Stimulus-control techniques are widely used in the laboratory to study perception and other psychological processes in animals. For example, the rat would not be able to respond

appropriately to light-on and light-off conditions if it could not see the light. Following this logic, experiments using stimulus-control methods have tested how well animals see colors, hear ultrasounds, and detect magnetic fields. That is, researchers pair these discriminative stimuli with those they know the animals already understand (such as pressing the lever). In this way, the researchers can test if the animals can learn to press the lever only when an ultrasound is played, for example.

These methods can also be used to study “higher” cognitive processes. For example, pigeons can learn to peck at different buttons in a Skinner box when pictures of flowers, cars, chairs, or people are shown on a miniature TV screen (see Wasserman, 1995). Pecking button 1 (and no other) is reinforced in the presence of a flower image, button 2 in the presence of a chair image, and so on. Pigeons can learn the discrimination readily, and, under the right conditions, will even peck the correct buttons associated with pictures of *new* flowers, cars, chairs, and people they have never seen before. The birds have learned to **categorize** the sets of stimuli. Stimulus-control methods can be used to study how such categorization is learned.

Operant Conditioning Involves Choice

Another thing to know about operant conditioning is that the response always requires choosing one behavior over others. The student who goes to the bar on Thursday night chooses to drink instead of staying at home and studying. The rat chooses to press the lever instead of sleeping or scratching its ear in the back of the box. The alternative behaviors are each associated with their own reinforcers. And the tendency to perform a particular action depends on both the reinforcers earned for it and the reinforcers earned for its alternatives.

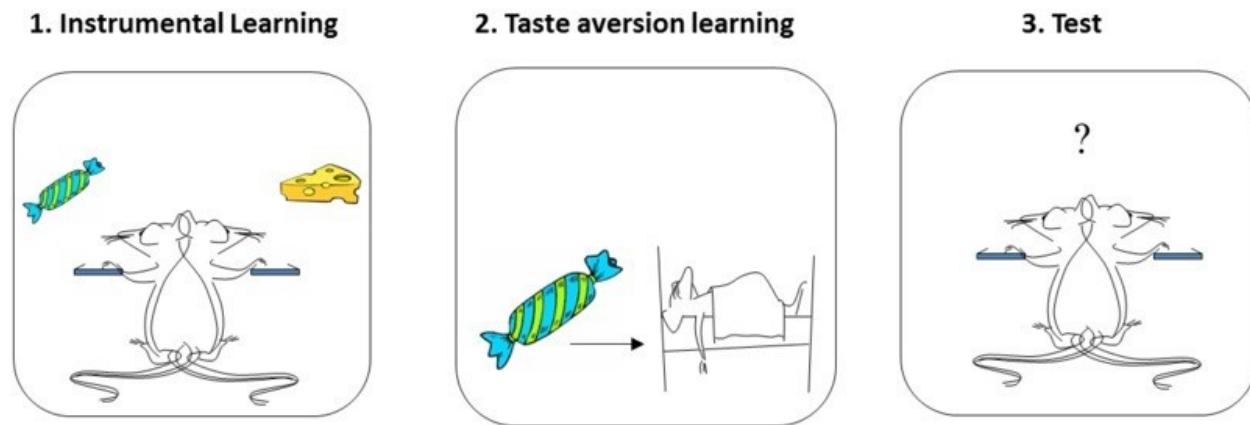


To investigate this idea, choice has been studied in the Skinner box by making two levers available for the rat (or two buttons available for the pigeon), each of which has its own reinforcement or payoff rate. A thorough study of choice in situations like this has led to a rule called the **quantitative law of effect** (see Herrnstein, 1970), which can be understood without going into quantitative detail: The law

acknowledges the fact that the effects of reinforcing one behavior depend crucially on how much reinforcement is earned for the behavior's alternatives. For example, if a pigeon learns that pecking one light will reward two food pellets, whereas the other light only rewards one, the pigeon will only peck the first light. However, what happens if the first light is more strenuous to reach than the second one? Will the cost of energy outweigh the bonus of food? Or will the extra food be worth the work? In general, a given reinforcer will be less reinforcing if there are many alternative reinforcers in the environment. For this reason, alcohol, sex, or drugs may be less powerful reinforcers if the person's environment is full of other sources of reinforcement, such as achievement at work or love from family members.

Cognition in Instrumental Learning

Modern research also indicates that reinforcers do more than merely strengthen or "stamp in" the behaviors they are a consequence of, as was Thorndike's original view. Instead, animals learn about the specific consequences of each behavior, and will perform a behavior depending on how much they currently want—or "value"—its consequence.



[Image courtesy of Bernard W. Balleine]

This idea is best illustrated by a phenomenon called the **reinforcer devaluation effect** (see Colwill & Rescorla, 1986). A rat is first trained to perform two instrumental actions (e.g., pressing a lever on the left, and on the right), each paired with a different reinforcer (e.g., a sweet sucrose solution, and a food pellet). At the end of this training, the rat tends to press both levers, alternating between the sucrose solution and the food pellet. In a second phase, one of the reinforcers (e.g., the sucrose) is then separately paired with illness. This conditions a taste aversion to the sucrose. In a final test, the rat is returned to the Skinner box and allowed to press either lever freely. No reinforcers are presented during this test (i.e., no sucrose or

food comes from pressing the levers), so behavior during testing can only result from the rat's memory of what it has learned earlier. Importantly here, the rat chooses *not* to perform the response that once produced the reinforcer that it now has an aversion to (e.g., it won't press the sucrose lever). This means that the rat has learned and remembered the reinforcer associated with each response, and can combine that knowledge with the knowledge that the reinforcer is now "bad." Reinforcers do not merely stamp in responses; the animal learns much more than that. The behavior is said to be "**goal-directed**" (see Dickinson & Balleine, 1994), because it is influenced by the current value of its associated goal (i.e., how much the rat wants/doesn't want the reinforcer).

Things can get more complicated, however, if the rat performs the instrumental actions frequently and repeatedly. That is, if the rat has spent many months learning the value of pressing each of the levers, the act of pressing them becomes automatic and routine. And here, this once goal-directed action (i.e., the rat pressing the lever for the goal of getting sucrose/food) can become a **habit**. Thus, if a rat spends many months performing the lever-pressing behavior (turning such behavior into a habit), even when sucrose is again paired with illness, the rat will continue to press that lever (see Holland, 2004). After all the practice, the instrumental response (pressing the lever) is no longer sensitive to reinforcer devaluation. The rat continues to respond automatically, regardless of the fact that the sucrose from this lever makes it sick.

Habits are very common in human experience, and can be useful. You do not need to relearn each day how to make your coffee in the morning or how to brush your teeth. Instrumental behaviors can eventually become habitual, letting us get the job done while being free to think about other things.

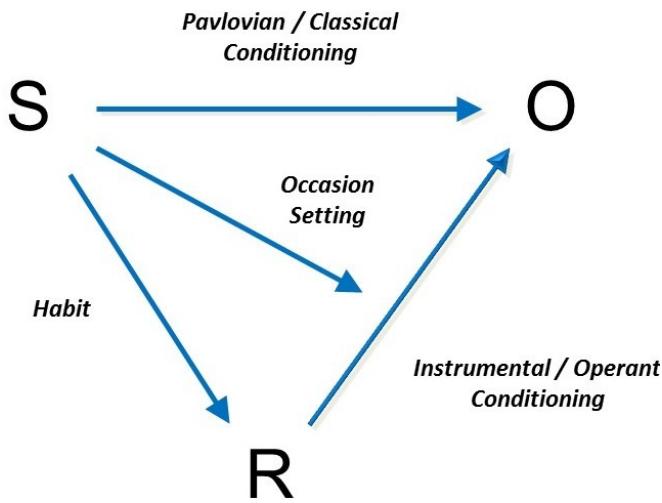
Putting Classical and Instrumental Conditioning Together

Classical and operant conditioning are usually studied separately. But outside of the laboratory they almost always occur at the same time. For example, a person who is reinforced for drinking alcohol or eating excessively learns these behaviors in the presence of certain stimuli —a pub, a set of friends, a restaurant, or possibly the couch in front of the TV. These stimuli are also available for association with the reinforcer. In this way, classical and operant conditioning are always intertwined.

The figure below summarizes this idea, and helps review what we have discussed in this module. Generally speaking, any reinforced or punished operant response (R) is paired with an outcome (O) in the presence of some stimulus or set of stimuli (S).

The figure illustrates the types of associations that can be learned in this very general scenario. For one thing, the organism will learn to associate the response *and* the outcome ($R - O$). This is instrumental conditioning. The learning process here is probably similar to classical conditioning, with all its emphasis on surprise and prediction error. And, as we discussed while considering the reinforcer devaluation effect, once $R - O$ is learned, the organism will be ready to perform the response if the outcome is desired or valued. The value of the reinforcer can also be influenced by other reinforcers earned for other behaviors in the situation. These factors are at the heart of instrumental learning.

Second, the organism can also learn to associate the stimulus with the reinforcing outcome ($S - O$). This is the classical conditioning component, and as we have seen, it can have many consequences on behavior. For one thing, the stimulus will come to evoke a system of responses that help the organism prepare for the reinforcer (not shown in the figure): The drinker may undergo changes in body temperature; the eater may salivate and have an increase in insulin secretion. In addition, the stimulus will evoke approach (if the outcome is positive) or retreat (if the outcome is negative). Presenting the stimulus will also prompt the instrumental response.



much mental processing of the relation between the action and the outcome and the outcome's current value.

The third association in the diagram is the one between the stimulus and the response ($S - R$). As discussed earlier, after a lot of practice, the stimulus may begin to elicit the response directly. This is habit learning, whereby the response occurs relatively automatically, without

The final link in the figure is between the stimulus and the response-outcome association [$S - (R - O)$]. More than just entering into a simple association with the R or the O , the stimulus can signal that the $R - O$ relationship is now in effect. This is what we mean when we say that the stimulus can “set the occasion” for the operant response: It sets the occasion for the

response-reinforcer relationship. Through this mechanism, the painter might begin to paint when given the right tools and the opportunity enabled by the canvas. The canvas theoretically signals that the behavior of painting will now be reinforced by positive consequences.

The figure provides a framework that you can use to understand almost any learned behavior you observe in yourself, your family, or your friends. If you would like to understand it more deeply, consider taking a course on learning in the future, which will give you a fuller appreciation of how classical learning, instrumental learning, habit learning, and occasion setting actually work and interact.

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 behavior 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 observing a social model (an experienced chess player) to learn the rules and strategies of the game of chess. [Image: David R. Tribble, <https://goo.gl/nWsgxl>, CC BY-SA 3.0, <https://goo.gl/uhHola>]

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' behaviors. 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

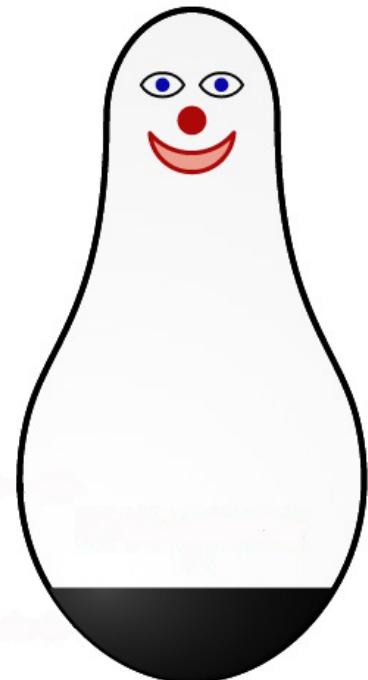
though they are the same age as the observer. By observing how the social models behave, an individual is able to learn how to act in a certain situation. Other examples of observational learning might include a child learning to place her napkin in her lap by watching her parents at the dinner table, 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 behavior. 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."

In this experiment (Bandura, Ross & Ross 1961), Bandura had children individually observe an adult social model interact with a clown doll ("Bobo"). For one group of children, the adult interacted aggressively with Bobo: punching it, kicking it, throwing it, and even hitting it in the face with a toy mallet. Another group of children watched the adult interact with other toys, displaying no aggression toward Bobo. In both instances the adult left and the children were allowed to interact with Bobo on their own. Bandura found that children exposed to the aggressive social model were significantly more likely to behave aggressively toward Bobo, hitting and kicking him, compared to those exposed to the non-aggressive model. The researchers concluded that the children in the aggressive group used their observations of the adult social model's behavior to determine that aggressive behavior toward Bobo was acceptable.

While reinforcement was not required to elicit the children's behavior 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, Ross, & Ross, 1963) demonstrated that children in the



Bobo [Image: © Sémhur / Wikimedia Commons / CC-BY-SA-3.0 (or Free Art License), <https://goo.gl/uhHola>]

aggression group showed less aggressive behavior 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.

Conclusion

We have covered three primary explanations for how we learn to behave and interact with the world around us. Considering your own experiences, how well do these theories apply to you? Maybe when reflecting on your personal sense of fashion, you realize that you tend to select clothes others have complimented you on (operant conditioning). Or maybe, thinking back on a new restaurant you tried recently, you realize you chose it because its commercials play happy music (classical conditioning). Or maybe you are now always on time with your assignments, because you saw how others were punished when they were late (observational learning). Regardless of the activity, behavior, or response, there's a good chance your "decision" to do it can be explained based on one of the theories presented in this module.

Outside Resources

Article: Rescorla, R. A. (1988). Pavlovian conditioning: It's not what you think it is. *American Psychologist*, 43, 151–160.

Book: Bouton, M. E. (2007). *Learning and behavior: A contemporary synthesis*. Sunderland, MA: Sinauer Associates.

Book: Bouton, M. E. (2009). Learning theory. In B. J. Sadock, V. A. Sadock, & P. Ruiz (Eds.), *Kaplan & Sadock's comprehensive textbook of psychiatry* (9th ed., Vol. 1, pp. 647–658). New York, NY: Lippincott Williams & Wilkins.

Book: Domjan, M. (2010). *The principles of learning and behavior* (6th ed.). Belmont, CA: Wadsworth.

Video: Albert Bandura discusses the Bobo Doll Experiment.

<https://www.youtube.com/watch?v=eqNaLerMNOE>

Discussion Questions

1. Describe three examples of Pavlovian (classical) conditioning that you have seen in your own behavior, or that of your friends or family, in the past few days.
2. Describe three examples of instrumental (operant) conditioning that you have seen in your own behavior, or that of your friends or family, in the past few days.
3. Drugs can be potent reinforcers. Discuss how Pavlovian conditioning and instrumental conditioning can work together to influence drug taking.
4. In the modern world, processed foods are highly available and have been engineered to be highly palatable and reinforcing. Discuss how Pavlovian and instrumental conditioning can work together to explain why people often eat too much.
5. How does blocking challenge the idea that pairings of a CS and US are sufficient to cause Pavlovian conditioning? What is important in creating Pavlovian learning?
6. How does the reinforcer devaluation effect challenge the idea that reinforcers merely "stamp in" the operant response? What does the effect tell us that animals actually learn in operant conditioning?
7. With regards to social learning do you think people learn violence from observing violence

in movies? Why or why not?

8. What do you think you have learned through social learning? Who are your social models?

Vocabulary

Blocking

In classical conditioning, the finding that no conditioning occurs to a stimulus if it is combined with a previously conditioned stimulus during conditioning trials. Suggests that information, surprise value, or prediction error is important in conditioning.

Categorize

To sort or arrange different items into classes or categories.

Classical conditioning

The procedure in which an initially neutral stimulus (the conditioned stimulus, or CS) is paired with an unconditioned stimulus (or US). The result is that the conditioned stimulus begins to elicit a conditioned response (CR). Classical conditioning is nowadays considered important as both a behavioral phenomenon and as a method to study simple associative learning. Same as Pavlovian conditioning.

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.”

Discriminative stimulus

In operant conditioning, a stimulus that signals whether the response will be reinforced. It is said to "set the occasion" for the operant response.

Extinction

Decrease in the strength of a learned behavior that occurs when the conditioned stimulus is presented without the unconditioned stimulus (in classical conditioning) or when the behavior is no longer reinforced (in instrumental conditioning). The term describes both the procedure (the US or reinforcer is no longer presented) as well as the result of the procedure (the learned response declines). Behaviors that have been reduced in strength through extinction are said to be "extinguished."

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.

Goal-directed behavior

Instrumental behavior that is influenced by the animal's knowledge of the association between the behavior and its consequence and the current value of the consequence. Sensitive to the reinforcer devaluation effect.

Habit

Instrumental behavior that occurs automatically in the presence of a stimulus and is no longer influenced by the animal's knowledge of the value of the reinforcer. Insensitive to the reinforcer devaluation effect.

Instrumental conditioning

Process in which animals learn about the relationship between their behaviors and their consequences. Also known as operant conditioning.

Law of effect

The idea that instrumental or operant responses are influenced by their effects. Responses that are followed by a pleasant state of affairs will be strengthened and those that are followed by discomfort will be weakened. Nowadays, the term refers to the idea that operant or instrumental behaviors are lawfully controlled by their consequences.

Observational learning

Learning by observing the behavior of others.

Operant

A behavior that is controlled by its consequences. The simplest example is the rat's lever-pressing, which is controlled by the presentation of the reinforcer.

Operant conditioning

See instrumental conditioning.

Pavlovian conditioning

See classical conditioning.

Prediction error

When the outcome of a conditioning trial is different from that which is predicted by the conditioned stimuli that are present on the trial (i.e., when the US is surprising). Prediction error is necessary to create Pavlovian conditioning (and associative learning generally). As learning occurs over repeated conditioning trials, the conditioned stimulus increasingly predicts the unconditioned stimulus, and prediction error declines. Conditioning works to correct or reduce prediction error.

Preparedness

The idea that an organism's evolutionary history can make it easy to learn a particular association. Because of preparedness, you are more likely to associate the taste of tequila, and not the circumstances surrounding drinking it, with getting sick. Similarly, humans are more likely to associate images of spiders and snakes than flowers and mushrooms with aversive outcomes like shocks.

Punisher

A stimulus that decreases the strength of an operant behavior when it is made a consequence of the behavior.

Quantitative law of effect

A mathematical rule that states that the effectiveness of a reinforcer at strengthening an operant response depends on the amount of reinforcement earned for all alternative behaviors. A reinforcer is less effective if there is a lot of reinforcement in the environment for other behaviors.

Reinforcer

Any consequence of a behavior that strengthens the behavior or increases the likelihood that

it will be performed it again.

Reinforcer devaluation effect

The finding that an animal will stop performing an instrumental response that once led to a reinforcer if the reinforcer is separately made aversive or undesirable.

Renewal effect

Recovery of an extinguished response that occurs when the context is changed after extinction. Especially strong when the change of context involves return to the context in which conditioning originally occurred. Can occur after extinction in either classical or instrumental conditioning.

Social Learning Theory

The theory that people can learn new responses and behaviors by observing the behavior of others.

Social models

Authorities that are the targets for observation and who model behaviors.

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 control

When an operant behavior is controlled by a stimulus that precedes it.

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.

Vicarious reinforcement

Learning that occurs by observing the reinforcement or punishment of another person.

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9

Memory (Encoding, Storage, Retrieval)

Kathleen B. McDermott & Henry L. Roediger

"Memory" is a single term that reflects a number of different abilities: holding information briefly while working with it (working memory), remembering episodes of one's life (episodic memory), and our general knowledge of facts of the world (semantic memory), among other types. Remembering episodes involves three processes: encoding information (learning it, by perceiving it and relating it to past knowledge), storing it (maintaining it over time), and then retrieving it (accessing the information when needed). Failures can occur at any stage, leading to forgetting or to having false memories. The key to improving one's memory is to improve processes of encoding and to use techniques that guarantee effective retrieval. Good encoding techniques include relating new information to what one already knows, forming mental images, and creating associations among information that needs to be remembered. The key to good retrieval is developing effective cues that will lead the rememberer back to the encoded information. Classic mnemonic systems, known since the time of the ancient Greeks and still used by some today, can greatly improve one's memory abilities.

Learning Objectives

- Define and note differences between the following forms of memory: working memory, episodic memory, semantic memory, collective memory.
- Describe the three stages in the process of learning and remembering.
- Describe strategies that can be used to enhance the original learning or encoding of information.
- Describe strategies that can improve the process of retrieval.
- Describe why the classic mnemonic device, the method of loci, works so well.

Introduction

In 2013, Simon Reinhard sat in front of 60 people in a room at Washington University, where he memorized an increasingly long series of digits. On the first round, a computer generated 10 random digits—6 1 9 4 8 5 6 3 7 1—on a screen for 10 seconds. After the series disappeared, Simon typed them into his computer. His recollection was perfect. In the next phase, 20 digits appeared on the screen for 20 seconds. Again, Simon got them all correct. No one in the audience (mostly professors, graduate students, and undergraduate students) could recall the 20 digits perfectly. Then came 30 digits, studied for 30 seconds; once again, Simon didn't misplace even a single digit. For a final trial, 50 digits appeared on the screen for 50 seconds, and again, Simon got them all right. In fact, Simon would have been happy to keep going. His record in this task—called “forward digit span”—is 240 digits!



In some ways memory is like file drawers where you store mental information. Memory is also a series of processes: how does that information get filed to begin with and how does it get retrieved when needed? [Image: M Cruz, <https://goo.gl/DhOMgp>, CC BY-SA 4.0, <https://goo.gl/SWjq94>]

remembering that have greatly increased his capacity for remembering virtually any type of material—digits, words, faces and names, poetry, historical dates, and so on. Twelve years earlier, before he started training his memory abilities, he had a digit span of 7, just like most of us. Simon has been training his abilities for about 10 years as of this writing, and has risen

When most of us witness a performance like that of Simon Reinhard, we think one of two things: First, maybe he's cheating somehow. (No, he is not.) Second, Simon must have abilities more advanced than the rest of humankind. After all, psychologists established many years ago that the normal memory span for adults is about 7 digits, with some of us able to recall a few more and others a few less (Miller, 1956). That is why the first phone numbers were limited to 7 digits—psychologists determined that many errors occurred (costing the phone company money) when the number was increased to even 8 digits. But in normal testing, no one gets 50 digits correct in a row, much less 240. So, does Simon Reinhard simply have a photographic memory? He does not. Instead, Simon has taught himself simple strategies for

to be in the top two of “memory athletes.” In 2012, he came in second place in the World Memory Championships (composed of 11 tasks), held in London. He currently ranks second in the world, behind another German competitor, Johannes Mallow. In this module, we reveal what psychologists and others have learned about memory, and we also explain the general principles by which you can improve your own memory for factual material.

Varieties of Memory

For most of us, remembering digits relies on *short-term memory*, or *working memory*—the ability to hold information in our minds for a brief time and work with it (e.g., multiplying 24×17 without using paper would rely on working memory). Another type of memory is **episodic memory**—the ability to remember the episodes of our lives. If you were given the task of recalling everything you did 2 days ago, that would be a test of episodic memory; you would be required to mentally travel through the day in your mind and note the main events. **Semantic memory** is our storehouse of more-or-less permanent knowledge, such as the meanings of words in a language (e.g., the meaning of “parasol”) and the huge collection of facts about the world (e.g., there are 196 countries in the world, and 206 bones in your body). *Collective memory* refers to the kind of memory that people in a group share (whether family, community, schoolmates, or citizens of a state or a country). For example, residents of small towns often strongly identify with those towns, remembering the local customs and historical events in a unique way. That is, the community’s collective memory passes stories and recollections between neighbors and to future generations, forming a memory system unto itself.

Psychologists continue to debate the classification of types of memory, as well as which types rely on others (Tulving, 2007), but for this module we will focus on episodic memory. Episodic memory is usually what people think of when they hear the word “memory.” For example,



To be a good chess player you have to learn to increase working memory so you can plan ahead for several offensive moves while simultaneously anticipating - through use of memory - how the other player could counter each of your planned moves. [Image: karpidis, <https://goo.gl/EhzMKM>, CC BY-SA 2.0, <https://goo.gl/jSSrcO>]

when people say that an older relative is “losing her memory” due to Alzheimer’s disease, the type of memory-loss they are referring to is the inability to recall events, or episodic memory. (Semantic memory is actually preserved in early-stage Alzheimer’s disease.) Although remembering specific events that have happened over the course of one’s entire life (e.g., your experiences in sixth grade) can be referred to as **autobiographical memory**, we will focus primarily on the episodic memories of more recent events.

Three Stages of the Learning/Memory Process

Psychologists distinguish between three necessary stages in the learning and memory process: **encoding**, **storage**, and **retrieval** (Melton, 1963). Encoding is defined as the initial learning of information; storage refers to maintaining information over time; retrieval is the ability to access information when you need it. If you meet someone for the first time at a party, you need to encode her name (Lyn Goff) while you associate her name with her face. Then you need to maintain the information over time. If you see her a week later, you need to recognize her face and have it serve as a cue to retrieve her name. Any successful act of remembering requires that all three stages be intact. However, two types of errors can also occur. Forgetting is one type: you see the person you met at the party and you cannot recall her name. The other error is misremembering (false recall or false recognition): you see someone who looks like Lyn Goff and call the person by that name (false recognition of the face). Or, you might see the real Lyn Goff, recognize her face, but then call her by the name of another woman you met at the party (misrecall of her name).

Whenever forgetting or misremembering occurs, we can ask, at which stage in the learning/memory process was there a failure?—though it is often difficult to answer this question with precision. One reason for this inaccuracy is that the three stages are not as discrete as our description implies. Rather, all three stages depend on one another. How we encode information determines how it will be stored and what cues will be effective when we try to retrieve it. And too, the act of retrieval itself also changes the way information is subsequently remembered, usually aiding later recall of the retrieved information. The central point for now is that the three stages—encoding, storage, and retrieval—affect one another, and are inextricably bound together.

Encoding

Encoding refers to the initial experience of perceiving and learning information. Psychologists often study recall by having participants study a list of pictures or words. Encoding in these situations is fairly straightforward. However, “real life” encoding is much more challenging.

When you walk across campus, for example, you encounter countless sights and sounds—friends passing by, people playing Frisbee, music in the air. The physical and mental environments are much too rich for you to encode all the happenings around you or the internal thoughts you have in response to them. So, an important first principle of encoding is that it is selective: we attend to some events in our environment and we ignore others. A second point about encoding is that it is prolific; we are always encoding the events of our lives—attending to the world, trying to understand it. Normally this presents no problem, as our days are filled with routine occurrences, so we don't need to pay attention to everything. But if something does happen that seems strange—during your daily walk across campus, you see a giraffe—then we pay close attention and try to understand why we are seeing what we are seeing.

Right after your typical walk across campus (one without the appearance of a giraffe), you would be able to remember the events reasonably well if you were asked. You could say whom you bumped into, what song was playing from a radio, and so on. However, suppose someone asked you to recall the same walk a month later. You wouldn't stand a chance. You would likely be able to recount the basics of a typical walk across campus, but not the precise details of that particular walk. Yet, if you had seen a giraffe during that walk, the event would have been fixed in your mind for a long time, probably for the rest of your life. You would tell your friends about it, and, on later occasions when you saw a giraffe, you might be reminded of the day you saw one on campus. Psychologists have long pinpointed **distinctiveness**—having an event stand out as quite different from a background of similar events—as a key to remembering events (Hunt, 2003).



A giraffe in the context of a zoo or its natural habitat may register as nothing more than ordinary, but put it in another setting - in the middle of a campus or a busy city - and its level of distinctiveness increases dramatically. Distinctiveness is a key attribute to remembering events. [Image: Colin J Babb, <https://goo.gl/Cci2yl>, CC BY-SA 2.0, <https://goo.gl/jSSrcO>]

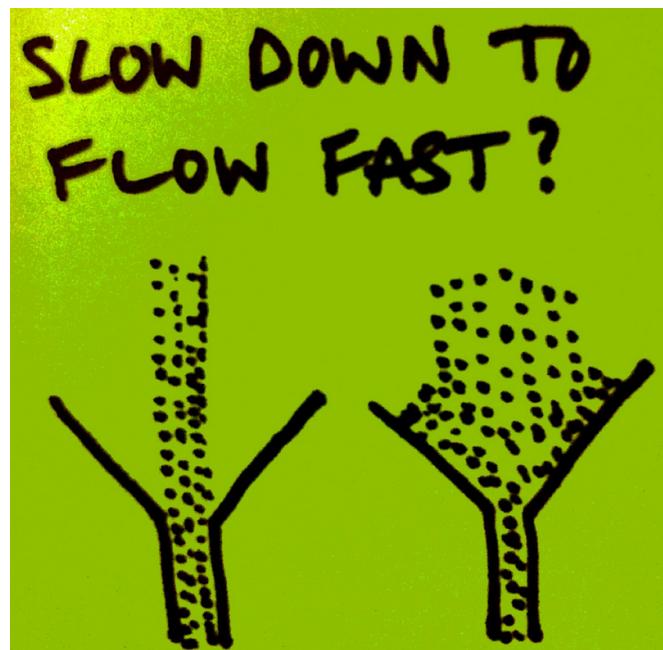
In addition, when vivid memories are tinged with strong emotional content, they often seem to leave a permanent mark on us. Public tragedies, such as terrorist attacks, often create vivid memories in those who witnessed them. But even those of us not directly involved in such events may have vivid memories of them, including memories of first hearing about them.

For example, many people are able to recall their exact physical location when they first learned about the assassination or accidental death of a national figure. The term **flashbulb memory** was originally coined by Brown and Kulik (1977) to describe this sort of vivid memory of finding out an important piece of news. The name refers to how some memories seem to be captured in the mind like a flash photograph; because of the distinctiveness and emotionality of the news, they seem to become permanently etched in the mind with exceptional clarity compared to other memories.

Take a moment and think back on your own life. Is there a particular memory that seems sharper than others? A memory where you can recall unusual details, like the colors of mundane things around you, or the exact positions of surrounding objects? Although people have great confidence in flashbulb memories like these, the truth is, our objective accuracy with them is far from perfect (Talarico & Rubin, 2003). That is, even though people may have great confidence in what they recall, their memories are not as accurate (e.g., what the actual colors were; where objects were truly placed) as they tend to imagine. Nonetheless, all other things being equal, distinctive and emotional events are well-remembered.

Details do not leap perfectly from the world into a person's mind. We might say that we went to a party and remember it, but what we remember is (at best) what we encoded. As noted above, the process of encoding is selective, and in complex situations, relatively few of many

possible details are noticed and encoded. The process of encoding always involves **recoding**—that is, taking the information from the form it is delivered to us and then converting it in a way that we can make sense of it. For example, you might try to remember the colors of a rainbow by using the acronym ROY G BIV (red, orange, yellow, green, blue, indigo, violet). The process of recoding the colors into a name can help us to remember. However, recoding can also introduce errors—when we accidentally add information during encoding, then remember that *new* material as if it had been part of the actual experience (as discussed below).



Although it requires more effort, using images and associations can improve the process of recoding. [Image: psd, <https://goo.gl/9xjcDe>, CC BY 2.0, <https://goo.gl/9uSnqN>]

Psychologists have studied many

recoding strategies that can be used during study to improve retention. First, research advises that, as we study, we should think of the meaning of the events (Craik & Lockhart, 1972), and we should try to relate new events to information we already know. This helps us form associations that we can use to retrieve information later. Second, imagining events also makes them more memorable; creating vivid images out of information (even verbal information) can greatly improve later recall (Bower & Reitman, 1972). Creating imagery is part of the technique Simon Reinhard uses to remember huge numbers of digits, but we can all use images to encode information more effectively. The basic concept behind good encoding strategies is to form distinctive memories (ones that stand out), and to form links or associations among memories to help later retrieval (Hunt & McDaniel, 1993). Using study strategies such as the ones described here is challenging, but the effort is well worth the benefits of enhanced learning and retention.

We emphasized earlier that encoding is selective: people cannot encode all information they are exposed to. However, recoding can add information that was not even seen or heard during the initial encoding phase. Several of the recoding processes, like forming associations between memories, can happen without our awareness. This is one reason people can sometimes remember events that did not actually happen—because during the process of recoding, details got added. One common way of inducing false memories in the laboratory employs a word-list technique (Deese, 1959; Roediger & McDermott, 1995). Participants hear lists of 15 words, like *door, glass, pane, shade, ledge, sill, house, open, curtain, frame, view, breeze, sash, screen, and shutter*. Later, participants are given a test in which they are shown a list of words and asked to pick out the ones they'd heard earlier. This second list contains some words from the first list (e.g., *door, pane, frame*) and some words not from the list (e.g., *arm, phone, bottle*). In this example, one of the words on the test is *window*, which—importantly—does not appear in the first list, but which is related to other words in that list. When subjects were tested, they were reasonably accurate with the studied words (*door*, etc.), recognizing them 72% of the time. However, when *window* was on the test, they falsely recognized it as having been on the list 84% of the time (Stadler, Roediger, & McDermott, 1999). The same thing happened with many other lists the authors used. This phenomenon is referred to as the DRM (for Deese-Roediger-McDermott) effect. One explanation for such results is that, while students listened to items in the list, the words triggered the students to think about *window*, even though *window* was never presented. In this way, people seem to encode events that are not actually part of their experience.

Because humans are creative, we are always going beyond the information we are given: we automatically make associations and infer from them what is happening. But, as with the word association mix-up above, sometimes we make false memories from our inferences—remembering the inferences themselves as if they were actual experiences. To illustrate this,

Brewer (1977) gave people sentences to remember that were designed to elicit *pragmatic inferences*. Inferences, in general, refer to instances when something is not explicitly stated, but we are still able to guess the undisclosed intention. For example, if your friend told you that she didn't want to go out to eat, you may infer that she doesn't have the money to go out, or that she's too tired. With *pragmatic* inferences, there is usually *one* particular inference you're likely to make. Consider the statement Brewer (1977) gave her participants: "The karate champion hit the cinder block." After hearing or seeing this sentence, participants who were given a memory test tended to remember the statement as having been, "The karate champion *broke* the cinder block." This remembered statement is not necessarily a *logical* inference (i.e., it is perfectly reasonable that a karate champion could hit a cinder block without breaking it). Nevertheless, the *pragmatic* conclusion from hearing such a sentence is that the block was likely broken. The participants remembered this inference they made while hearing the sentence in place of the actual words that were in the sentence (see also McDermott & Chan, 2006).

Encoding—the initial registration of information—is essential in the learning and memory process. Unless an event is encoded in some fashion, it will not be successfully remembered later. However, just because an event is encoded (even if it is encoded well), there's no guarantee that it will be remembered later.

Storage

Every experience we have changes our brains. That may seem like a bold, even strange, claim at first, but it's true. We encode each of our experiences within the structures of the nervous system, making new impressions in the process—and each of those impressions involves changes in the brain. Psychologists (and neurobiologists) say that experiences leave **memory traces**, or **engrams** (the two terms are synonyms). Memories have to be stored somewhere in the brain, so in order to do so, the brain biochemically alters itself and its neural tissue. Just like you might write yourself a note to remind you of something, the brain "writes" a memory trace, changing its own

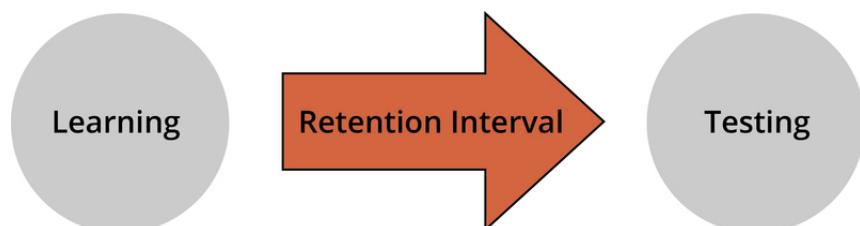


Memory traces, or engrams, are NOT perfectly preserved recordings of past experiences. The traces are combined with current knowledge to reconstruct what we think happened in the past. [Simon Bierwald, <https://goo.gl/JDhdCE>, CC BY-NC-SA 2.0, <https://goo.gl/jSSrcO>]

physical composition to do so. The basic idea is that events (occurrences in our environment) create engrams through a process of **consolidation**: the neural changes that occur after learning to create the memory trace of an experience. Although neurobiologists are concerned with exactly what neural processes change when memories are created, for psychologists, the term *memory trace* simply refers to the physical change in the nervous system (whatever that may be, exactly) that represents our experience.

Although the concept of engram or memory trace is extremely useful, we shouldn't take the term too literally. It is important to understand that memory traces are not perfect little packets of information that lie dormant in the brain, waiting to be called forward to give an accurate report of past experience. Memory traces are not like video or audio recordings, capturing experience with great accuracy; as discussed earlier, we often have errors in our memory, which would not exist if memory traces were perfect packets of information. Thus, it is wrong to think that remembering involves simply "reading out" a faithful record of past experience. Rather, when we remember past events, we reconstruct them with the aid of our memory traces—but also with our current belief of what happened. For example, if you were trying to recall for the police who started a fight at a bar, you may not have a memory trace of who pushed whom first. However, let's say you remember that one of the guys held the door open for you. When thinking back to the start of the fight, this knowledge (of how one guy was friendly to you) may unconsciously influence your memory of what happened in favor of the nice guy. Thus, memory is a construction of what you actually recall and what you believe happened. In a phrase, remembering is reconstructive (we reconstruct our past with the aid of memory traces) not reproductive (a perfect reproduction or recreation of the past).

Psychologists refer to the time between learning and testing as the retention interval. Memories can consolidate during that time, aiding retention. However, experiences can also occur that undermine the memory. For example, think of what you had for lunch yesterday



—a pretty easy task. However, if you had to recall what you had for lunch 17 days ago, you may well fail (assuming you don't eat the same thing every day). The 16 lunches you've had since that one have created **retroactive interference**. Retroactive interference refers to new activities (i.e., the subsequent lunches) during the retention interval (i.e., the time between the lunch 17 days ago and now) that interfere with retrieving the specific, older memory (i.e., the lunch details from 17 days ago). But just as newer things can interfere with remembering older things, so can the opposite happen. *Proactive interference* is when past memories interfere with the encoding of new ones. For example, if you have ever studied a second language, often times the grammar and vocabulary of your native language will pop into your head, impairing your fluency in the foreign language.

Retroactive interference is one of the main causes of forgetting (McGeoch, 1932). In the module *Eyewitness Testimony and Memory Biases* <http://noba.to/uy49tm37> Elizabeth Loftus describes her fascinating work on eyewitness memory, in which she shows how memory for an event can be changed via misinformation supplied during the retention interval. For example, if you witnessed a car crash but subsequently heard people describing it from their own perspective, this new information may interfere with or disrupt your own personal recollection of the crash. In fact, you may even come to remember the event happening exactly as the others described it! This **misinformation effect** in eyewitness memory represents a type of retroactive interference that can occur during the retention interval (see Loftus [2005] for a review). Of course, if correct information is given during the retention interval, the witness's memory will usually be improved.

Although interference may arise between the occurrence of an event and the attempt to recall it, *the effect itself is always expressed when we retrieve memories*, the topic to which we turn next.

Retrieval

Endel Tulving argued that "the key process in memory is retrieval" (1991, p. 91). Why should retrieval be given more prominence than encoding or storage? For one thing, if information were encoded and stored but could not be retrieved, it would be useless. As discussed previously in this module, we encode and store thousands of events—conversations, sights and sounds—every day, creating memory traces. However, we later access only a tiny portion of what we've taken in. Most of our memories will never be used—in the sense of being brought back to mind, consciously. This fact seems so obvious that we rarely reflect on it. All those events that happened to you in the fourth grade that seemed so important then? Now, many years later, you would struggle to remember even a few. You may wonder if the traces of those memories still exist in some latent form. Unfortunately, with currently available

methods, it is impossible to know.

Psychologists distinguish information that is available in memory from that which is accessible (Tulving & Pearlstone, 1966). *Available* information is the information that is stored in memory—but precisely how much and what types are stored cannot be known. That is, all we can know is what information we can retrieve—*accessible* information. The assumption is that accessible information represents only a tiny slice of the information available in our brains. Most of us have had the experience of trying to remember some fact or event, giving up, and then—all of a sudden!—it comes to us at a later time, even after we've stopped trying to remember it. Similarly, we all know the experience of failing to recall a fact, but then, if we are given several choices (as in a multiple-choice test), we are easily able to recognize it.



We can't know the entirety of what is in our memory, but only that portion we can actually retrieve. Something that cannot be retrieved now and which is seemingly gone from memory may, with different cues applied, reemerge. [Image: Ores2k, <https://goo.gl/1du8Qe>, CC BY-NC-SA 2.0, <https://goo.gl/jSSrcO>]

became part of that whole complex experience. Years later, even though you haven't thought about that party in ages, when you hear the song on the radio, the whole experience rushes back to you. In general, the encoding specificity principle states that, to the extent a retrieval cue (the song) matches or overlaps the memory trace of an experience (the party, the conversation), it will be effective in evoking the memory. A classic experiment on the encoding specificity principle had participants memorize a set of words in a unique setting. Later, the participants were tested on the word sets, either in the same location they learned the words

What factors determine what information can be retrieved from memory? One critical factor is the type of hints, or *cues*, in the environment. You may hear a song on the radio that suddenly evokes memories of an earlier time in your life, even if you were not trying to remember it when the song came on. Nevertheless, the song is closely associated with that time, so it brings the experience to mind.

The general principle that underlies the effectiveness of retrieval cues is the **encoding specificity principle** (Tulving & Thomson, 1973): when people encode information, they do so in specific ways. For example, take the song on the radio: perhaps you heard it while you were at a terrific party, having a great, philosophical conversation with a friend. Thus, the song

or a different one. As a result of encoding specificity, the students who took the test in the same place they learned the words were actually able to recall more words (Godden & Baddeley, 1975) than the students who took the test in a new setting.

One caution with this principle, though, is that, for the cue to work, it can't match too many other experiences (Nairne, 2002; Watkins, 1975). Consider a lab experiment. Suppose you study 100 items; 99 are words, and one is a picture—of a penguin, item 50 in the list. Afterwards, the cue "recall the picture" would evoke "penguin" perfectly. No one would miss it. However, if the word "penguin" were placed in the same spot among the other 99 words, its memorability would be exceptionally worse. This outcome shows the power of distinctiveness that we discussed in the section on encoding: one picture is perfectly recalled from among 99 words because it stands out. Now consider what would happen if the experiment were repeated, but there were 25 pictures distributed within the 100-item list. Although the picture of the penguin would still be there, the probability that the cue "recall the picture" (at item 50) would be useful for the penguin would drop correspondingly. Watkins (1975) referred to this outcome as demonstrating the **cue overload principle**. That is, to be effective, a retrieval cue cannot be overloaded with too many memories. For the cue "recall the picture" to be effective, it should only match one item in the target set (as in the one-picture, 99-word case).

To sum up how memory cues function: for a retrieval cue to be effective, a match must exist between the cue and the desired target memory; furthermore, to produce the best retrieval, the cue-target relationship should be distinctive. Next, we will see how the encoding specificity principle can work in practice.

Psychologists measure memory performance by using production tests (involving recall) or recognition tests (involving the selection of correct from incorrect information, e.g., a multiple-choice test). For example, with our list of 100 words, one group of people might be asked to recall the list in any order (a free recall test), while a different group might be asked to circle the 100 studied words out of a mix with another 100, unstudied words (a recognition test). In this situation, the recognition test would likely produce better performance from participants than the recall test.

We usually think of recognition tests as being quite easy, because the cue for retrieval is a copy of the actual event that was presented for study. After all, what could be a better cue than the exact target (memory) the person is trying to access? In most cases, this line of reasoning is true; nevertheless, recognition tests do not provide perfect indexes of what is stored in memory. That is, you can fail to recognize a target staring you right in the face, yet be able to recall it later with a different set of cues (Watkins & Tulving, 1975). For example, suppose you had the task of recognizing the surnames of famous authors. At first, you might

think that being given the actual last name would always be the best cue. However, research has shown this not necessarily to be true (Muter, 1984). When given names such as Tolstoy, Shaw, Shakespeare, and Lee, subjects might well say that Tolstoy and Shakespeare are famous authors, whereas Shaw and Lee are not. But, when given a cued recall test using first names, people often recall items (produce them) that they had failed to recognize before. For example, in this instance, a cue like *George Bernard _____* often leads to a recall of "Shaw," even though people initially failed to recognize *Shaw* as a famous author's name. Yet, when given the cue "William," people may not come up with Shakespeare, because William is a common name that matches many people (the cue overload principle at work). This strange fact—that recall can sometimes lead to better performance than recognition—can be explained by the encoding specificity principle. As a cue, *George Bernard _____* matches the way the famous writer is stored in memory better than does his surname, Shaw, does (even though it is the target). Further, the match is quite distinctive with *George Bernard _____*, but the cue *William _____* is much more overloaded (Prince William, William Yeats, William Faulkner, will.i.am).

The phenomenon we have been describing is called the *recognition failure of recallable words*, which highlights the point that a cue will be most effective depending on how the information has been encoded (Tulving & Thomson, 1973). The point is, the cues that work best to evoke retrieval are those that recreate the event or name to be remembered, whereas sometimes even the target itself, such as *Shaw* in the above example, is not the best cue. Which cue will be most effective depends on how the information has been encoded.

Whenever we think about our past, we engage in the act of retrieval. We usually think that retrieval is an objective act because we tend to imagine that retrieving a memory is like pulling a book from a shelf, and after we are done with it, we return the book to the shelf just as it was. However, research shows this assumption to be false; far from being a static repository of data, the memory is constantly changing. In fact, every time we retrieve a memory, it is altered. For example, the act of retrieval itself (of a fact, concept, or event) makes the retrieved memory much more likely to be retrieved again, a phenomenon called the *testing effect* or the *retrieval practice effect* (Pyc & Rawson, 2009; Roediger & Karpicke, 2006). However, retrieving some information can actually cause us to forget other information related to it, a phenomenon called *retrieval-induced forgetting* (Anderson, Bjork, & Bjork, 1994). Thus the act of retrieval can be a double-edged sword—strengthening the memory just retrieved (usually by a large amount) but harming related information (though this effect is often relatively small).

As discussed earlier, retrieval of distant memories is reconstructive. We weave the concrete bits and pieces of events in with assumptions and preferences to form a coherent story (Bartlett, 1932). For example, if during your 10th birthday, your dog got to your cake before

you did, you would likely tell that story for years afterward. Say, then, in later years you misremember where the dog actually found the cake, but repeat that error over and over during subsequent retellings of the story. Over time, that inaccuracy would become a basic fact of the event in your mind. Just as retrieval practice (repetition) enhances accurate memories, so will it strengthen errors or false memories (McDermott, 2006). Sometimes memories can even be manufactured just from hearing a vivid story. Consider the following episode, recounted by Jean Piaget, the famous developmental psychologist, from his childhood:

One of my first memories would date, if it were true, from my second year. I can still see, most clearly, the following scene, in which I believed until I was about 15. I was sitting in my pram . . . when a man tried to kidnap me. I was held in by the strap fastened round me while my nurse bravely tried to stand between me and the thief. She received various scratches, and I can still vaguely see those on her face. . . . When I was about 15, my parents received a letter from my former nurse saying that she had been converted to the Salvation Army. She wanted to confess her past faults, and in particular to return the watch she had been given as a reward on this occasion. She had made up the whole story, faking the scratches. I therefore must have heard, as a child, this story, which my parents believed, and projected it into the past in the form of a visual memory. . . . Many real memories are doubtless of the same order. (Norman & Schacter, 1997, pp. 187–188)

Piaget's vivid account represents a case of a pure reconstructive memory. He heard the tale told repeatedly, and doubtless told it (and thought about it) himself. The repeated telling cemented the events as though they had really happened, just as we are all open to the possibility of having "many real memories . . . of the same order." The fact that one can remember precise details (the location, the scratches) does not necessarily indicate that the memory is true, a point that has been confirmed in laboratory studies, too (e.g., Norman & Schacter, 1997).

Putting It All Together: Improving Your Memory

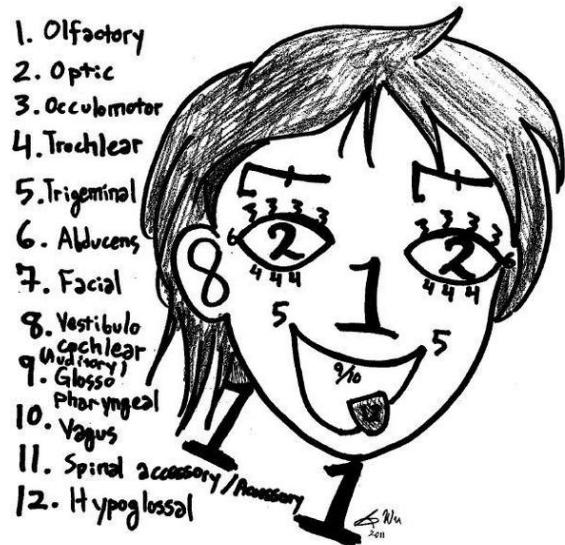
A central theme of this module has been the importance of the encoding and retrieval processes, and their interaction. To recap: to improve learning and memory, we need to encode information in conjunction with excellent cues that will bring back the remembered events when we need them. But how do we do this? Keep in mind the two critical principles we have discussed: to maximize retrieval, we should construct *meaningful* cues that remind us of the original experience, and those cues should be *distinctive* and *not associated with other memories*. These two conditions are critical in maximizing cue effectiveness (Nairne, 2002).

So, how can these principles be adapted for use in many situations? Let's go back to how we started the module, with Simon Reinhard's ability to memorize huge numbers of digits. Although it was not obvious, he applied these same general memory principles, but in a more deliberate way. In fact, all **mnemonic devices**, or memory aids/tricks, rely on these fundamental principles. In a typical case, the person learns a set of cues and then applies these cues to learn and remember information. Consider the set of 20 items below that are easy to learn and remember (Bower & Reitman, 1972).

1. is a gun. 11 is penny-one, hot dog bun.
2. is a shoe. 12 is penny-two, airplane glue.
3. is a tree. 13 is penny-three, bumble bee.
4. is a door. 14 is penny-four, grocery store.
5. is knives. 15 is penny-five, big beehive.
6. is sticks. 16 is penny-six, magic tricks.
7. is oven. 17 is penny-seven, go to heaven.
8. is plate. 18 is penny-eight, golden gate.
9. is wine. 19 is penny-nine, ball of twine.
10. is hen. 20 is penny-ten, ballpoint pen.

It would probably take you less than 10 minutes to learn this list and practice recalling it several times (remember to use retrieval practice!). If you were to do so, you would have a set of peg words on which you could "hang" memories. In fact, this mnemonic device is called the *peg word technique*. If you then needed to remember some discrete items—say a grocery list, or points you wanted to make in a speech—this method would let you do so in a very precise yet flexible way. Suppose you had to remember bread, peanut butter, bananas, lettuce, and so on. The way to use the method is to form a vivid image of what you want to remember and imagine it interacting with your peg words (as many as you need). For example, for these items, you might imagine a large gun (the first peg word) shooting a loaf of bread, then a jar of peanut butter inside a shoe, then large bunches of bananas hanging from a tree, then a door slamming on a head of lettuce with leaves flying everywhere. The idea is to provide good, distinctive cues (the weirder the better!) for the information you need to remember while you are learning it. If you do this, then retrieving it later is relatively easy. You know your cues perfectly (one is gun, etc.), so you simply go through your cue word list and "look" in your mind's eye at the image stored there (bread, in this case).

This peg word method may sound strange at first, but it works quite well, even with little



On Old Olympus' Towering Top, A
Finn And German Viewed Some H

Example of a mnemonic system created by a student to study cranial nerves. [Image: Kelidimari, <https://goo.gl/kiA1kP>, CC BY-SA 3.0, <https://goo.gl/SCKRfm>]

you grew up and identifying as many distinct areas and objects as possible. Simon has hundreds of such memory palaces that he uses. Next, for remembering digits, he has memorized a set of 10,000 images. Every four-digit number for him immediately brings forth a mental image. So, for example, 6187 might recall Michael Jackson. When Simon hears all the numbers coming at him, he places an image for every four digits into locations in his memory palace. He can do this at an incredibly rapid rate, faster than 4 digits per 4 seconds when they are flashed visually, as in the demonstration at the beginning of the module. As noted, his record is 240 digits, recalled in exact order. Simon also holds the world record in an event called “speed cards,” which involves memorizing the precise order of a shuffled deck of cards. Simon was able to do this in 21.19 seconds! Again, he uses his memory palaces, and he encodes groups of cards as single images.

Many books exist on how to improve memory using mnemonic devices, but all involve forming distinctive encoding operations and then having an infallible set of memory cues. We should add that to develop and use these memory systems beyond the basic peg system outlined above takes a great amount of time and concentration. The World Memory Championships are held every year and the records keep improving. However, for most common purposes, just keep in mind that to remember well you need to encode information in a distinctive way

training (Roediger, 1980). One word of warning, though, is that the items to be remembered need to be presented relatively slowly at first, until you have practice associating each with its cue word. People get faster with time. Another interesting aspect of this technique is that it's just as easy to recall the items in backwards order as forwards. This is because the peg words provide direct access to the memorized items, regardless of order.

How did Simon Reinhard remember those digits? Essentially he has a much more complex system based on these same principles. In his case, he uses “memory palaces” (elaborate scenes with discrete places) combined with huge sets of images for digits. For example, imagine mentally walking through the home where

and to have good cues for retrieval. You can adapt a system that will meet most any purpose.

Outside Resources

Book: Brown, P.C., Roediger, H. L. & McDaniel, M. A. (2014). *Make it stick: The science of successful learning*. Cambridge, MA: Harvard University Press.

<https://www.amazon.com/Make-Stick-Science-Successful-Learning/dp/0674729013>

Student Video 1: Eureka Foong\\\\\\'s - The Misinformation Effect. This is a student-made video illustrating this phenomenon of altered memory. It was one of the winning entries in the 2014 Noba Student Video Award.

<https://www.youtube.com/watch?v=iMPIWkFtd88>

Student Video 2: Kara McCord\\\\\\'s - Flashbulb Memories. This is a student-made video illustrating this phenomenon of autobiographical memory. It was one of the winning entries in the 2014 Noba Student Video Award.

<https://www.youtube.com/watch?v=mPhW9bUI4F0>

Student Video 3: Ang Rui Xia & Ong Jun Hao\\\\\\'s - The Misinformation Effect. Another student-made video exploring the misinformation effect. Also an award winner from 2014.

<https://www.youtube.com/watch?v=gsn9iKmOJLQ>

Video: Simon Reinhard breaking the world record in speedcards.

<http://vimeo.com/12516465>

Web: Retrieval Practice, a website with research, resources, and tips for both educators and learners around the memory-strengthening skill of retrieval practice.

<http://www.retrievalpractice.org/>

Discussion Questions

1. Mnemonists like Simon Reinhard develop mental “journeys,” which enable them to use the method of loci. Develop your own journey, which contains 20 places, in order, that you know well. One example might be: the front walkway to your parents’ apartment; their doorbell; the couch in their living room; etc. Be sure to use a set of places that you know well and that have a natural order to them (e.g., the walkway comes before the doorbell). Now you are more than halfway toward being able to memorize a set of 20 nouns, in order, rather quickly. As an optional second step, have a friend make a list of 20 such nouns and read them to you, slowly (e.g., one every 5 seconds). Use the method to attempt to

remember the 20 items.

2. Recall a recent argument or misunderstanding you have had about memory (e.g., a debate over whether your girlfriend/boyfriend had agreed to something). In light of what you have just learned about memory, how do you think about it? Is it possible that the disagreement can be understood by one of you making a pragmatic inference?
3. Think about what you've learned in this module and about how you study for tests. On the basis of what you have learned, is there something you want to try that might help your study habits?

Vocabulary

Autobiographical memory

Memory for the events of one's life.

Consolidation

The process occurring after encoding that is believed to stabilize memory traces.

Cue overload principle

The principle stating that the more memories that are associated to a particular retrieval cue, the less effective the cue will be in prompting retrieval of any one memory.

Distinctiveness

The principle that unusual events (in a context of similar events) will be recalled and recognized better than uniform (nondistinctive) events.

Encoding

The initial experience of perceiving and learning events.

Encoding specificity principle

The hypothesis that a retrieval cue will be effective to the extent that information encoded from the cue overlaps or matches information in the engram or memory trace.

Engrams

A term indicating the change in the nervous system representing an event; also, memory trace.

Episodic memory

Memory for events in a particular time and place.

Flashbulb memory

Vivid personal memories of receiving the news of some momentous (and usually emotional) event.

Memory traces

A term indicating the change in the nervous system representing an event.

Misinformation effect

When erroneous information occurring after an event is remembered as having been part of

the original event.

Mnemonic devices

A strategy for remembering large amounts of information, usually involving imaging events occurring on a journey or with some other set of memorized cues.

Recoding

The ubiquitous process during learning of taking information in one form and converting it to another form, usually one more easily remembered.

Retrieval

The process of accessing stored information.

Retroactive interference

The phenomenon whereby events that occur after some particular event of interest will usually cause forgetting of the original event.

Semantic memory

The more or less permanent store of knowledge that people have.

Storage

The stage in the learning/memory process that bridges encoding and retrieval; the persistence of memory over time.

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10

Eyewitness Testimony and Memory Biases

Cara Laney & Elizabeth F. Loftus

Eyewitnesses can provide very compelling legal testimony, but rather than recording experiences flawlessly, their memories are susceptible to a variety of errors and biases. They (like the rest of us) can make errors in remembering specific details and can even remember whole events that did not actually happen. In this module, we discuss several of the common types of errors, and what they can tell us about human memory and its interactions with the legal system.

Learning Objectives

- Describe the kinds of mistakes that eyewitnesses commonly make and some of the ways that this can impede justice.
- Explain some of the errors that are common in human memory.
- Describe some of the important research that has demonstrated human memory errors and their consequences.

What Is Eyewitness Testimony?

Eyewitness testimony is what happens when a person witnesses a crime (or accident, or other legally important event) and later gets up on the stand and recalls for the court all the details of the witnessed event. It involves a more complicated process than might initially be

presumed. It includes what happens during the actual crime to facilitate or hamper witnessing, as well as everything that happens from the time the event is over to the later courtroom appearance. The eyewitness may be interviewed by the police and numerous lawyers, describe the perpetrator to several different people, and make an identification of the perpetrator, among other things.



What can happen to our memory from the time we witness an event to the retelling of that event later? What can influence how we remember, or misremember, highly significant events like a crime or accident? [Image: Robert Couse-Baker, <https://goo.gl/OiPUMz>, CC BY 2.0, <https://goo.gl/BRvSA7>]

Why Is Eyewitness Testimony an Important Area of Psychological Research?

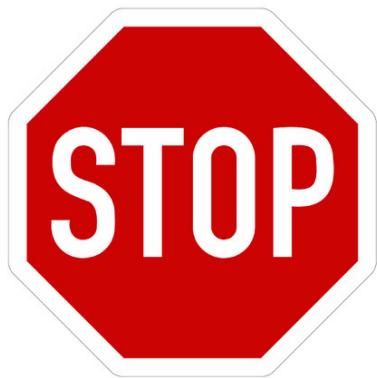
When an eyewitness stands up in front of the court and describes what happened from her own perspective, this testimony can be extremely compelling—it is hard for those hearing this testimony to take it “with a grain of salt,” or otherwise adjust its power. But to what extent is this necessary?

There is now a wealth of evidence, from research conducted over several decades, suggesting that eyewitness testimony is probably the most persuasive form of evidence presented in court, but in many cases, its accuracy is dubious. There is also evidence that mistaken eyewitness evidence can lead to wrongful conviction—sending people to prison for years or decades, even to death row, for crimes they did not commit. Faulty eyewitness testimony has been implicated in at least 75% of DNA exoneration cases—more than any other cause (Garrett, 2011). In a particularly famous case, a man named Ronald Cotton was identified by

a rape victim, Jennifer Thompson, as her rapist, and was found guilty and sentenced to life in prison. After more than 10 years, he was exonerated (and the real rapist identified) based on DNA evidence. For details on this case and other (relatively) lucky individuals whose false convictions were subsequently overturned with DNA evidence, see the Innocence Project website (<http://www.innocenceproject.org/>).

There is also hope, though, that many of the errors may be avoidable if proper precautions are taken during the investigative and judicial processes. Psychological science has taught us what some of those precautions might involve, and we discuss some of that science now.

Misinformation



Misinformation can be introduced into the memory of a witness between the time of seeing an event and reporting it later. Something as straightforward as which sort of traffic sign was in place at an intersection can be confused if subjects are exposed to erroneous information after the initial incident.

In an early study of eyewitness memory, undergraduate subjects first watched a slideshow depicting a small red car driving and then hitting a pedestrian (Loftus, Miller, & Burns, 1978). Some subjects were then asked leading questions about what had happened in the slides. For example, subjects were asked, "How fast was the car traveling when it passed the yield sign?" But this question was actually designed to be misleading, because the original slide included a stop sign rather than a yield sign.

Later, subjects were shown pairs of slides. One of the pair was the original slide containing the stop sign; the other was a replacement slide containing a yield sign. Subjects were asked which of the pair they had previously seen. Subjects who had been asked about the yield sign were likely to pick the slide showing the yield sign, even though they had originally seen the slide with the stop sign. In other words, the misinformation in the leading question led to inaccurate memory.

This phenomenon is called the **misinformation effect**, because the misinformation that subjects were exposed to after the event (here in the form of a misleading question) apparently contaminates subjects' memories of what they witnessed. Hundreds of subsequent studies have demonstrated that memory can be contaminated by erroneous information that people are

exposed to after they witness an event (see Frenda, Nichols, & Loftus, 2011; Loftus, 2005). The misinformation in these studies has led people to incorrectly remember everything from small but crucial details of a perpetrator's appearance to objects as large as a barn that wasn't there at all.

These studies have demonstrated that young adults (the typical research subjects in psychology) are often susceptible to misinformation, but that children and older adults can be even more susceptible (Bartlett & Memon, 2007; Ceci & Bruck, 1995). In addition, misinformation effects can occur easily, and without any intention to deceive (Allan & Gabbert, 2008). Even slight differences in the wording of a question can lead to misinformation effects. Subjects in one study were more likely to say yes when asked "Did you see the broken headlight?" than when asked "Did you see a broken headlight?" (Loftus, 1975).

Other studies have shown that misinformation can corrupt memory even more easily when it is encountered in social situations (Gabbert, Memon, Allan, & Wright, 2004). This is a problem particularly in cases where more than one person witnesses a crime. In these cases, witnesses tend to talk to one another in the immediate aftermath of the crime, including as they wait for police to arrive. But because different witnesses are different people with different perspectives, they are likely to see or notice different things, and thus remember different things, even when they witness the same event. So when they communicate about the crime later, they not only reinforce common memories for the event, they also contaminate each other's memories for the event (Gabbert, Memon, & Allan, 2003; Paterson & Kemp, 2006; Takarangi, Parker, & Garry, 2006).

The misinformation effect has been modeled in the laboratory. Researchers had subjects watch a video in pairs. Both subjects sat in front of the same screen, but because they wore differently polarized glasses, they saw two different versions of a video, projected onto a screen. So, although they were both watching the same screen, and believed (quite reasonably) that they were watching the same video, they were actually watching two different versions of the video (Garry, French, Kinzett, & Mori, 2008).

In the video, Eric the electrician is seen wandering through an unoccupied house and helping himself to the contents thereof. A total of eight details were different between the two videos. After watching the videos, the "co-witnesses" worked together on 12 memory test questions. Four of these questions dealt with details that were different in the two versions of the video, so subjects had the chance to influence one another. Then subjects worked individually on 20 additional memory test questions. Eight of these were for details that were different in the two videos. Subjects' accuracy was highly dependent on whether they had discussed the details previously. Their accuracy for items they had *not* previously discussed with their co-

witness was 79%. But for items that they *had* discussed, their accuracy dropped markedly, to 34%. That is, subjects allowed their co-witnesses to corrupt their memories for what they had seen.

Identifying Perpetrators

In addition to correctly remembering many details of the crimes they witness, eyewitnesses often need to remember the faces and other identifying features of the perpetrators of those crimes. Eyewitnesses are often asked to describe that perpetrator to law enforcement and later to make identifications from books of mug shots or lineups. Here, too, there is a substantial body of research demonstrating that eyewitnesses can make serious, but often understandable and even predictable, errors (Caputo & Dunning, 2007; Cutler & Penrod, 1995).

In most jurisdictions in the United States, lineups are typically conducted with pictures, called **photo spreads**, rather than with actual people standing behind one-way glass (Wells, Memon, & Penrod, 2006). The eyewitness is given a set of small pictures of perhaps six or eight individuals who are dressed similarly and photographed in similar circumstances. One of these individuals is the police suspect, and the remainder are “**foils**” or “fillers” (people known to be innocent of the particular crime under investigation). If the eyewitness identifies the

suspect, then the investigation of that suspect is likely to progress. If a witness identifies a foil or no one, then the police may choose to move their investigation in another direction.



Mistakes in identifying perpetrators can be influenced by a number of factors including poor viewing conditions, too little time to view the perpetrator, or too much delay from time of witnessing to identification.

This process is modeled in laboratory studies of eyewitness identifications. In these studies, research subjects witness a mock crime (often as a short video) and then are asked to make an identification from a photo or a live lineup. Sometimes the lineups are target present, meaning that the perpetrator from the mock crime is actually in the lineup, and sometimes they are target absent, meaning that the lineup is made up entirely of foils. The subjects, or **mock witnesses**, are given some instructions and asked to pick the

perpetrator out of the lineup. The particular details of the witnessing experience, the instructions, and the lineup members can all influence the extent to which the mock witness is likely to pick the perpetrator out of the lineup, or indeed to make any selection at all. Mock witnesses (and indeed real witnesses) can make errors in two different ways. They can fail to pick the perpetrator out of a target present lineup (by picking a foil or by neglecting to make a selection), or they can pick a foil in a target absent lineup (wherein the only correct choice is to not make a selection).

Some factors have been shown to make eyewitness identification errors particularly likely. These include poor vision or viewing conditions during the crime, particularly stressful witnessing experiences, too little time to view the perpetrator or perpetrators, too much delay between witnessing and identifying, and being asked to identify a perpetrator from a race other than one's own (Bornstein, Deffenbacher, Penrod, & McGorty, 2012; Brigham, Bennett, Meissner, & Mitchell, 2007; Burton, Wilson, Cowan, & Bruce, 1999; Deffenbacher, Bornstein, Penrod, & McGorty, 2004).

It is hard for the legal system to do much about most of these problems. But there are some things that the justice system can do to help lineup identifications "go right." For example, investigators can put together high-quality, fair lineups. A fair lineup is one in which the suspect and each of the foils is equally likely to be chosen by someone who has read an eyewitness description of the perpetrator but who did not actually witness the crime (Brigham, Ready, & Spier, 1990). This means that no one in the lineup should "stick out," and that everyone should match the description given by the eyewitness. Other important recommendations that have come out of this research include better ways to conduct lineups, "double blind" lineups, unbiased instructions for witnesses, and conducting lineups in a sequential fashion (see Technical Working Group for Eyewitness Evidence, 1999; Wells et al., 1998; Wells & Olson, 2003).

Kinds of Memory Biases

Memory is also susceptible to a wide variety of other biases and errors. People can forget events that happened to them and people they once knew. They can mix up details across time and place. They can even remember whole complex events that never happened at all. Importantly, these errors, once made, can be very hard to unmake. A memory is no less "memorable" just because it is wrong.

Some small memory errors are commonplace, and you have no doubt experienced many of them. You set down your keys without paying attention, and then cannot find them later when

you go to look for them. You try to come up with a person's name but cannot find it, even though you have the sense that it is right at the tip of your tongue (psychologists actually call this the tip-of-the-tongue effect, or TOT) (Brown, 1991).

Other sorts of memory biases are more complicated and longer lasting. For example, it turns out that our expectations and beliefs about how the world works can have huge influences on our memories. Because many aspects of our everyday lives are full of redundancies, our memory systems take advantage of the recurring patterns by forming and using **schemata**, or memory templates (Alba & Hasher, 1983; Brewer & Treyens, 1981). Thus, we know to expect that a library will have shelves and tables and librarians, and so we don't have to spend energy noticing these at the time. The result of this lack of attention, however, is that one is likely to remember schema-consistent information (such as tables), and to remember them in a rather generic way, whether or not they were actually present.



For most of our experiences schematas are a benefit and help with information overload. However, they may make it difficult or impossible to recall certain details of a situation later. Do you recall the library as it actually was or the library as approximated by your library schemata? [Dan Kleinman, <https://goo.gl/07xyDD>, CC BY 2.0, <https://goo.gl/BRvSA7>]

False Memory

Some memory errors are so "large" that they almost belong in a class of their own: **false memories**. Back in the early 1990s a pattern emerged whereby people would go into therapy for depression and other everyday problems, but over the course of the therapy develop memories for violent and horrible victimhood (Loftus & Ketcham, 1994). These patients' therapists claimed that the patients were recovering genuine memories of real childhood abuse, buried deep in their minds for years or even decades. But some experimental psychologists believed that the memories were instead likely to be false—created in therapy. These researchers then set out to see whether it would indeed be possible for wholly false memories to be created by procedures similar to those used in these patients' therapy.

In early false memory studies, undergraduate subjects' family members were recruited to provide events from the students' lives. The student subjects were told that the researchers

had talked to their family members and learned about four different events from their childhoods. The researchers asked if the now undergraduate students remembered each of these four events—introduced via short hints. The subjects were asked to write about each of the four events in a booklet and then were interviewed two separate times. The trick was that one of the events came from the researchers rather than the family (and the family had actually assured the researchers that this event had *not* happened to the subject). In the first such study, this researcher-introduced event was a story about being lost in a shopping mall and rescued by an older adult. In this study, after just being asked whether they remembered these events occurring on three separate occasions, a quarter of subjects came to believe that they had indeed been lost in the mall (Loftus & Pickrell, 1995). In subsequent studies, similar procedures were used to get subjects to believe that they nearly drowned and had been rescued by a lifeguard, or that they had spilled punch on the bride's parents at a family wedding, or that they had been attacked by a vicious animal as a child, among other events (Heaps & Nash, 1999; Hyman, Husband, & Billings, 1995; Porter, Yuille, & Lehman, 1999).

More recent false memory studies have used a variety of different manipulations to produce false memories in substantial minorities and even occasional majorities of manipulated subjects (Braun, Ellis, & Loftus, 2002; Lindsay, Hagen, Read, Wade, & Garry, 2004; Mazzoni, Loftus, Seitz, & Lynn, 1999; Seamon, Philbin, & Harrison, 2006; Wade, Garry, Read, & Lindsay, 2002). For example, one group of researchers used a mock-advertising study, wherein subjects were asked to review (fake) advertisements for Disney vacations, to convince subjects that they had once met the character Bugs Bunny at Disneyland—an impossible false memory because Bugs is a Warner Brothers character (Braun et al., 2002). Another group of researchers photoshopped childhood photographs of their subjects into a hot air balloon picture and then asked the subjects to try to remember and describe their hot air balloon experience (Wade et al., 2002). Other researchers gave subjects unmanipulated class photographs from their childhoods along with a fake story about a class prank, and thus enhanced the likelihood that subjects would falsely remember the prank (Lindsay et al., 2004).

Using a false feedback manipulation, we have been able to persuade subjects to falsely remember having a variety of childhood experiences. In these studies, subjects are told (falsely) that a powerful computer system has analyzed questionnaires that they completed previously and has concluded that they had a particular experience years earlier. Subjects apparently believe what the computer says about them and adjust their memories to match this new information. A variety of different false memories have been implanted in this way. In some studies, subjects are told they once got sick on a particular food (Bernstein, Laney, Morris, & Loftus, 2005). These memories can then spill out into other aspects of subjects' lives, such that they often become less interested in eating that food in the future (Bernstein & Loftus, 2009b). Other false memories implanted with this methodology include having an

unpleasant experience with the character Pluto at Disneyland and witnessing physical violence between one's parents (Berkowitz, Laney, Morris, Garry, & Loftus, 2008; Laney & Loftus, 2008).

Importantly, once these false memories are implanted—whether through complex methods or simple ones—it is extremely difficult to tell them apart from true memories (Bernstein & Loftus, 2009a; Laney & Loftus, 2008).

Conclusion

To conclude, eyewitness testimony is very powerful and convincing to jurors, even though it is not particularly reliable. Identification errors occur, and these errors can lead to people being falsely accused and even convicted. Likewise, eyewitness memory can be corrupted by leading questions, misinterpretations of events, conversations with co-witnesses, and their own expectations for what should have happened. People can even come to remember whole events that never occurred.

The problems with memory in the legal system are real. But what can we do to start to fix them? A number of specific recommendations have already been made, and many of these are in the process of being implemented (e.g., Steblay & Loftus, 2012; Technical Working Group for Eyewitness Evidence, 1999; Wells et al., 1998). Some of these recommendations are aimed at specific legal procedures, including when and how witnesses should be interviewed, and how lineups should be constructed and conducted. Other recommendations call for appropriate education (often in the form of expert witness testimony) to be provided to jury members and others tasked with assessing eyewitness memory. Eyewitness testimony can be of great value to the legal system, but decades of research now argues that this testimony is often given far more weight than its accuracy justifies.

Outside Resources

Video 1: Eureka Foong's - The Misinformation Effect. This is a student-made video illustrating this phenomenon of altered memory. It was one of the winning entries in the 2014 Noba Student Video Award.

<https://www.youtube.com/watch?v=iMPIWkFtd88>

Video 2: Ang Rui Xia & Ong Jun Hao's - The Misinformation Effect. Another student-made video exploring the misinformation effect. Also an award winner from 2014.

<https://www.youtube.com/watch?v=gsn9iKmOJLQ>

Discussion Questions

1. Imagine that you are a juror in a murder case where an eyewitness testifies. In what ways might your knowledge of memory errors affect your use of this testimony?
2. How true to life do you think television shows such as CSI or Law & Order are in their portrayals of eyewitnesses?
3. Many jurisdictions in the United States use "show-ups," where an eyewitness is brought to a suspect (who may be standing on the street or in handcuffs in the back of a police car) and asked, "Is this the perpetrator?" Is this a good or bad idea, from a psychological perspective? Why?

Vocabulary

False memories

Memory for an event that never actually occurred, implanted by experimental manipulation or other means.

Foils

Any member of a lineup (whether live or photograph) other than the suspect.

Misinformation effect

A memory error caused by exposure to incorrect information between the original event (e.g., a crime) and later memory test (e.g., an interview, lineup, or day in court).

Mock witnesses

A research subject who plays the part of a witness in a study.

Photo spreads

A selection of normally small photographs of faces given to a witness for the purpose of identifying a perpetrator.

Schema (plural: schemata)

A memory template, created through repeated exposure to a particular class of objects or events.

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Cognition

11

Judgment and Decision Making

Max H. Bazerman

Humans are not perfect decision makers. Not only are we not perfect, but we depart from perfection or rationality in systematic and predictable ways. The understanding of these systematic and predictable departures is core to the field of judgment and decision making. By understanding these limitations, we can also identify strategies for making better and more effective decisions.

Learning Objectives

- Understand the systematic biases that affect our judgment and decision making.
- Develop strategies for making better decisions.
- Experience some of the biases through sample decisions.

Introduction

Every day you have the opportunity to make countless decisions: should you eat dessert, cheat on a test, or attend a sports event with your friends. If you reflect on your own history of choices you will realize that they vary in quality; some are rational and some are not. This module provides an overview of decision making and includes discussion of many of the common biases involved in this process.

In his Nobel Prize-winning work, psychologist Herbert Simon (1957; March & Simon, 1958) argued that our decisions are bounded in their rationality. According to the bounded

rationality framework, human beings try to make rational decisions (such as weighing the costs and benefits of a choice) but our cognitive limitations prevent us from being fully rational. Time and cost constraints limit the quantity and quality of the information that is available to us. Moreover, we only retain a relatively small amount of information in our usable memory. And limitations on intelligence and perceptions constrain the ability of even very bright decision makers to accurately make the best choice based on the information that is available.

About 15 years after the publication of Simon's seminal work, Tversky and Kahneman (1973, 1974; Kahneman & Tversky, 1979) produced their own Nobel Prize-winning research, which provided critical information about specific systematic and predictable **biases**, or mistakes, that influence judgment (Kahneman received the prize after Tversky's death). The work of Simon, Tversky, and Kahneman paved the way to our modern understanding of judgment and decision making. And their two Nobel prizes signaled the broad acceptance of the field of behavioral decision research as a mature area of intellectual study.

What Would a Rational Decision Look Like?



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

Imagine that during your senior year in college, you apply to a number of doctoral programs, law schools, or business schools (or another set of programs in whatever field most interests you). The good news is that you receive many acceptance letters. So, how should you decide where to go? Bazerman and Moore (2013) outline the following six steps that you should take to make a rational decision: (1) define the problem (i.e., selecting the right graduate program), (2) identify the criteria necessary to judge the multiple options (location, prestige, faculty, etc.), (3) weight the criteria (rank them in terms of importance to you), (4) generate alternatives (the schools that admitted you), (5) rate each alternative on each criterion (rate each school on each

criteria that you identified, and (6) compute the optimal decision. Acting rationally would require that you follow these six steps in a fully rational manner.

I strongly advise people to think through important decisions such as this in a manner similar to this process. Unfortunately, we often don't. Many of us rely on our intuitions far more than we should. And when we do try to think systematically, the way we enter data into such formal decision-making processes is often biased.

Fortunately, psychologists have learned a great deal about the biases that affect our thinking. This knowledge about the systematic and predictable mistakes that even the best and the brightest make can help you identify flaws in your thought processes and reach better decisions.

Biases in Our Decision Process

Simon's concept of bounded rationality taught us that judgment deviates from rationality, but it did not tell us *how* judgment is biased. Tversky and Kahneman's (1974) research helped to diagnose the specific systematic, directional biases that affect human judgment. These biases are created by the tendency to short-circuit a rational decision process by relying on a number of simplifying strategies, or rules of thumb, known as **heuristics**. Heuristics allow us to cope with the complex environment surrounding our decisions. Unfortunately, they also lead to systematic and predictable biases.

To highlight some of these biases please answer the following three quiz items:

Problem 1 (adapted from Alpert & Raiffa, 1969):

Listed below are 10 uncertain quantities. Do not look up any information on these items. For each, write down your best estimate of the quantity. Next, put a lower and upper bound around your estimate, such that you are 98 percent confident that your range surrounds the actual quantity. Respond to each of these items even if you admit to knowing very little about these quantities.

1. The first year the Nobel Peace Prize was awarded
2. The date the French celebrate "Bastille Day"
3. The distance from the Earth to the Moon
4. The height of the Leaning Tower of Pisa
5. Number of students attending Oxford University (as of 2014)
6. Number of people who have traveled to space (as of 2013)

7. 2012-2013 annual budget for the University of Pennsylvania
8. Average life expectancy in Bangladesh (as of 2012)
9. World record for pull-ups in a 24-hour period
10. Number of colleges and universities in the Boston metropolitan area

Problem 2 (adapted from Joyce & Biddle, 1981):

We know that executive fraud occurs and that it has been associated with many recent financial scandals. And, we know that many cases of management fraud go undetected even when annual audits are performed. Do you think that the incidence of significant executive-level management fraud is more than 10 in 1,000 firms (that is, 1 percent) audited by Big Four accounting firms?

1. Yes, more than 10 in 1,000 Big Four clients have significant executive-level management fraud.
2. No, fewer than 10 in 1,000 Big Four clients have significant executive-level management fraud.

What is your estimate of the number of Big Four clients per 1,000 that have significant executive-level management fraud? (Fill in the blank below with the appropriate number.)

_____ in 1,000 Big Four clients have significant executive-level management fraud.

Problem 3 (adapted from Tversky & Kahneman, 1981):

Imagine that the United States is preparing for the outbreak of an unusual avian disease that is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows.

1. Program A: If Program A is adopted, 200 people will be saved.
2. Program B: If Program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved.

Which of the two programs would you favor?

Overconfidence

On the first problem, if you set your ranges so that you were justifiably 98 percent confident, you should expect that approximately 9.8, or nine to 10, of your ranges would include the actual value. So, let's look at the correct answers:

1. 1901
2. 14th of July
3. 384,403 km (238,857 mi)
4. 56.67 m (183 ft)
5. 22,384 (as of 2014)
6. 536 people (as of 2013)
7. \$6.007 billion
8. 70.3 years (as of 2012)
9. 4,321
10. 52

Count the number of your 98% ranges that actually surrounded the true quantities. If you surrounded nine to 10, you were appropriately confident in your judgments. But most readers surround only between three (30%) and seven (70%) of the correct answers, despite claiming 98% confidence that each range would surround the true value. As this problem shows, humans tend to be **overconfident** in their judgments.



Overconfidence is a natural part of most people's decision-making process and this can get us into trouble. Is it possible to overcome our faulty thinking? Perhaps. See the "Fixing Our Decisions" section below. [Image: Barn Images, <https://goo.gl/IYzbDV>, CC BY 2.0, <https://goo.gl/BRvSA7>]

Anchoring

Regarding the second problem, people vary a great deal in their final assessment of the level of executive-level management fraud, but most think that 10 out of 1,000 is too low. When I run this exercise in class, half of the students respond to the question that I asked you to answer. The other half receive a similar problem, but instead are asked whether the correct answer is higher or lower than 200 rather than 10. Most people think that 200 is high. But, again, most people claim that this "**anchor**" does not affect their final estimate. Yet, on average,

people who are presented with the question that focuses on the number 10 (out of 1,000) give answers that are about one-half the size of the estimates of those facing questions that use an anchor of 200. When we are making decisions, any initial anchor that we face is likely to influence our judgments, even if the anchor is arbitrary. That is, we insufficiently adjust our judgments away from the anchor.

Framing

Turning to Problem 3, most people choose Program A, which saves 200 lives for sure, over Program B. But, again, if I was in front of a classroom, only half of my students would receive this problem. The other half would have received the same set-up, but with the following two options:

1. Program C: If Program C is adopted, 400 people will die.
2. Program D: If Program D is adopted, there is a one-third probability that no one will die and a two-thirds probability that 600 people will die.

Which of the two programs would you favor?

Careful review of the two versions of this problem clarifies that they are objectively the same. Saving 200 people (Program A) means losing 400 people (Program C), and Programs B and D are also objectively identical. Yet, in one of the most famous problems in judgment and decision making, most individuals choose Program A in the first set and Program D in the second set (Tversky & Kahneman, 1981). People respond very differently to saving versus losing lives—even when the difference is based just on the “framing” of the choices.

The problem that I asked you to respond to was framed in terms of saving lives, and the implied reference point was the worst outcome of 600 deaths. Most of us, when we make decisions that concern gains, are risk averse; as a consequence, we lock in the possibility of saving 200 lives for sure. In the alternative version, the problem is framed in terms of losses. Now the implicit reference point is the best outcome of no deaths due to the avian disease. And in this case, most people are risk seeking when making decisions regarding losses.

These are just three of the many biases that affect even the smartest among us. Other research shows that we are biased in favor of information that is easy for our minds to retrieve, are insensitive to the importance of base rates and sample sizes when we are making inferences, assume that random events will always look random, search for information that confirms our expectations even when disconfirming information would be more informative, claim a

priori knowledge that didn't exist due to the hindsight bias, and are subject to a host of other effects that continue to be developed in the literature (Bazerman & Moore, 2013).

Contemporary Developments



The concept of bounded willpower may explain why many of us are better shoppers than savers. [Image: CC0 Public Domain, <https://goo.gl/m25gce>]

outcomes of others—giving them more of a commodity than is necessary out of a desire to be fair, for example. And, in unfortunate contexts, we sometimes are willing to forgo our own benefits out of a desire to harm others.

My colleagues and I have recently added two other important bounds to the list. Chugh, Banaji, and Bazerman (2005) and Banaji and Bhaskar (2000) introduced the concept of **bounded ethicality**, which refers to the notion that our ethics are limited in ways we are not even aware of ourselves. Second, Chugh and Bazerman (2007) developed the concept of **bounded awareness** to refer to the broad array of focusing failures that affect our judgment, specifically the many ways in which we fail to notice obvious and important information that is available to us.

A final development is the application of judgment and decision-making research to the areas of behavioral economics, behavioral finance, and behavioral marketing, among others. In

Bounded rationality served as the integrating concept of the field of behavioral decision research for 40 years. Then, in 2000, Thaler (2000) suggested that decision making is bounded in two ways not precisely captured by the concept of bounded rationality. First, he argued that our **willpower is bounded** and that, as a consequence, we give greater weight to present concerns than to future concerns. Our immediate motivations are often inconsistent with our long-term interests in a variety of ways, such as the common failure to save adequately for retirement or the difficulty many people have staying on a diet. Second, Thaler suggested that our **self-interest is bounded** such that we care about the outcomes of others.

Sometimes we positively value the

each case, these fields have been transformed by applying and extending research from the judgment and decision-making literature.

Fixing Our Decisions

Ample evidence documents that even smart people are routinely impaired by biases. Early research demonstrated, unfortunately, that awareness of these problems does little to reduce bias (Fischhoff, 1982). The good news is that more recent research documents interventions that do help us overcome our faulty thinking (Bazerman & Moore, 2013).

One critical path to fixing our biases is provided in Stanovich and West's (2000) distinction between **System 1** and **System 2** decision making. System 1 processing is our intuitive system, which is typically fast, automatic, effortless, implicit, and emotional. System 2 refers to decision making that is slower, conscious, effortful, explicit, and logical. The six logical steps of decision making outlined earlier describe a System 2 process.

Clearly, a complete System 2 process is not required for every decision we make. In most situations, our System 1 thinking is quite sufficient; it would be impractical, for example, to logically reason through every choice we make while shopping for groceries. But, preferably, System 2 logic should influence our most important decisions. Nonetheless, we use our System 1 processes for most decisions in life, relying on it even when making important decisions.

The key to reducing the effects of bias and improving our decisions is to transition from trusting our intuitive System 1 thinking toward engaging more in deliberative System 2 thought. Unfortunately, the busier and more rushed people are, the more they have on their minds, and the more likely they are to rely on System 1 thinking (Chugh, 2004). The frantic pace of professional life suggests that executives often rely on System 1 thinking (Chugh, 2004).

Fortunately, it is possible to identify conditions where we rely on intuition at our peril and substitute more deliberative thought. One fascinating example of this substitution comes from journalist Michael Lewis' (2003) account of how Billy Beane, the general manager of the Oakland Athletics, improved the outcomes of the failing baseball team after recognizing that the intuition of baseball executives was limited and systematically biased and that their intuitions had been incorporated into important decisions in ways that created enormous mistakes. Lewis (2003) documents that baseball professionals tend to overgeneralize from their personal experiences, be overly influenced by players' very recent performances, and overweight what they see with their own eyes, despite the fact that players' multiyear records

provide far better data. By substituting valid predictors of future performance (System 2 thinking), the Athletics were able to outperform expectations given their very limited payroll.

Another important direction for improving decisions comes from Thaler and Sunstein's (2008) book *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Rather than setting out to debias human judgment, Thaler and Sunstein outline a strategy for how "decision architects" can change environments in ways that account for human bias and trigger better decisions as a result. For example, Beshears, Choi, Laibson, and Madrian (2008) have shown that simple changes to defaults can dramatically improve people's decisions. They tackle the failure of many people to save for retirement and show that a simple change can significantly influence enrollment in 401(k) programs. In most companies, when you start your job, you need to proactively sign up to join the company's retirement savings plan. Many people take years before getting around to doing so. When, instead, companies automatically enroll their employees in 401(k) programs and give them the opportunity to "opt out," the net enrollment rate rises significantly. By changing defaults, we can counteract the human tendency to live with the status quo.



Nudges can be used to help people make better decisions about saving for retirement. [Image: Tax Credits, <https://goo.gl/YLuyth>, CC BY 2.0, <https://goo.gl/BRvSA7>]

Similarly, Johnson and Goldstein's (2003) cross-European organ donation study reveals that countries that have opt-in organ donation policies, where the default is not to harvest people's organs without their prior consent, sacrifice thousands of lives in comparison to opt-out policies, where the default is to harvest organs. The United States and too many other countries require that citizens opt in to organ donation through a proactive effort; as a consequence, consent rates range between 4.25%–44% across these countries. In contrast, changing the decision architecture to an opt-out policy improves consent rates to 85.9% to 99.98%. Designing the donation system with knowledge of the power of defaults can dramatically change donation rates without changing the options available to citizens. In contrast, a more intuitive strategy, such as the one in place in the United States, inspires defaults that result in many unnecessary deaths.

Concluding Thoughts

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

Outside Resources

Book: Bazerman, M. H., & Moore, D. (2013). Judgment in managerial decision making (8th ed.). John Wiley & Sons Inc.

Book: Kahneman, D. (2011) Thinking, Fast and Slow. New York, NY: Farrar, Straus and Giroux.

Book: Thaler, R. H., & Sunstein, C. R. (2008). Nudge: Improving Decisions about Health, Wealth, and Happiness. New Haven, CT: Yale University Press.

Discussion Questions

1. Are the biases in this module a problem in the real world?
2. How would you use this module to be a better decision maker?
3. Can you see any biases in today's newspaper?

Vocabulary

Anchoring

The bias to be affected by an initial anchor, even if the anchor is arbitrary, and to insufficiently adjust our judgments away from that anchor.

Biases

The systematic and predictable mistakes that influence the judgment of even very talented human beings.

Bounded awareness

The systematic ways in which we fail to notice obvious and important information that is available to us.

Bounded ethicality

The systematic ways in which our ethics are limited in ways we are not even aware of ourselves.

Bounded rationality

Model of human behavior that suggests that humans try to make rational decisions but are bounded due to cognitive limitations.

Bounded self-interest

The systematic and predictable ways in which we care about the outcomes of others.

Bounded willpower

The tendency to place greater weight on present concerns rather than future concerns.

Framing

The bias to be systematically affected by the way in which information is presented, while holding the objective information constant.

Heuristics

cognitive (or thinking) strategies that simplify decision making by using mental short-cuts

Overconfident

The bias to have greater confidence in your judgment than is warranted based on a rational assessment.

System 1

Our intuitive decision-making system, which is typically fast, automatic, effortless, implicit, and emotional.

System 2

Our more deliberative decision-making system, which is slower, conscious, effortful, explicit, and logical.

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Emotion

12

Drive States

Sudeep Bhatia & George Loewenstein

Our thoughts and behaviors are strongly influenced by affective experiences known as drive states. These drive states motivate us to fulfill goals that are beneficial to our survival and reproduction. This module provides an overview of key drive states, including information about their neurobiology and their psychological effects.

Learning Objectives

- Identify the key properties of drive states
- Describe biological goals accomplished by drive states
- Give examples of drive states
- Outline the neurobiological basis of drive states such as hunger and arousal
- Discuss the main moderators and determinants of drive states such as hunger and arousal

Introduction

What is the longest you've ever gone without eating? A couple of hours? An entire day? How did it feel? Humans rely critically on food for nutrition and energy, and the absence of food can create drastic changes, not only in physical appearance, but in thoughts and behaviors. If you've ever fasted for a day, you probably noticed how hunger can take over your mind, directing your attention to foods you could be eating (a cheesy slice of pizza, or perhaps some sweet, cold ice cream), and motivating you to obtain and consume these foods. And once you have eaten and your hunger has been satisfied, your thoughts and behaviors return to normal.



Hunger is among our most basic motivators. [Image: Jeremy Brooks, <https://goo.gl/XrFG2W>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

functions they accomplish. Whereas all affective states possess valence (i.e., they are positive or negative) and serve to motivate approach or avoidance behaviors (Zajonc, 1998), drive states are unique in that they generate behaviors that result in specific benefits for the body. For example, hunger directs individuals to eat foods that increase blood sugar levels in the body, while thirst causes individuals to drink fluids that increase water levels in the body.

Different drive states have different triggers. Most drive states respond to both internal and external cues, but the combinations of internal and external cues, and the specific types of cues, differ between drives. Hunger, for example, depends on internal, visceral signals as well as sensory signals, such as the sight or smell of tasty food. Different drive states also result in different cognitive and emotional states, and are associated with different behaviors. Yet despite these differences, there are a number of properties common to all drive states.

Homeostasis

Humans, like all organisms, need to maintain a stable state in their various physiological systems. For example, the excessive loss of body water results in dehydration, a dangerous and potentially fatal state. However, too much water can be damaging as well. Thus, a moderate and stable level of body fluid is ideal. The tendency of an organism to maintain this stability across all the different physiological systems in the body is called homeostasis.

Hunger is a drive state, an affective experience (something you feel, like the sensation of being tired or hungry) that motivates organisms to fulfill goals that are generally beneficial to their survival and reproduction. Like other drive states, such as thirst or sexual arousal, hunger has a profound impact on the functioning of the mind. It affects psychological processes, such as perception, attention, emotion, and motivation, and influences the behaviors that these processes generate.

Key Properties of Drive States

Drive states differ from other affective or emotional states in terms of the biological

Homeostasis is maintained via two key factors. First, the state of the system being regulated must be monitored and compared to an ideal level, or a **set point**. Second, there need to be mechanisms for moving the system back to this set point—that is, to restore homeostasis when deviations from it are detected. To better understand this, think of the thermostat in your own home. It detects when the current temperature in the house is different than the temperature you have it set at (i.e., the set point). Once the thermostat recognizes the difference, the heating or air conditioning turns on to bring the overall temperature back to the designated level.

Many homeostatic mechanisms, such as blood circulation and immune responses, are automatic and nonconscious. Others, however, involve deliberate action. Most drive states motivate action to restore homeostasis using both “punishments” and “rewards.” Imagine that these homeostatic mechanisms are like molecular parents. When you behave poorly by departing from the set point (such as not eating or being somewhere too cold), they raise their voice at you. You experience this as the bad feelings, or “punishments,” of hunger, thirst, or feeling too cold or too hot. However, when you behave well (such as eating nutritious foods when hungry), these homeostatic parents reward you with the pleasure that comes from any activity that moves the system back toward the set point. For example, when body temperature declines below the set point, any activity that helps to restore homeostasis (such as putting one’s hand in warm water) feels pleasurable; and likewise, when body temperature rises above the set point, anything that cools it feels pleasurable.



The body needs homeostasis and motivates us - through both pleasure and pain - to stay in balance. [Image: ashleigh290, <https://goo.gl/yXQtEC>, CC-BY 2.0, <https://goo.gl/BRvSA7>]

The Narrowing of Attention

As drive states intensify, they direct attention toward elements, activities, and forms of consumption that satisfy the biological needs associated with the drive. Hunger, for example, draws attention toward food. Outcomes and objects that are not related to satisfying hunger

lose their value (Easterbrook, 1959). For instance, has anyone ever invited you to do a fun activity while you were hungry? Likely your response was something like: "I'm not doing anything until I eat first." Indeed, at a sufficient level of intensity, individuals will sacrifice almost any quantity of goods that do not address the needs signaled by the drive state. For example, cocaine addicts, according to Gawin (1991:1581), "report that virtually all thoughts are focused on cocaine during binges; nourishment, sleep, money, loved ones, responsibility, and survival lose all significance."

Drive states also produce a second form of attention-narrowing: a collapsing of time-perspective toward the present. That is, they make us impatient. While this form of attention-narrowing is particularly pronounced for the outcomes and behaviors directly related to the biological function being served by the drive state at issue (e.g., "I need food *now*"), it applies to general concerns for the future as well. Ariely and Loewenstein (2006), for example, investigated the impact of sexual arousal on the thoughts and behaviors of a sample of male undergraduates. These undergraduates were lent laptop computers that they took to their private residences, where they answered a series of questions, both in normal states and in states of high sexual arousal. Ariely and Loewenstein found that being sexually aroused made people extremely impatient for both sexual outcomes and for outcomes in other domains, such as those involving money. In another study Giordano et al. (2002) found that heroin addicts were more impatient with respect to heroin when they were craving it than when they were not. More surprisingly, they were also more impatient toward money (they valued delayed money less) when they were actively craving heroin.

Yet a third form of attention-narrowing involves thoughts and outcomes related to the self versus others. Intense drive states tend to narrow one's focus inwardly and to undermine altruism—or the desire to do good for others. People who are hungry, in pain, or craving drugs tend to be selfish. Indeed, popular interrogation methods involve depriving individuals of sleep, food, or water, so as to trigger intense drive states leading the subject of the interrogation to divulge information that may betray comrades, friends, and family (Biderman, 1960).

Two Illustrative Drive States

Thus far we have considered drive states abstractly. We have discussed the ways in which they relate to other affective and motivational mechanisms, as well as their main biological purpose and general effects on thought and behavior. Yet, despite serving the same broader goals, different drive states are often remarkably different in terms of their specific properties. To understand some of these specific properties, we will explore two different drive states

Current Controversy

In 2005, the American Psychological Association (APA) issued a report concluding that psychologists could ethically play a role in the interrogation of people captured in Afghanistan and elsewhere. In 2014, following critical media publicity documenting the APA's involvement in torture, the APA commissioned a law firm to independently investigate APA involvement in interrogation. The firm's report was damaging to the APA because it suggested that APA leaders colluded with the Department of Defense, CIA, and other government officials not only to aid in interrogation itself, but to provide justification for government guidelines that defined torture (which is banned by international treaties signed by the U.S.) in a narrow fashion that excluded, for example so-called "stress positions" and sleep deprivation.

Critical Questions

1. Do you think that manipulating drive states, such as the need for sleep, constitutes torture?
2. How do you think research on drive states should inform the definition of "torture" and our definition of ethical interrogation techniques?

See the full Hoffman Report here - <http://www.apa.org/independent-review/APA-FINAL-Report-7.2.15.pdf>

For more coverage - <http://www.nytimes.com/2015/07/11/us/psychologists-shielded-us-torture-program-report-finds.html>

that play very important roles in determining behavior, and in ensuring human survival: hunger and sexual arousal.

Hunger

Hunger is a classic example of a drive state, one that results in thoughts and behaviors related to the consumption of food. Hunger is generally triggered by low glucose levels in the blood (Rolls, 2000), and behaviors resulting from hunger aim to restore homeostasis regarding those glucose levels. Various other internal and external cues can also cause hunger. For example, when fats are broken down in the body for energy, this initiates a chemical cue that the body should search for food (Greenberg, Smith, & Gibbs, 1990). External cues include the time of day, estimated time until the next feeding (hunger increases immediately prior to food consumption), and the sight, smell, taste, and even touch of food and food-related stimuli. Note that while hunger is a generic feeling, it has nuances that can provoke the eating of specific foods that correct for nutritional imbalances we may not even be conscious of. For



External cues, like the sight and smell of food, can ignite feelings of hunger. [Image: Marco Verch, <https://goo.gl/c4TC5A>, CC BY 2.0, <https://goo.gl/BRvSA7>]

(Anand & Brobeck, 1951). Additionally, artificially stimulating the LH, using electrical currents, can generate eating behavior if food is available (Andersson, 1951).

Activation of the LH can not only increase the desirability of food but can also reduce the desirability of nonfood-related items. For example, Brendl, Markman, and Messner (2003) found that participants who were given a handful of popcorn to trigger hunger not only had higher ratings of food products, but also had lower ratings of nonfood products—compared with participants whose appetites were not similarly primed. That is, because eating had become more important, other non-food products lost some of their value.

Hunger is only part of the story of when and why we eat. A related process, **satiation**, refers to the decline of hunger and the eventual termination of eating behavior. Whereas the feeling of hunger gets you to start eating, the feeling of satiation gets you to stop. Perhaps surprisingly, hunger and satiation are two distinct processes, controlled by different circuits in the brain and triggered by different cues. Distinct from the LH, which plays an important role in hunger, the ventromedial hypothalamus (VMH) plays an important role in satiety. Though lesions of the VMH can cause an animal to overeat to the point of obesity, the relationship between the LH and the VMH is quite complicated. Rats with VMH lesions can also be quite finicky about their food (Teitelbaum, 1955).

Other brain areas, besides the LH and VMH, also play important roles in eating behavior. The

example, a couple who was lost adrift at sea found they inexplicably began to crave the eyes of fish. Only later, after they had been rescued, did they learn that fish eyes are rich in vitamin C—a very important nutrient that they had been depleted of while lost in the ocean (Walker, 2014).

The **hypothalamus** (located in the lower, central part of the brain) plays a very important role in eating behavior. It is responsible for synthesizing and secreting various hormones. The lateral hypothalamus (LH) is concerned largely with hunger and, in fact, lesions (i.e., damage) of the LH can eliminate the desire for eating entirely—to the point that animals starve themselves to death unless kept alive by force feeding

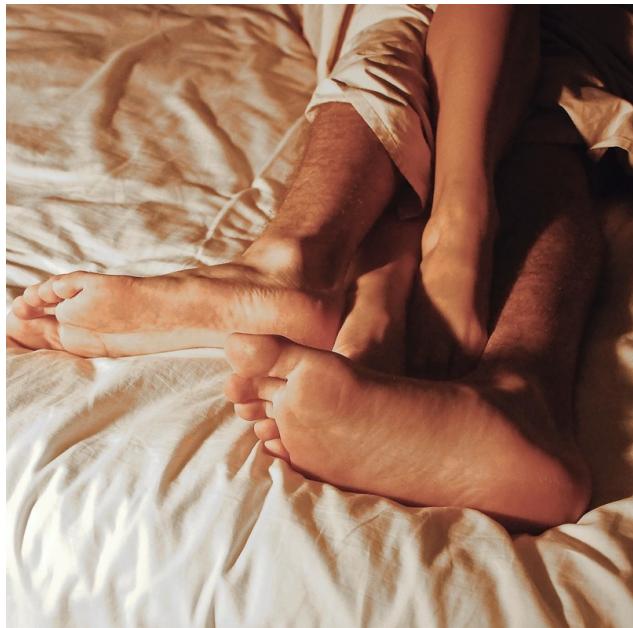
sensory cortices (visual, olfactory, and taste), for example, are important in identifying food items. These areas provide informational value, however, not hedonic evaluations. That is, these areas help tell a person what is good or safe to eat, but they don't provide the pleasure (or hedonic) sensations that *actually* eating the food produces. While many sensory functions are roughly stable across different psychological states, other functions, such as the detection of food-related stimuli, are enhanced when the organism is in a hungry drive state.

After identifying a food item, the brain also needs to determine its **reward value**, which affects the organism's motivation to consume the food. The reward value ascribed to a particular item is, not surprisingly, sensitive to the level of hunger experienced by the organism. The hungrier you are, the greater the reward value of the food. Neurons in the areas where reward values are processed, such as the orbitofrontal cortex, fire more rapidly at the sight or taste of food when the organism is hungry relative to if it is satiated.

Sexual Arousal

A second drive state, especially critical to reproduction, is sexual arousal. Sexual arousal results in thoughts and behaviors related to sexual activity. As with hunger, it is generated by a large range of internal and external mechanisms that are triggered either after the extended absence of sexual activity or by the immediate presence and possibility of sexual activity (or by cues commonly associated with such possibilities). Unlike hunger, however, these mechanisms can differ substantially between males and females, indicating important evolutionary differences in the biological functions that sexual arousal serves for different sexes.

Sexual arousal and pleasure in males, for example, is strongly related to the **preoptic area**, a region in the anterior hypothalamus (or the front of the hypothalamus). If the preoptic area is damaged, male sexual behavior is severely impaired. For example, rats that have had prior sexual experiences will still seek out sexual partners after their preoptic area is lesioned.



Unlike other drive states the mechanisms that trigger sexual arousal are not the same for men and women. [Image: Matthew Romack, <https://goo.gl/lUbbk0>, CC BY 2.0, <https://goo.gl/BRvSA7>]

However, once having secured a sexual partner, rats with lesioned preoptic areas will show no further inclination to actually initiate sex.

For females, though, the preoptic area fulfills different roles, such as functions involved with eating behaviors. Instead, there is a different region of the brain, the ventromedial hypothalamus (the lower, central part) that plays a similar role for females as the preoptic area does for males. Neurons in the ventromedial hypothalamus determine the excretion of estradiol, an estrogen hormone that regulates sexual receptivity (or the willingness to accept a sexual partner). In many mammals, these neurons send impulses to the periaqueductal gray (a region in the midbrain) which is responsible for defensive behaviors, such as freezing immobility, running, increases in blood pressure, and other motor responses. Typically, these defensive responses might keep the female rat from interacting with the male one. However, during sexual arousal, these defensive responses are weakened and lordosis behavior, a physical sexual posture that serves as an invitation to mate, is initiated (Kow and Pfaff, 1998). Thus, while the preoptic area encourages males to engage in sexual activity, the ventromedial hypothalamus fulfills that role for females.

Other differences between males and females involve overlapping functions of neural modules. These neural modules often provide clues about the biological roles played by sexual arousal and sexual activity in males and females. Areas of the brain that are important for male sexuality overlap to a great extent with areas that are also associated with aggression. In contrast, areas important for female sexuality overlap extensively with those that are also connected to nurturance (Panksepp, 2004).

One region of the brain that seems to play an important role in sexual pleasure for both males and females is the septal nucleus, an area that receives reciprocal connections from many other brain regions, including the hypothalamus and the amygdala (a region of the brain primarily involved with emotions). This region shows considerable activity, in terms of rhythmic spiking, during sexual orgasm. It is also one of the brain regions that rats will most reliably voluntarily self-stimulate (Olds & Milner, 1954). In humans, placing a small amount of acetylcholine into this region, or stimulating it electrically, has been reported to produce a feeling of imminent orgasm (Heath, 1964).

Conclusion

Drive states are evolved motivational mechanisms designed to ensure that organisms take self-beneficial actions. In this module, we have reviewed key properties of drive states, such as homeostasis and the narrowing of attention. We have also discussed, in some detail, two

important drive states—hunger and sexual arousal—and explored their underlying neurobiology and the ways in which various environmental and biological factors affect their properties.

There are many drive states besides hunger and sexual arousal that affect humans on a daily basis. Fear, thirst, exhaustion, exploratory and maternal drives, and drug cravings are all drive states that have been studied by researchers (see e.g., Buck, 1999; Van Boven & Loewenstein, 2003). Although these drive states share some of the properties discussed in this module, each also has unique features that allow it to effectively fulfill its evolutionary function.

One key difference between drive states is the extent to which they are triggered by internal as opposed to external stimuli. Thirst, for example, is induced both by decreased fluid levels and an increased concentration of salt in the body. Fear, on the other hand, is induced by perceived threats in the external environment. Drug cravings are triggered both by internal homeostatic mechanisms and by external visual, olfactory, and contextual cues. Other drive states, such as those pertaining to maternity, are triggered by specific events in the organism's life. Differences such as these make the study of drive states a scientifically interesting and important endeavor. Drive states are rich in their diversity, and many questions involving their neurocognitive underpinnings, environmental determinants, and behavioral effects, have yet to be answered.

One final thing to consider, not discussed in this module, relates to the real-world consequences of drive states. Hunger, sexual arousal, and other drive states are all psychological mechanisms that have evolved gradually over millions of years. We share these drive states not only with our human ancestors but with other animals, such as monkeys, dogs, and rats. It is not surprising then that these drive states, at times, lead us to behave in ways that are ill-suited to our modern lives. Consider, for example, the obesity epidemic that is affecting countries around the world. Like other diseases of affluence, obesity is a product of drive states that are too easily fulfilled: homeostatic mechanisms that once worked well when food was scarce now backfire when meals rich in fat and sugar are readily available. Unrestricted sexual arousal can have similarly perverse effects on our well-being. Countless politicians have sacrificed their entire life's work (not to mention their marriages) by indulging adulterous sexual impulses toward colleagues, staffers, prostitutes, and others over whom they have social or financial power. It not an overstatement to say that many problems of the 21st century, from school massacres to obesity to drug addiction, are influenced by the mismatch between our drive states and our uniquely modern ability to fulfill them at a moment's notice.

Outside Resources

Web: An open textbook chapter on homeostasis

http://en.wikibooks.org/wiki/Human_Physiology/Homeostasis

Web: Motivation and emotion in psychology

http://allpsych.com/psychology101/motivation_emotion.html

Web: The science of sexual arousal

<http://www.apa.org/monitor/apr03/arousal.aspx>

Discussion Questions

1. The ability to maintain homeostasis is important for an organism's survival. What are the ways in which homeostasis ensures survival? Do different drive states accomplish homeostatic goals differently?
2. Drive states result in the narrowing of attention toward the present and toward the self. Which drive states lead to the most pronounced narrowing of attention toward the present? Which drive states lead to the most pronounced narrowing of attention toward the self?
3. What are important differences between hunger and sexual arousal, and in what ways do these differences reflect the biological needs that hunger and sexual arousal have been evolved to address?
4. Some of the properties of sexual arousal vary across males and females. What other drives states affect males and females differently? Are there drive states that vary with other differences in humans (e.g., age)?

Vocabulary

Drive state

Affective experiences that motivate organisms to fulfill goals that are generally beneficial to their survival and reproduction.

Homeostasis

The tendency of an organism to maintain a stable state across all the different physiological systems in the body.

Homeostatic set point

An ideal level that the system being regulated must be monitored and compared to.

Hypothalamus

A portion of the brain involved in a variety of functions, including the secretion of various hormones and the regulation of hunger and sexual arousal.

Lordosis

A physical sexual posture in females that serves as an invitation to mate.

Preoptic area

A region in the anterior hypothalamus involved in generating and regulating male sexual behavior.

Reward value

A neuropsychological measure of an outcome's affective importance to an organism.

Satiation

The state of being full to satisfaction and no longer desiring to take on more.

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13

Functions of Emotions

Hyisung Hwang & David Matsumoto

Emotions play a crucial role in our lives because they have important functions. This module describes those functions, dividing the discussion into three areas: the intrapersonal, the interpersonal, and the social and cultural functions of emotions. The section on the intrapersonal functions of emotion describes the roles that emotions play within each of us individually; the section on the interpersonal functions of emotion describes the meanings of emotions to our relationships with others; and the section on the social and cultural functions of emotion describes the roles and meanings that emotions have to the maintenance and effective functioning of our societies and cultures at large. All in all we will see that emotions are a crucially important aspect of our psychological composition, having meaning and function to each of us individually, to our relationships with others in groups, and to our societies as a whole.

Learning Objectives

- Gain an appreciation of the importance of emotion in human life.
- Understand the functions and meanings of emotion in three areas of life: the intrapersonal, interpersonal, and social-cultural.
- Give examples of the role and function of emotion in each of the three areas described.

Introduction

It is impossible to imagine life without emotion. We treasure our feelings—the joy at a ball

game, the pleasure of the touch of a loved one, or the fun with friends on a night out. Even negative emotions are important, such as the sadness when a loved one dies, the anger when violated, the fear that overcomes us in a scary or unknown situation, or the guilt or shame toward others when our sins are made public. Emotions color life experiences and give those experiences meaning and flavor.

In fact, emotions play many important roles in people's lives and have been the topic of scientific inquiry in psychology for well over a century (Cannon, 1927; Darwin, 1872; James, 1890). This module explores why we have emotions and why they are important. Doing so requires us to understand the function of emotions, and this module does so below by dividing the discussion into three sections. The first concerns the **intrapersonal** functions of emotion, which refer to the role that emotions play within each of us individually. The second concerns the **interpersonal** functions of emotion, which refer to the role emotions play between individuals within a group. The third concerns the **social and cultural** functions of emotion, which refer to the role that emotions play in the maintenance of social order within a society. All in all, we will see that emotions inform us of who we are, what our relationships with others are like, and how to behave in social interactions. Emotions give meaning to events; without emotions, those events would be mere facts. Emotions help coordinate interpersonal relationships. And emotions play an important role in the cultural functioning of keeping human societies together.



Emotions help us navigate the complex social landscape of our lives. [Image: Gwenaël Piase, <https://goo.gl/d4EDKS>, CC BY-NC-SA 2.0, <https://goo.gl/hSpkVl>]

Intrapersonal Functions of Emotion

Emotions Help us Act Quickly with Minimal Conscious Awareness

Emotions are rapid information-processing systems that help us act with minimal thinking (Tooby & Cosmides, 2008). Problems associated with birth, battle, death, and seduction have occurred throughout evolutionary history and emotions evolved to aid humans in adapting

to those problems rapidly and with minimal conscious cognitive intervention. If we did not have emotions, we could not make rapid decisions concerning whether to attack, defend, flee, care for others, reject food, or approach something useful, all of which were functionally adaptive in our evolutionary history and helped us to survive. For instance, drinking spoiled milk or eating rotten eggs has negative consequences for our welfare. The emotion of disgust, however, helps us immediately take action by not ingesting them in the first place or by vomiting them out. This response is adaptive because it aids, ultimately, in our survival and allows us to act immediately without much thinking. In some instances, taking the time to sit and rationally think about what to do, calculating cost-benefit ratios in one's mind, is a luxury that might cost one one's life. Emotions evolved so that we can act without that depth of thinking.

Emotions Prepare the Body for Immediate Action



The emotion of disgust serves to protect us from toxins and contamination, of the physical and moral variety. [Image: Runs with Scissors, <https://goo.gl/FQRxGa>, CC BY-NC 2.0, <https://goo.gl/tgFydH>]

Emotions prepare us for behavior. When triggered, emotions orchestrate systems such as perception, attention, inference, learning, memory, goal choice, motivational priorities, physiological reactions, motor behaviors, and behavioral decision making (Cosmides & Tooby, 2000; Tooby & Cosmides, 2008). Emotions simultaneously activate certain systems and deactivate others in order to prevent the chaos of competing systems operating at the same time, allowing for coordinated responses to environmental stimuli (Levenson, 1999). For instance, when we are afraid, our bodies shut down temporarily unneeded digestive processes, resulting in saliva reduction (a dry mouth); blood flows disproportionately to the lower half of the body; the visual field expands; and air is breathed in, all preparing the body to flee. Emotions initiate a system of components that includes subjective experience, expressive behaviors, physiological reactions, action tendencies, and cognition, all for the purposes of specific actions; the term "emotion" is, in reality, a metaphor for these reactions.

One common misunderstanding many people have when thinking about emotions, however,

is the belief that emotions must always directly produce action. This is not true. Emotion certainly *prepares* the body for action; but whether people actually engage in action is dependent on many factors, such as the context within which the emotion has occurred, the target of the emotion, the perceived consequences of one's actions, previous experiences, and so forth (Baumeister, Vohs, DeWall, & Zhang, 2007; Matsumoto & Wilson, 2008). Thus, emotions are just one of many determinants of behavior, albeit an important one.

Emotions Influence Thoughts

Emotions are also connected to thoughts and memories. Memories are not just facts that are encoded in our brains; they are colored with the emotions felt at those times the facts occurred (Wang & Ross, 2007). Thus, emotions serve as the neural glue that connects those disparate facts in our minds. That is why it is easier to remember happy thoughts when happy, and angry times when angry. Emotions serve as the affective basis of many attitudes, values, and beliefs that we have about the world and the people around us; without emotions those attitudes, values, and beliefs would be just statements without meaning, and emotions give those statements meaning. Emotions influence our thinking processes, sometimes in constructive ways, sometimes not. It is difficult to think critically and clearly when we feel intense emotions, but easier when we are not overwhelmed with emotions (Matsumoto, Hirayama, & LeRoux, 2006).

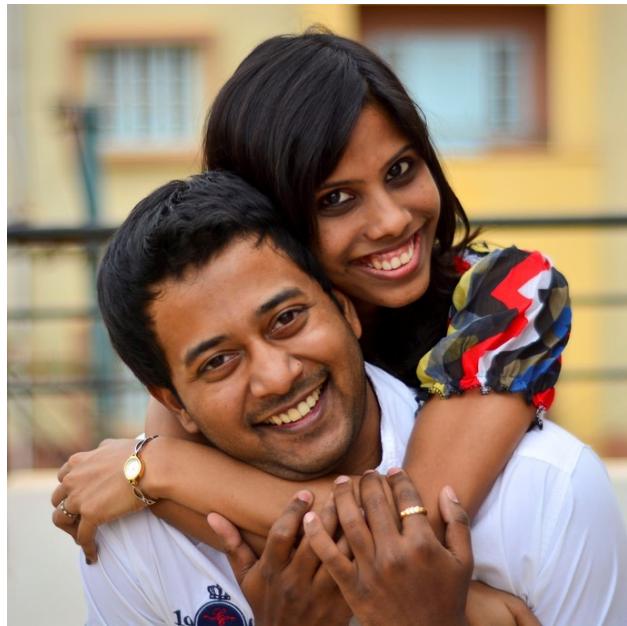
Emotions Motivate Future Behaviors

Because emotions prepare our bodies for immediate action, influence thoughts, and can be felt, they are important motivators of future behavior. Many of us strive to experience the feelings of satisfaction, joy, pride, or triumph in our accomplishments and achievements. At the same time, we also work very hard to avoid strong negative feelings; for example, once we have felt the emotion of disgust when drinking the spoiled milk, we generally work very hard to avoid having those feelings again (e.g., checking the expiration date on the label before buying the milk, smelling the milk before drinking it, watching if the milk curdles in one's coffee before drinking it). Emotions, therefore, not only influence immediate actions but also serve as an important motivational basis for future behaviors.

Interpersonal Functions of Emotion

Emotions are expressed both verbally through words and nonverbally through facial expressions, voices, gestures, body postures, and movements. We are constantly expressing

emotions when interacting with others, and others can reliably judge those emotional expressions (Elfenbein & Ambady, 2002; Matsumoto, 2001); thus, emotions have signal value to others and influence others and our social interactions. Emotions and their expressions communicate information to others about our feelings, intentions, relationship with the target of the emotions, and the environment. Because emotions have this communicative signal value, they help solve social problems by evoking responses from others, by signaling the nature of interpersonal relationships, and by providing incentives for desired social behavior (Keltner, 2003).



Emotions can act as signals to our friends and partners, conveying information about the quality of the relationship.
[Image: mynameisharsha, <https://goo.gl/HY2XgV>, CC BY-SA 2.0, <https://goo.gl/rxiUsF>]

Emotional Expressions Facilitate Specific Behaviors in Perceivers

Because facial expressions of emotion are universal social signals, they contain meaning not only about the expressor's psychological state but also about that person's intent and subsequent behavior. This information affects what the perceiver is likely to do. People observing fearful faces, for instance, are more likely to produce approach-related behaviors, whereas people who observe angry faces are more likely to produce avoidance-related behaviors (Marsh, Ambady, & Kleck, 2005). Even subliminal presentation of smiles produces increases in how much beverage people pour and consume and how much they are willing to pay for it; presentation of angry faces decreases these behaviors (Winkielman, Berridge, & Wilbarger, 2005). Also, emotional displays evoke specific, complementary emotional responses from observers; for example, anger evokes fear in others (Dimberg & Ohman, 1996; Esteves, Dimberg, & Ohman, 1994), whereas distress evokes sympathy and aid (Eisenberg et al., 1989).

Emotional Expressions Signal the Nature of Interpersonal Relationships

Emotional expressions provide information about the nature of the relationships among

interactants. Some of the most important and provocative set of findings in this area come from studies involving married couples (Gottman & Levenson, 1992; Gottman, Levenson, & Woodin, 2001). In this research, married couples visited a laboratory after having not seen each other for 24 hours, and then engaged in intimate conversations about daily events or issues of conflict. Discrete expressions of contempt, especially by the men, and disgust, especially by the women, predicted later marital dissatisfaction and even divorce.

Emotional Expressions Provide Incentives for Desired Social Behavior

Facial expressions of emotion are important regulators of social interaction. In the developmental literature, this concept has been investigated under the concept of social referencing (Klinnert, Campos, & Sorce, 1983); that is, the process whereby infants seek out information from others to clarify a situation and then use that information to act. To date, the strongest demonstration of social referencing comes from work on the visual cliff. In the first study to investigate this concept, Campos and colleagues (Sorce, Emde, Campos, & Klinnert, 1985) placed mothers on the far end of the "cliff" from the infant. Mothers first smiled to the infants and placed a toy on top the safety glass to attract them; infants invariably began crawling to their mothers. When the infants were in the center of the table, however, the mother then posed an expression of fear, sadness, anger, interest, or joy. The results were clearly different for the different faces; no infant crossed the table when the mother showed fear; only 6% did when the mother posed anger, 33% crossed when the mother posed sadness, and approximately 75% of the infants crossed when the mother posed joy or interest.

Other studies provide similar support for facial expressions as regulators of social interaction. In one study (Bradshaw, 1986), experimenters posed facial expressions of neutral, anger, or disgust toward babies as they moved toward an object and measured the amount of inhibition the babies showed in touching the object. The results for 10- and 15-month olds were the same: anger produced the greatest inhibition, followed by disgust, with neutral the least. This study was later replicated (Hertenstein & Campos, 2004) using joy and disgust expressions, altering the method so that the infants were not allowed to touch the toy (compared with a distractor object) until one hour after exposure to the expression. At 14 months of age, significantly more infants touched the toy when they saw joyful expressions, but fewer touched the toy when the infants saw disgust.

Social and Cultural Functions of Emotion



Although there are cultural differences in the display of emotion, almost all infants start showing emotion such as smiling or reacting to their caretaker as early as 6 weeks after their birth.
[Image: vgm8383, <https://goo.gl/jgfRDN>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

banana to your store. The store had people to care for that banana until you came and got it and to barter with you for it (with your money). You may have gotten to the store riding a vehicle that was produced somewhere else in the world by others, and you were probably wearing clothes produced by some other people somewhere else.

Thus, human social life is complex. Individuals are members of multiple groups, with multiple social roles, norms, and expectations, and people move rapidly in and out of the multiple groups of which they are members. Moreover, much of human social life is unique because it revolves around cities, where many people of disparate backgrounds come together. This creates the enormous potential for social chaos, which can easily occur if individuals are not coordinated well and relationships not organized systematically.

One of the important functions of culture is to provide this necessary coordination and organization. Doing so allows individuals and groups to negotiate the social complexity of human social life, thereby maintaining social order and preventing social chaos. Culture does this by providing a meaning and information system to its members, which is shared by a group and transmitted across generations, that allows the group to meet basic needs of survival, pursue happiness and well-being, and derive meaning from life (Matsumoto & Juang, 2013). Culture is what allowed the banana from southeast Asia to appear on your table.

If you stop to think about many things we take for granted in our daily lives, we cannot help but come to the conclusion that modern human life is a colorful tapestry of many groups and individual lives woven together in a complex yet functional way. For example, when you're hungry, you might go to the local grocery store and buy some food. Ever stop to think about how you're able to do that? You might buy a banana that was grown in a field in southeast Asia being raised by farmers there, where they planted the tree, cared for it, and picked the fruit. They probably handed that fruit off to a distribution chain that allowed multiple people somewhere to use tools such as cranes, trucks, cargo bins, ships or airplanes (that were also created by multiple people somewhere) to bring that

The Role of Emotions in the Function of Culture

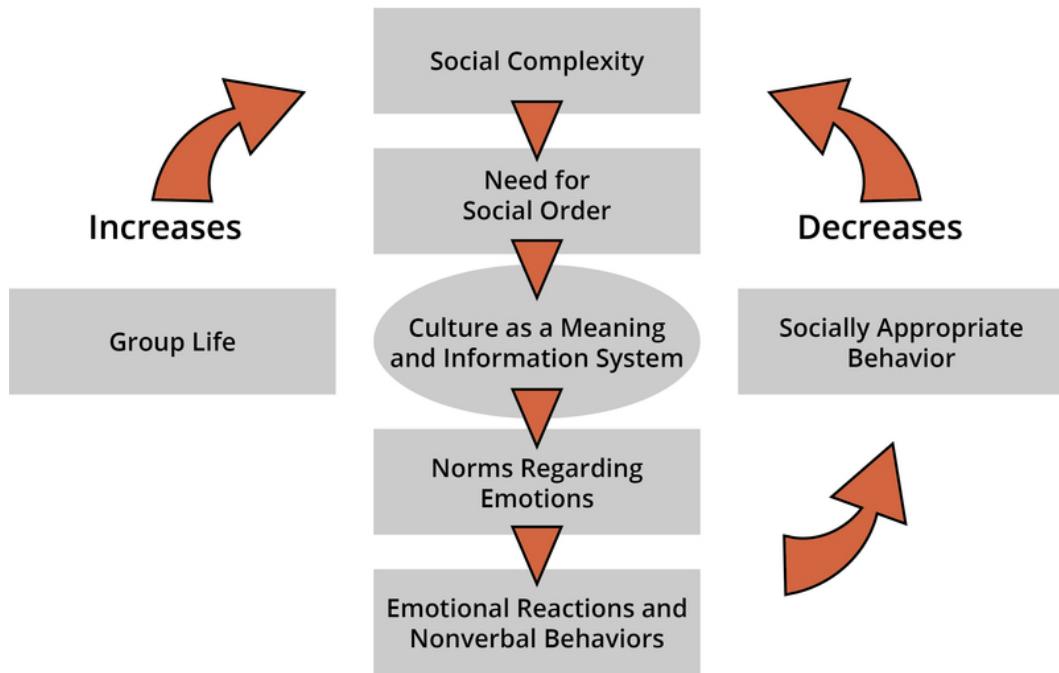


Figure 1: The Role of Emotions in the Function of Culture

Cultural transmission of the meaning and information system to its members is, therefore, a crucial aspect of culture. One of the ways this transmission occurs is through the development of worldviews (including attitudes, values, beliefs, and norms) related to emotions (Matsumoto & Hwang, 2013; Matsumoto et al., 2008). Worldviews related to emotions provide guidelines for desirable emotions that facilitate norms for regulating individual behaviors and interpersonal relationships. Our cultural backgrounds tell us which emotions are ideal to have, and which are not (Tsai, Knutson, & Fung, 2006). The cultural transmission of information related to emotions occurs in many ways, from childbearers to children, as well as from the cultural products available in our world, such as books, movies, ads, and the like (Schönpflug, 2009; Tsai, Louie, Chen, & Uchida, 2007).

Cultures also inform us about what to do with our emotions—that is, how to manage or modify them—when we experience them. One of the ways in which this is done is through the management of our emotional expressions through **cultural display rules** (Friesen, 1972). These are rules that are learned early in life that specify the management and modification of our emotional expressions according to social circumstances. Thus, we learn that “big boys don’t cry” or to laugh at the boss’s jokes even though they’re not funny. By affecting how individuals express their emotions, culture also influences how people experience them as

well.

Because one of the major functions of culture is to maintain social order in order to ensure group efficiency and thus survival, cultures create worldviews, rules, guidelines, and norms concerning emotions because emotions have important intra- and interpersonal functions, as described above, and are important motivators of behavior. Norms concerning emotion and its regulation in all cultures serve the purpose of maintaining social order. Cultural worldviews and norms help us manage and modify our emotional reactions (and thus behaviors) by helping us to have certain kinds of emotional experiences in the first place and by managing our reactions and subsequent behaviors once we have them. By doing so, our culturally moderated emotions can help us engage in socially appropriate behaviors, as defined by our cultures, and thus reduce social complexity and increase social order, avoiding social chaos. All of this allows us to live relatively harmonious and constructive lives in groups. If cultural worldviews and norms about emotions did not exist, people would just run amok having all kinds of emotional experiences, expressing their emotions and then behaving in all sorts of unpredictable and potentially harmful ways. If that were the case, it would be very difficult for groups and societies to function effectively, and even for humans to survive as a species, if emotions were not regulated in culturally defined ways for the common, social good. Thus, emotions play a critical role in the successful functioning of any society and culture.



Cultural display rules teach us how to manage our emotions. For example, in many Asian countries children are taught to mute their emotions, especially negative emotions like anger. [Image: john.gillespie, <https://goo.gl/gTdPYb>, CC BY-SA 3.0, <https://goo.gl/eLCn2O>]

Outside Resources

Alberta, G. M., Rieckmann, T. R., & Rush, J. D. (2000). Issues and recommendations for teaching an ethnic/culture-based course. *Teaching of Psychology*, 27, 102-107. doi:10.1207/S15328023TOP2702_05

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<http://books.wwnorton.com/books/The-Feeling-Brain/>

NPR News: Science Of Sadness And Joy: 'Inside Out' Gets Childhood Emotions Right

<http://www.npr.org/sections/health-shots/2015/06/13/413980258/science-of-sadness-and-joy-inside-out-gets-childhood-emotions-right>

Online Psychology Laboratory: Motivation and Emotion resources

<http://opl.apa.org/Resources.aspx#Motivation>

Web: See how well you can read other people's facial expressions of emotion

<http://www.humintell.com/free-demos/>

Discussion Questions

1. When emotions occur, why do they simultaneously activate certain physiological and psychological systems in the body and deactivate others?

2. Why is it difficult for people to act rationally and think happy thoughts when they are angry? Conversely, why is it difficult to remember sad memories or have sad thoughts when people are happy?
3. You're walking down a deserted street when you come across a stranger who looks scared. What would you say? What would you do? Why?
4. You're walking down a deserted street when you come across a stranger who looks angry. What would you say? What would you do? Why?
5. Think about the messages children receive from their environment (such as from parents, mass media, the Internet, Hollywood movies, billboards, and storybooks). In what ways do these messages influence the kinds of emotions that children should and should not feel?

Vocabulary

Cultural display rules

These are rules that are learned early in life that specify the management and modification of emotional expressions according to social circumstances. Cultural display rules can work in a number of different ways. For example, they can require individuals to express emotions "as is" (i.e., as they feel them), to exaggerate their expressions to show more than what is actually felt, to tone down their expressions to show less than what is actually felt, to conceal their feelings by expressing something else, or to show nothing at all.

Interpersonal

This refers to the relationship or interaction between two or more individuals in a group. Thus, the interpersonal functions of emotion refer to the effects of one's emotion on others, or to the relationship between oneself and others.

Intrapersonal

This refers to what occurs within oneself. Thus, the intrapersonal functions of emotion refer to the effects of emotion to individuals that occur physically inside their bodies and psychologically inside their minds.

Social and cultural

Society refers to a system of relationships between individuals and groups of individuals; culture refers to the meaning and information afforded to that system that is transmitted across generations. Thus, the social and cultural functions of emotion refer to the effects that emotions have on the functioning and maintenance of societies and cultures.

Social referencing

This refers to the process whereby individuals look for information from others to clarify a situation, and then use that information to act. Thus, individuals will often use the emotional expressions of others as a source of information to make decisions about their own behavior.

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14

Culture and Emotion

Jeanne Tsai

How do people's cultural ideas and practices shape their emotions (and other types of feelings)? In this module, we will discuss findings from studies comparing North American (United States, Canada) and East Asian (Chinese, Japanese, Korean) contexts. These studies reveal both cultural similarities and differences in various aspects of emotional life. Throughout, we will highlight the scientific and practical importance of these findings and conclude with recommendations for future research.

Learning Objectives

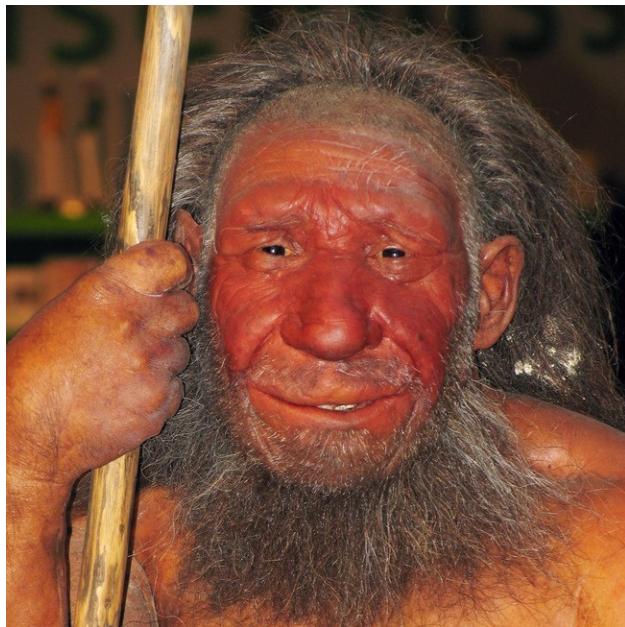
- Review the history of cross-cultural studies of emotion
- Learn about recent empirical findings and theories of culture and emotion
- Understand why cultural differences in emotion matter
- Explore current and future directions in culture and emotion research

Take a moment and imagine you are traveling in a country you've never been to before. Everything—the sights, the smells, the sounds—seems strange. People are speaking a language you don't understand and wearing clothes unlike yours. But they greet you with a smile and you sense that, despite the differences you observe, deep down inside these people have the same feelings as you. But is this true? Do people from opposite ends of the world really feel the same emotions? While most scholars agree that members of different cultures may vary in the foods they eat, the languages they speak, and the holidays they celebrate, there is disagreement about the extent to which culture shapes people's emotions and feelings

—including what people feel, what they express, and what they do during an emotional event. Understanding how culture shapes people's emotional lives and what impact emotion has on psychological health and well-being in different cultures will not only advance the study of human behavior but will also benefit multicultural societies. Across a variety of settings—academic, business, medical—people worldwide are coming into more contact with people from foreign cultures. In order to communicate and function effectively in such situations, we must understand the ways cultural ideas and practices shape our emotions.

Historical Background

In the 1950s and 1960s, social scientists tended to fall into either one of two camps. The **universalist** camp claimed that, despite cultural differences in customs and traditions, at a fundamental level all humans feel similarly. These universalists believed that emotions evolved as a response to the environments of our primordial ancestors, so they are the same across all cultures. Indeed, people often describe their emotions as "automatic," "natural," "physiological," and "instinctual," supporting the view that emotions are hard-wired and universal.



Universalists point to our prehistoric ancestors as the source of emotions that all humans share. [Image: Stefan Sheer, <https://goo.gl/x56mw9>, CC BY-SA 3.0, <https://goo.gl/tCiqlm>]

unaware of how their feelings are shaped by their culture. Therefore emotions can feel automatic, natural, physiological, and instinctual, and yet still be primarily culturally shaped.

The **social constructivist** camp, however, claimed that despite a common evolutionary heritage, different groups of humans evolved to adapt to their distinctive environments. And because human environments vary so widely, people's emotions are also culturally variable. For instance, Lutz (1988) argued that many Western views of emotion assume that emotions are "singular events situated within individuals." However, people from Ifaluk (a small island near Micronesia) view emotions as "exchanges between individuals" (p. 212). Social constructivists contended that because cultural ideas and practices are all-encompassing, people are often

In the 1970s, Paul Ekman conducted one of the first scientific studies to address the universalist-social constructivist debate. He and Wallace Friesen devised a system to measure people's facial muscle activity, called the Facial Action Coding System (FACS; Ekman & Friesen, 1978). Using FACS, Ekman and Friesen analyzed people's facial expressions and identified specific facial muscle configurations associated with specific emotions, such as happiness, anger, sadness, fear, disgust. Ekman and Friesen then took photos of people posing with these different expressions (Figure 1). With the help of colleagues at different universities around the world, Ekman and Friesen showed these pictures to members of vastly different cultures, gave them a list of emotion words (translated into the relevant languages), and asked them to match the facial expressions in the photos with their corresponding emotion words on the list (Ekman & Friesen, 1971; Ekman et al., 1987).

Across cultures, participants "recognized" the emotional facial expressions, matching each picture with its "correct" emotion word at levels greater than chance. This led Ekman and his colleagues to conclude that there are universally recognized emotional facial expressions. At the same time, though, they found considerable variability across cultures in recognition rates. For instance, whereas 95% of U.S. participants associated a smile with "happiness," only 69% of Sumatran participants did. Similarly, 86% of U.S. participants associated wrinkling of the nose with "disgust," but only 60% of Japanese did (Ekman et al., 1987). Ekman and colleagues interpreted this variation as demonstrating cultural differences in "display rules," or rules about what emotions are appropriate to show in a given situation (Ekman, 1972). Indeed, since this initial work, Matsumoto and his colleagues have demonstrated widespread cultural differences in display rules (Safdar et al., 2009). One prominent example of such differences is biting one's tongue. In India, this signals embarrassment; however, in the U.S. this expression has no such meaning (Haidt & Keltner, 1999).

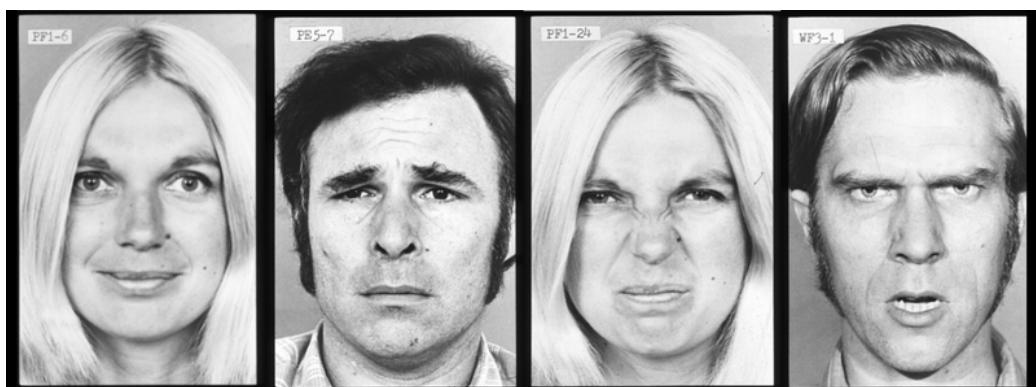


Photo credit - Paul Eckman Ph.D. / Paul Ekman Group, LLC.

Figure 1. Facial expressions associated with happiness, sadness, disgust, and anger based on the Facial Action Coding System. [Image: Paul Eckman, used with permission]

These findings suggest both cultural similarities and differences in the recognition of emotional facial expressions (although see Russell, 1994, for criticism of this work). Interestingly, since the mid-2000s, increasing research has demonstrated cultural differences not only in display rules, but also the degree to which people focus on the face (versus other aspects of the social context; Masuda, Ellsworth, Mesquita, Leu, Tanida, & Van de Veerdonk, 2008), and on different features of the face (Yuki, Maddux, & Matsuda, 2007) when perceiving others' emotions. For example, people from the United States tend to focus on the mouth when interpreting others' emotions, whereas people from Japan tend to focus on the eyes.

But how does culture shape other aspects of emotional life—such as how people emotionally respond to different situations, how they want to feel generally, and what makes them happy? Today, most scholars agree that emotions and other related states are multifaceted, and that cultural similarities and differences exist for each facet. Thus, rather than classifying emotions as *either* universal *or* socially-constructed, scholars are now attempting to identify the specific similarities and differences of emotional life across cultures. These endeavors are yielding new insights into the effects of cultural on emotion.

Current and Research Theory

Given the wide range of cultures and facets of emotion in the world, for the remainder of the module we will limit our scope to the two cultural contexts that have received the most empirical attention by social scientists: North America (United States, Canada) and East Asia (China, Japan, and Korea). Social scientists have focused on North American and East Asian contexts because they differ in obvious ways, including their geographical locations, histories, languages, and religions. Moreover, since the 1980s large-scale studies have revealed that North American and East Asian contexts differ in their overall values and attitudes, such as the prioritization of personal vs. group needs (individualism vs. collectivism; Hofstede, 2001). Whereas North American contexts encourage members to prioritize personal over group needs (to be “individualistic”), East Asian contexts encourage members to prioritize group over personal needs (to be “collectivistic”).

Cultural Models of Self in North American and East Asian Contexts

In a landmark paper, cultural psychologists Markus and Kitayama (1991) proposed that previously observed differences in individualism and collectivism translated into different models of the self—or one's personal concept of who s/he is as a person. Specifically, the researchers argued that in North American contexts, the dominant model of the self is an independent one, in which being a person means being distinct from others and behaving

accordingly across situations. In East Asian contexts, however, the dominant model of the self is an interdependent one, in which being a person means being fundamentally connected to others and being responsive to situational demands. For example, in a classic study (Cousins, 1989), American and Japanese students were administered the Twenty Statements Test, in which they were asked to complete the sentence stem, "I am _____," twenty times. U.S. participants were more likely than Japanese participants to complete the stem with psychological attributes (e.g., friendly, cheerful); Japanese participants, on the other hand, were more likely to complete the stem with references to social roles and responsibilities (e.g., a daughter, a student) (Cousins, 1989). These different models of the self result in different principles for interacting with others. An independent model of self teaches people to express themselves and try to influence others (i.e., change their environments to be consistent with their own beliefs and desires). In contrast, an interdependent model of self teaches people to suppress their own beliefs and desires and adjust to others' (i.e., fit in with their environment) (Heine, Lehman, Markus, & Kitayama, 1999; Morling, Kitayama, & Miyamoto, 2002; Weisz, Rothbaum, & Blackburn, 1984). Markus and Kitayama (1991) argue that these different models of self have significant implications for how people in Western and East Asian contexts feel.

Cultural Similarities and Differences in Emotion: Comparisons of North American and East Asian Contexts

A considerable body of empirical research suggests that these different models of self shape various aspects of emotional dynamics. Next we will discuss several ways culture shapes emotion, starting with emotional response.

People's Physiological Responses to Emotional Events Are Similar Across Cultures, but Culture Influences People's Facial Expressive Behavior

How does culture influence people's responses to emotional events? Studies of emotional response tend to focus on three components: physiology (e.g., how fast one's heart beats), subjective experience (e.g., feeling intensely happy or sad), and facial expressive behavior (e.g., smiling or frowning). Although only a few studies have simultaneously measured these different aspects of emotional response, those that do tend to observe more similarities than differences in physiological responses between cultures. That is, regardless of culture, people tend to respond similarly in terms of physiological (or bodily) expression. For instance, in one study, European American and Hmong (pronounced "muhng") American participants were

asked to relive various emotional episodes in their lives (e.g., when they lost something or someone they loved; when something good happened) (Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002). At the level of physiological arousal (e.g., heart rate), there were no differences in how the participants responded. However, their facial expressive behavior told a different story. When reliving events that elicited happiness, pride, and love, European Americans smiled more frequently and more intensely than did their Hmong counterparts—though all participants reported feeling happy, proud, and in love at similar levels of intensity. And similar patterns have emerged in studies comparing European Americans with Chinese Americans during different emotion-eliciting tasks (Tsai et al., 2002; Tsai, Levenson, & McCoy, 2006; Tsai, Levenson, & Carstensen, 2000). Thus, while the physiological aspects of emotional responses appear to be similar across cultures, their accompanying facial expressions are more culturally distinctive.

Again, these differences in facial expressions during positive emotional events are consistent with findings from cross-cultural studies of *display rules*, and stem from the models of self-description discussed above: In North American contexts that promote an independent self, individuals tend to express their emotions to influence others. Conversely, in East Asian contexts that promote an interdependent self, individuals tend to control and suppress their emotions to adjust to others.

People Suppress Their Emotions Across Cultures, but Culture Influences the Consequences of Suppression for Psychological Well-Being

If the cultural ideal in North American contexts is to express oneself, then suppressing emotions (not showing how one feels) should have negative consequences. This is the



Although study participants from different cultural backgrounds reported similar emotions and levels of intensity when recalling important episodes in their lives, there were significant differences in facial expressions in response to those emotions.
[Image: Andrew Sweeney, <https://goo.gl/Npc7Wm>, CC BY-NC-SA 4.0, <https://goo.gl/H2QaA8>]

assumption underlying hydraulic models of emotion: the idea that emotional suppression and repression impair psychological functioning (Freud, 1910). Indeed, significant empirical research shows that suppressing emotions can have negative consequences for psychological well-being in North American contexts (Gross, 1998). However, Soto and colleagues (2011) find that the relationship between suppression and psychological well-being varies by culture. True, with European Americans, emotional suppression is associated with higher levels of depression and lower levels of life satisfaction. (Remember, in these individualistic societies, the expression of emotion is a fundamental aspect of positive interactions with others.) On the other hand, since for Hong Kong Chinese, emotional suppression is needed to adjust to others (in this interdependent community, suppressing emotions is how to appropriately interact with others), it is simply a part of normal life and therefore not associated with depression or life satisfaction.

These findings are consistent with research suggesting that factors related to clinical depression vary between European Americans and Asian Americans. European Americans diagnosed with depression show dampened or muted emotional responses (Bylsma, Morris, & Rottenberg, 2008). For instance, when shown sad or amusing film clips, depressed European Americans respond less intensely than their nondepressed counterparts. However, other

studies have shown that depressed East Asian Americans (i.e., people of East Asian descent who live in the United States) demonstrate *similar or increased* emotional responses compared with their nondepressed counterparts (Chentsova-Dutton et al., 2007; Chentsova-Dutton, Tsai, & Gotlib, 2010). In other words, depressed European Americans show reduced emotional expressions, but depressed East Asian Americans do *not*—and, in fact, may express *more* emotion. Thus, muted responses (which resemble suppression) are associated with depression in European American contexts, but not in East Asian contexts.



Someone from a collectivist culture is more likely to think about how their own accomplishments might impact others. An otherwise positive achievement for one person could cause another to feel something negative, with mixed emotions as the result. [Image: lian xiaoxiao, <https://goo.gl/js5jDw>, CC BY-SA 2.0, <https://goo.gl/jSSrcO>]

People Feel Good During Positive Events, but Culture Influences Whether People

Feel Bad During Positive Events

What about people's subjective emotional experiences? Do people across cultures *feel* the same emotions in similar situations, despite how they show them? Recent studies indicate that culture affects whether people are likely to feel bad during good events. In North American contexts, people rarely feel bad after good experiences. However, a number of research teams have observed that, compared with people in North American contexts, people in East Asian contexts are more likely to feel bad *and* good ("mixed" emotions) during positive events (e.g., feeling worried after winning an important competition; Miyamoto, Uchida, & Ellsworth, 2010). This may be because, compared with North Americans, East Asians engage in more dialectical thinking (i.e., they are more tolerant of contradiction and change). Therefore, they accept that positive and negative feelings can occur simultaneously. In addition, whereas North Americans value maximizing positive states and minimizing negative ones, East Asians value a greater balance between the two (Sims, Tsai, Wang, Fung, & Zhang, 2013). To better understand this, think about how you would feel after getting the top score on a test that's graded on a curve. In North American contexts, such success is considered an individual achievement and worth celebrating. But what about the other students who will now receive a lower grade because you "raised the curve" with your good grade? In East Asian contexts, not only would students be more thoughtful of the overall group's success, but they would also be more comfortable acknowledging both the positive (their own success on the test) and the negative (their classmates' lower grades).

Again, these differences can be linked to cultural differences in models of the self. An interdependent model encourages people to think about how their accomplishments might affect others (e.g., make others feel bad or jealous). Thus, awareness of negative emotions during positive events may discourage people from expressing their excitement and standing out (as in East Asian contexts). Such emotional suppression helps individuals feel in sync with those around them. An independent model, however, encourages people to express themselves and stand out, so when something good happens, they have no reason to feel bad.

So far, we have reviewed research that demonstrates cultural similarities in physiological responses and in the ability to suppress emotions. We have also discussed the cultural differences in facial expressive behavior and the likelihood of experiencing negative feelings during positive events. Next, we will explore how culture shapes people's ideal or desired states.

People Want to Feel Good Across Cultures, but Culture Influences the Specific Good States People Want to Feel (Their "Ideal Affect")

Everyone welcomes positive feelings, but cultures vary in the specific types of positive affective states (see Figure 2) their people favor. An affective state is essentially the type of emotional arousal one feels coupled with its intensity—which can vary from pleasant to unpleasant (e.g., happy to sad), with high to low arousal (e.g., energetic to passive). Although people of all cultures experience this range of affective states, they can vary in their preferences for each. For example, people in North American contexts lean toward feeling excited, enthusiastic, energetic, and other “high arousal positive” states. People in East Asian contexts, however, generally prefer feeling calm, peaceful, and other “low arousal positive” states (Tsai, Knutson, & Fung, 2006). These cultural differences have been observed in young children between the ages of 3 and 5, college students, and adults between the ages of 60 and 80 (Tsai, Louie, Chen, & Uchida, 2007; Tsai, Sims, Thomas, & Fung, 2013), and are reflected in widely-distributed cultural products. For example, wherever you look in American contexts—women’s magazines, children’s storybooks, company websites, and even Facebook profiles (Figure 3)—you will find more open, excited smiles and fewer closed, calm smiles compared to Chinese contexts (Chim, Moon, Ang, Tsai, 2013; Tsai, 2007; Tsai, Louie, et al., 2007).

Two-Dimensional Map of Affective States

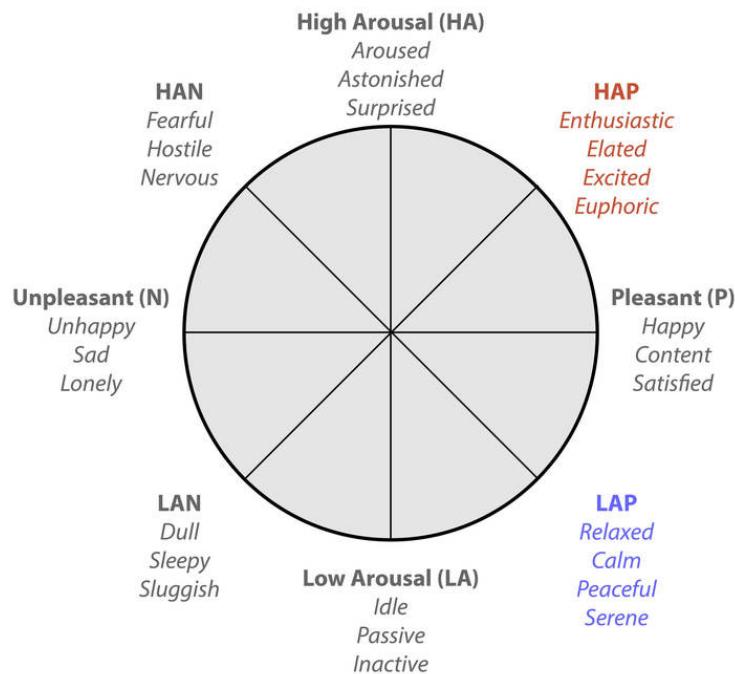


Figure 2: Adapted from Feldman, Barrett, and Russell (1999); Larsen and Diener ((1992); Russell (1991); Thayer (1989); Watson and Tellegen (1985)

Again, these differences in ideal affect (i.e., the emotional states that people believe are best) correspond to the independent and interdependent models described earlier: Independent selves want to influence others, which requires action (*doingsomething*), and action involves high arousal states. Conversely, interdependent selves want to adjust to others, which requires *suspending* action and attending to others—both of which involve low arousal states. Thus, the more that individuals and cultures want to influence others (as in North American contexts), the more they value excitement, enthusiasm, and other high arousal positive states. And, the more that individuals and cultures want to adjust to others (as in East Asian contexts), the more they value calm, peacefulness, and other low arousal positive states (Tsai, Miao, Seppala, Fung, & Yeung, 2007).



Figure 3: Sample Hong Kong Chinese (left) and European American (right) Facebook pages.

Because one's ideal affect functions as a guide for behavior and a way of evaluating one's emotional states, cultural differences in ideal affect can result in different emotional lives. For example, several studies have shown that people engage in activities (e.g., recreational pastimes, musical styles) consistent with their cultural ideal affect. That is, people from North American contexts (who value high arousal affective states) tend to prefer thrilling activities like skydiving, whereas people from East Asian contexts (who value low arousal affective states) prefer tranquil activities like lounging on the beach (Tsai, 2007). In addition, people base their conceptions of well-being and happiness on their ideal affect. Therefore, European Americans are more likely to define well-being in terms of excitement, whereas Hong Kong Chinese are more likely to define well-being in terms of calmness. Indeed, among European Americans, the less people experience *high* arousal positive states, the more depressed they are. But, among Hong Kong Chinese—you guessed it!—the less people experience *low* arousal positive states, the more depressed they are (Tsai, Knutson, & Fung, 2006).

People Base Their Happiness on Similar Factors Across Cultures, but Culture Influences the Weight Placed on Each Factor



Research has shown that self-esteem is more highly correlated with life satisfaction in individualistic cultures than in collectivist cultures. [Image: Erik, <https://goo.gl/N8zccv>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Oishi and colleagues (1999) found in a study of 39 nations that self-esteem was more strongly correlated with life satisfaction in more individualistic nations compared to more collectivistic ones. Researchers also found that in individualistic cultures people rated life satisfaction based on their emotions more so than on social definitions (or norms). In other words, rather than using social norms as a guideline for what constitutes an ideal life, people in individualistic cultures tend to evaluate their satisfaction according to how they feel emotionally. In collectivistic cultures, however, people's life satisfaction tends to be based on a balance between their emotions and norms (Suh, Diener, Oishi, & Triandis, 1998). Similarly, other researchers have recently found that people in North American contexts are more likely to feel negative when they have poor mental and physical health, while people in Japanese contexts don't have this association (Curhan et al., 2013).

Again, these findings are consistent with cultural differences in models of the self. In North American, independent contexts, feelings about the self matter more, whereas in East Asian, interdependent contexts, feelings about others matter as much as or even more than feelings

What factors make people happy or satisfied with their lives? We have seen that discrepancies between how people actually feel (actual affect) and how they want to feel (ideal affect)—as well as people's suppression of their ideal affect—are associated with depression. But happiness is based on other factors as well. For instance, Kwan, Bond, & Singelis (1997) found that while European Americans and Hong Kong Chinese subjects both based life satisfaction on how they felt about themselves (self-esteem) and their relationships (relationship harmony), their weighting of each factor was different. That is, European Americans based their life satisfaction primarily on self-esteem, whereas Hong Kong Chinese based their life satisfaction equally on self-esteem *and* relationship harmony. Consistent with these findings,

about the self.

Why Do Cultural Similarities And Differences In Emotion Matter?

Understanding cultural similarities and differences in emotion is obviously critical to understanding emotions in general, and the flexibility of emotional processes more specifically. Given the central role that emotions play in our interaction, understanding cultural similarities and differences is especially critical to preventing potentially harmful miscommunications. Although misunderstandings are unintentional, they can result in negative consequences—as we've seen historically for ethnic minorities in many cultures. For instance, across a variety of North American settings, Asian Americans are often characterized as too “quiet” and “reserved,” and these low arousal states are often misinterpreted as expressions of disengagement or boredom—rather than expressions of the ideal of calmness. Consequently, Asian Americans may be perceived as “cold,” “stoic,” and “unfriendly,” fostering stereotypes of Asian Americans as “perpetual foreigners” (Cheryan & Monin, 2005). Indeed, this may be one reason Asian Americans are often overlooked for top leadership positions (Hyun, 2005).

In addition to averting cultural miscommunications, recognizing cultural similarities and differences in emotion may provide insights into other paths to psychological health and well-being. For instance, findings from a recent series of studies suggest that calm states are easier to elicit than excited states, suggesting that one way of increasing happiness in cultures that value excitement may be to increase the value placed on calm states (Chim, Tsai, Hogan, & Fung, 2013).

Current Directions In Culture And Emotion Research

What About Other Cultures?

In this brief review, we've focused primarily on comparisons between North American and East Asian contexts because most of the research in cultural psychology has focused on these comparisons. However, there are obviously a multitude of other cultural contexts in which emotional differences likely exist. For example, although Western contexts are similar in many ways, specific Western contexts (e.g., American vs. German) also differ from each other in substantive ways related to emotion (Koopmann-Holm & Matsumoto, 2011). Thus, future research examining other cultural contexts is needed. Such studies may also reveal additional, uninvestigated dimensions or models that have broad implications for emotion. In addition,

because more and more people are being raised within multiple cultural contexts (e.g., for many Chinese Americans, a Chinese immigrant culture at home and mainstream American culture at school), more research is needed to examine how people negotiate and integrate these different cultures in their emotional lives (for examples, see De Leersnyder, Mesquita, & Kim, 2011; Perunovic, Heller, & Rafaeli, 2007).

How Are Cultural Differences in Beliefs About Emotion Transmitted?

According to Kroeber and Kluckhohn (1952), cultural ideas are reflected in and reinforced by practices, institutions, and products. As an example of this phenomenon—and illustrating the point regarding cultural differences in ideal affect—bestselling children’s storybooks in the United States often contain more exciting and less calm content (smiles and activities) than do bestselling children’s storybooks in Taiwan (Tsai, Louie, et al., 2007). To investigate this further, the researchers randomly assigned European American, Asian American, and Taiwanese Chinese preschoolers to be read either stories with exciting content or stories with calm content. Across all of these cultures, the kids who were read stories with exciting content were afterward more likely to value excited states, whereas those who were read stories with calm content were more likely to value calm states. As a test, after hearing the stories, the kids were shown a list of toys and asked to select their favorites. Those who heard the exciting stories wanted to play with more arousing toys (like a drum that beats loud and fast), whereas those who heard the calm stories wanted to play with less arousing toys (like a drum that beats quiet and slow). These findings suggest that regardless of ethnic background, direct exposure to storybook content alters children’s ideal affect. More studies are needed to assess whether a similar process occurs when children and adults are chronically exposed to various types of cultural products. As well, future studies should examine other ways cultural ideas regarding emotion are transmitted (e.g., via interactions with parents and teachers).



Children’s story books offer one interesting and effective way to study how early influences can impact a person’s ideal affect.

[Image: Vernon Barford School Library, <https://goo.gl/fghcae>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Could These Cultural Differences Be Due to Temperament?

An alternative explanation for cultural differences in emotion is that they are due to temperamental factors—that is, biological predispositions to respond in certain ways. (Might European Americans just be more emotional than East Asians because of genetics?) Indeed, most models of emotion acknowledge that both culture *and* temperament play roles in emotional life, yet few if any models indicate how. Nevertheless, most researchers believe that despite genetic differences in founder populations (i.e., the migrants from a population who leave to create their own societies), culture has a greater impact on emotions. For instance, one theoretical framework, Affect Valuation Theory, proposes that cultural factors shape how people want to feel (“ideal affect”) more than how they actually feel (“actual affect”); conversely, temperamental factors influence how people actually feel more than how they want to feel (Tsai, 2007) (see Figure 4).

To test this hypothesis, European American, Asian American, and Hong Kong Chinese participants completed measures of temperament (i.e., stable dispositions, such as neuroticism or extraversion), actual affect (i.e., how people actually feel in given situations), ideal affect (i.e., how people would like to feel in given situations), and influential cultural values (i.e., personal beliefs transmitted through culture). When researchers analyzed the participants’ responses, they found that differences in ideal affect between cultures were associated more with cultural factors than with temperamental factors (Tsai, Knutson, & Fung, 2006). However, when researchers examined actual affect, they found this to be reversed: actual affect was more strongly associated with temperamental factors than cultural factors. Not all of the studies described above have ruled out a temperamental explanation, though, and more studies are needed to rule out the possibility that the observed group differences

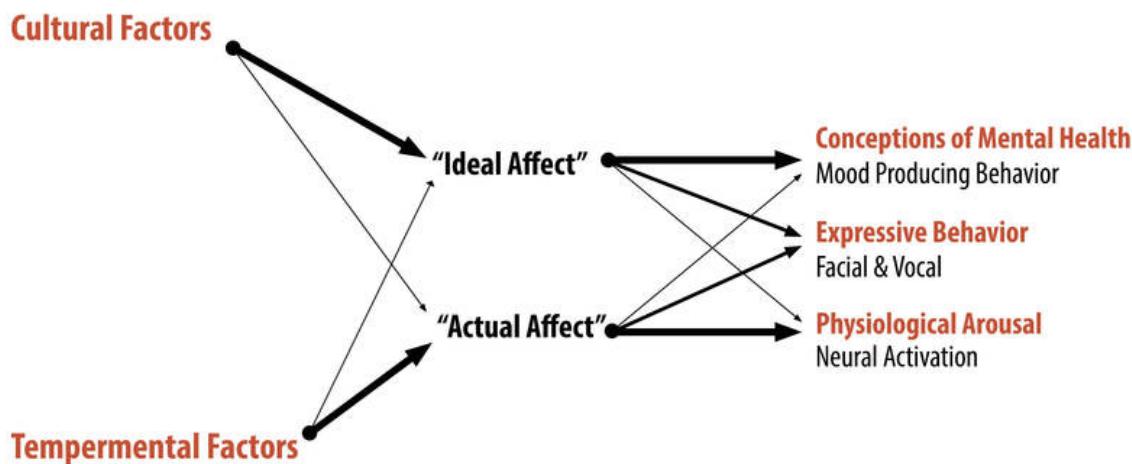


Figure 4: Affect valuation theory. Thicker lines indicate stronger predicted relationships.

are due to genetic factors instead of, or in addition to, cultural factors. Moreover, future studies should examine whether the links between temperament and emotions might vary across cultures, and how cultural and temperamental factors work together to shape emotion.

Summary

Based on studies comparing North American and East Asian contexts, there is clear evidence for cultural similarities and differences in emotions, and most of the differences can be traced to different cultural models of the self.

Consider your own concept of self for a moment. What kinds of pastimes do you prefer—activities that make you excited, or ones that make you calm? What kinds of feelings do you strive for? What is your ideal affect? Because emotions seem and feel so instinctual to us, it's hard to imagine that the way we experience them and the ones we desire are anything other than biologically programmed into us. However, as current research has shown (and as future research will continue to explore), there are myriad ways in which culture, both consciously and unconsciously, shapes people's emotional lives.

Outside Resources

Audio Interview: The Really Big Questions "What Are Emotions?" Interview with Paul Ekman, Martha Nussbaum, Dominique Moisi, and William Reddy

http://www.trbq.org/index.php?option=com_content&view=category&layout=blog&id=16&Itemid=43

Book: Ed Diener and Robert Biswas-Diener: Happiness: Unlocking the Mysteries of Psychological Wealth

Book: Eric Weiner: The Geography of Bliss

Book: Eva Hoffmann: Lost in Translation: Life in a New Language

Book: Hazel Markus: Clash: 8 Cultural Conflicts That Make Us Who We Are

Video: Social Psychology Alive

<http://psychology.stanford.edu/~tsailab/PDF/socpsychalive.wmv>

Video: The Really Big Questions "Culture and Emotion," Dr. Jeanne Tsai

<http://youtu.be/RQaEaUwNoiw>

Video: Tsai's description of cultural differences in emotion

<http://youtu.be/T46EZ8LH8Ss>

Web: Acculturation and Culture Collaborative at Leuven

<http://ppw.kuleuven.be/home/english/research/cscp/acc-research>

Web: Culture and Cognition at the University of Michigan

<http://culturecognition.isr.umich.edu/>

Web: Experts In Emotion Series, Dr. June Gruber, Department of Psychology, Yale University

http://www.yalepeplab.com/teaching/psych131_summer2013/expertseries.php

Web: Georgetown Culture and Emotion Lab

<http://georgetownculturelab.wordpress.com/>

Web: Paul Ekman's website

<http://www.paulekman.com>

Web: Penn State Culture, Health, and Emotion Lab

<http://www.personal.psu.edu/users/m/r/mrm280/sotosite/>

Web: Stanford Culture and Emotion Lab

<http://www-psych.stanford.edu/~tsailab/index.htm>

Web: Wesleyan Culture and Emotion Lab

<http://culture-and-emotion.research.wesleyan.edu/>

Discussion Questions

1. What cultural ideas and practices related to emotion were you exposed to when you were a child? What cultural ideas and practices related to emotion are you currently exposed to as an adult? How do you think they shape your emotional experiences and expressions?
2. How can researchers avoid inserting their own beliefs about emotion in their research?
3. Most of the studies described above are based on self-report measures. What are some of the advantages and disadvantages of using self-report measures to understand the cultural shaping of emotion? How might the use of other behavioral methods (e.g., neuroimaging) address some of these limitations?
4. Do the empirical findings described above change your beliefs about emotion? How?
5. Imagine you are a manager of a large American company that is beginning to do work in China and Japan. How will you apply your current knowledge about culture and emotion to prevent misunderstandings between you and your Chinese and Japanese employees?

Vocabulary

Affect

Feelings that can be described in terms of two dimensions, the dimensions of arousal and valence (Figure 2). For example, high arousal positive states refer to excitement, elation, and enthusiasm. Low arousal positive states refer to calm, peacefulness, and relaxation. Whereas “actual affect” refers to the states that people actually feel, “ideal affect” refers to the states that people ideally want to feel.

Culture

Shared, socially transmitted ideas (e.g., values, beliefs, attitudes) that are reflected in and reinforced by institutions, products, and rituals.

Emotions

Changes in subjective experience, physiological responding, and behavior in response to a meaningful event. Emotions tend to occur on the order of seconds (in contrast to moods which may last for days).

Feelings

A general term used to describe a wide range of states that include emotions, moods, traits and that typically involve changes in subjective experience, physiological responding, and behavior in response to a meaningful event. Emotions typically occur on the order of seconds, whereas moods may last for days, and traits are tendencies to respond a certain way across various situations.

Independent self

A model or view of the self as distinct from others and as stable across different situations. The goal of the independent self is to express and assert the self, and to influence others. This model of self is prevalent in many individualistic, Western contexts (e.g., the United States, Australia, Western Europe).

Interdependent self

A model or view of the self as connected to others and as changing in response to different situations. The goal of the interdependent self is to suppress personal preferences and desires, and to adjust to others. This model of self is prevalent in many collectivistic, East Asian contexts (e.g., China, Japan, Korea).

Social constructivism

Social constructivism proposes that knowledge is first created and learned within a social context and is then adopted by individuals.

Universalism

Universalism proposes that there are single objective standards, independent of culture, in basic domains such as learning, reasoning, and emotion that are a part of all human experience.

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Development

15

Cognitive Development in Childhood

Robert Siegler

This module examines what cognitive development is, major theories about how it occurs, the roles of nature and nurture, whether it is continuous or discontinuous, and how research in the area is being used to improve education.

Learning Objectives

- Be able to identify and describe the main areas of cognitive development.
- Be able to describe major theories of cognitive development and what distinguishes them.
- Understand how nature and nurture work together to produce cognitive development.
- Understand why cognitive development is sometimes viewed as discontinuous and sometimes as continuous.
- Know some ways in which research on cognitive development is being used to improve education.

Introduction

By the time you reach adulthood you have learned a few things about how the world works. You know, for instance, that you can't walk through walls or leap into the tops of trees. You know that although you cannot see your car keys they've got to be around here someplace. What's more, you know that if you want to communicate complex ideas like ordering a triple-shot soy vanilla latte with chocolate sprinkles it's better to use words with meanings attached to them rather than simply gesturing and grunting. People accumulate all this useful

knowledge through the process of cognitive development, which involves a multitude of factors, both inherent and learned.

Cognitive development refers to the development of thinking across the lifespan. Defining thinking can be problematic, because no clear boundaries separate thinking from other mental activities. Thinking obviously involves the higher mental processes: problem solving, reasoning, creating, conceptualizing, categorizing, remembering, planning, and so on. However, thinking also involves other mental processes that seem more basic and at which even toddlers are skilled—such as perceiving objects and events in the environment, acting skillfully on objects to obtain goals, and understanding and producing language. Yet other areas of human development that involve thinking are not usually associated with cognitive development, because thinking isn't a prominent feature of them—such as personality and temperament.

As the name suggests, cognitive development is about change. Children's thinking changes in dramatic and surprising ways. Consider DeVries's (1969) study of whether young children understand the difference between appearance and reality. To find out, she brought an unusually even-tempered cat named Maynard to a psychology laboratory and allowed the 3- to 6-year-old participants in the study to pet and play with him. DeVries then put a mask of a fierce dog on Maynard's head, and asked the children what Maynard was. Despite all of the children having identified Maynard previously as a cat, now most 3-year-olds said that he was a dog and claimed that he had a dog's bones and a dog's stomach. In contrast, the 6-year-olds weren't fooled; they had no doubt that Maynard remained a cat. Understanding how children's thinking changes so dramatically in just a few years is one of the fascinating challenges in studying cognitive development.

There are several main types of theories of child development. Stage theories, such as **Piaget's stage theory**, focus on whether children progress through qualitatively different stages of



Cognitive development in childhood is about change. From birth to adolescence a young person's mind changes dramatically in many important ways. [Image: One Laptop per Child, <https://goo.gl/L1eAsO>, CC BY 2.0, <https://goo.gl/9uSnqN>]

development. **Sociocultural theories**, such as that of Lev Vygotsky, emphasize how other people and the attitudes, values, and beliefs of the surrounding culture, influence children's development. **Information processing theories**, such as that of David Klahr, examine the mental processes that produce thinking at any one time and the transition processes that lead to growth in that thinking.

At the heart of all of these theories, and indeed of all research on cognitive development, are two main questions: (1) How do nature and nurture interact to produce cognitive development? (2) Does cognitive development progress through qualitatively distinct stages? In the remainder of this module, we examine the answers that are emerging regarding these questions, as well as ways in which cognitive developmental research is being used to improve education.

Nature and Nurture

The most basic question about child development is how nature and nurture together shape development. **Nature** refers to our biological endowment, the genes we receive from our parents. **Nurture** refers to the environments, social as well as physical, that influence our development, everything from the womb in which we develop before birth to the homes in which we grow up, the schools we attend, and the many people with whom we interact.

The nature-nurture issue is often presented as an either-or question: Is our intelligence (for example) due to our genes or to the environments in which we live? In fact, however, every aspect of development is produced by the interaction of genes and environment. At the most basic level, without genes, there would be no child, and without an environment to provide nurture, there also would be no child.

The way in which nature and nurture work together can be seen in findings on visual development. Many people view vision as something that people either are born with or that is purely a matter of biological maturation, but it also depends on the right kind of experience at the right time. For example, development of **depth perception**, the ability to actively perceive the distance from oneself to objects in the environment, depends on seeing patterned light and having normal brain activity in response to the patterned light, in infancy (Held, 1993). If no patterned light is received, for example when a baby has severe cataracts or blindness that is not surgically corrected until later in development, depth perception remains abnormal even after the surgery.

Adding to the complexity of the nature-nurture interaction, children's genes lead to their



A child that is perceived to be attractive and calm may receive a different sort of care and attention from adults and as a result enjoy a developmental advantage. [Image: Cairn 111, <https://goo.gl/6RpBVt>, CC BY-NC-SA 2.0, <https://goo.gl/HEXbAA>]

attend more to some things and less to others. For example, even 1-month-olds choose to look at their mother's face more than at the faces of other women of the same age and general level of attractiveness (Bartrip, Morton, & de Schonen, 2001). Children's contributions to their own cognitive development grow larger as they grow older (Scarr & McCartney, 1983). When children are young, their parents largely determine their experiences: whether they will attend day care, the children with whom they will have play dates, the books to which they have access, and so on. In contrast, older children and adolescents choose their environments to a larger degree. Their parents' preferences largely determine how 5-year-olds spend time, but 15-year-olds' own preferences largely determine when, if ever, they set foot in a library. Children's choices often have large consequences. To cite one example, the more that children choose to read, the more that their reading improves in future years (Baker, Dreher, & Guthrie, 2000). Thus, the issue is not whether cognitive development is a product of nature or nurture; rather, the issue is how nature and nurture work together to produce cognitive development.

Does Cognitive Development Progress Through Distinct Stages?

Some aspects of the development of living organisms, such as the growth of the width of a pine tree, involve **quantitative changes**, with the tree getting a little wider each year. Other changes, such as the life cycle of a ladybug, involve **qualitative changes**, with the creature

eliciting different treatment from other people, which influences their cognitive development. For example, infants' physical attractiveness and temperament are influenced considerably by their genetic inheritance, but it is also the case that parents provide more sensitive and affectionate care to easygoing and attractive infants than to difficult and less attractive ones, which can contribute to the infants' later cognitive development (Langlois et al., 1995; van den Boom & Hoeksma, 1994).

Also contributing to the complex interplay of nature and nurture is the role of children in shaping their own cognitive development. From the first days out of the womb, children actively choose to

becoming a totally different type of entity after a transition than before (Figure 1). The existence of both gradual, quantitative changes and relatively sudden, qualitative changes in the world has led researchers who study cognitive development to ask whether changes in children's thinking are gradual and **continuous** or sudden and **discontinuous**.

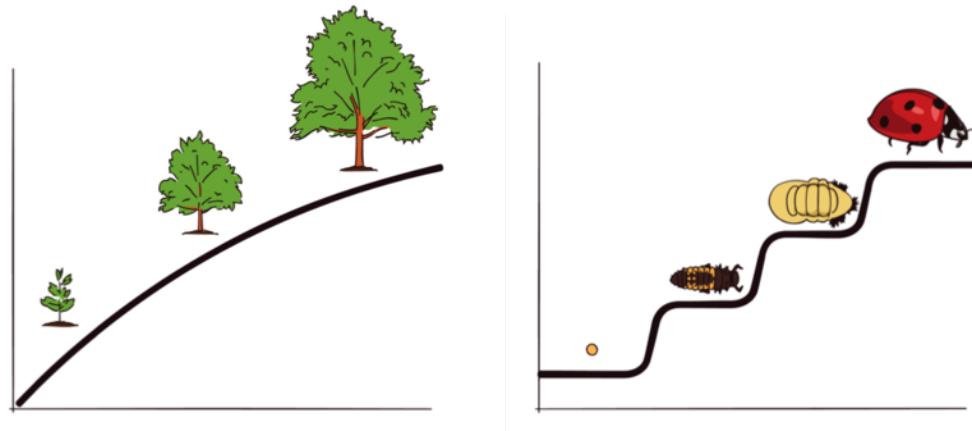


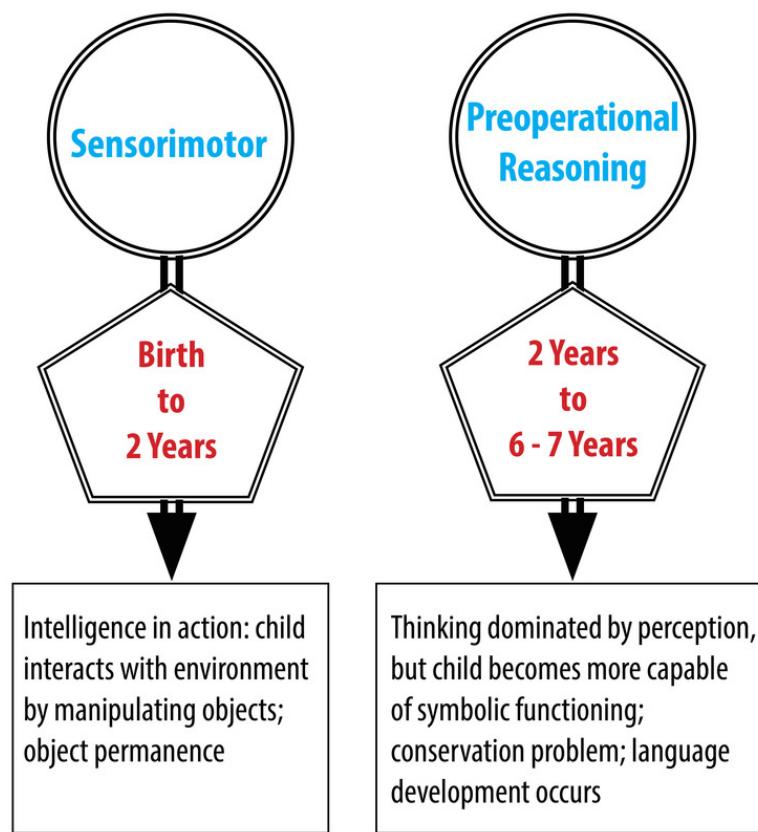
Figure 1: Continuous and discontinuous development. Some researchers see development as a continuous gradual process, much like a maple tree growing steadily in height and cross-sectional area. Other researchers see development as a progression of discontinuous stages, involving rapid discontinuous changes, such as those in the life cycle of a ladybug, separated by longer periods of slow, gradual change.

The great Swiss psychologist Jean Piaget proposed that children's thinking progresses through a series of four discrete stages. By "stages," he meant periods during which children reasoned similarly about many superficially different problems, with the stages occurring in a fixed order and the thinking within different stages differing in fundamental ways. The four stages that Piaget hypothesized were the **sensorimotor stage** (birth to 2 years), the **preoperational reasoning stage** (2 to 6 or 7 years), the **concrete operational reasoning stage** (6 or 7 to 11 or 12 years), and the **formal operational reasoning stage** (11 or 12 years and throughout the rest of life).

During the sensorimotor stage, children's thinking is largely realized through their perceptions of the world and their physical interactions with it. Their mental representations are very limited. Consider Piaget's **object permanence task**, which is one of his most famous problems. If an infant younger than 9 months of age is playing with a favorite toy, and another person removes the toy from view, for example by putting it under an opaque cover and not letting the infant immediately reach for it, the infant is very likely to make no effort to retrieve it and to show no emotional distress (Piaget, 1954). This is not due to their being uninterested in the toy or unable to reach for it; if the same toy is put under a clear cover, infants below 9

months readily retrieve it (Munakata, McClelland, Johnson, & Siegler, 1997). Instead, Piaget claimed that infants less than 9 months do not understand that objects continue to exist even when out of sight.

During the preoperational stage, according to Piaget, children can solve not only this simple problem (which they actually can solve after 9 months) but show a wide variety of other symbolic-representation capabilities, such as those involved in drawing and using language. However, such 2- to 7-year-olds tend to focus on a single dimension, even when solving problems would require them to consider multiple dimensions. This is evident in Piaget's (1952) **conservation problems**. For example, if a glass of water is poured into a taller, thinner glass, children below age 7 generally say that there now is more water than before. Similarly, if a clay ball is reshaped into a long, thin sausage, they claim that there is now more clay, and if a row of coins is spread out, they claim that there are now more coins. In all cases, the children are focusing on one dimension, while ignoring the changes in other dimensions (for example, the greater width of the glass and the clay ball).

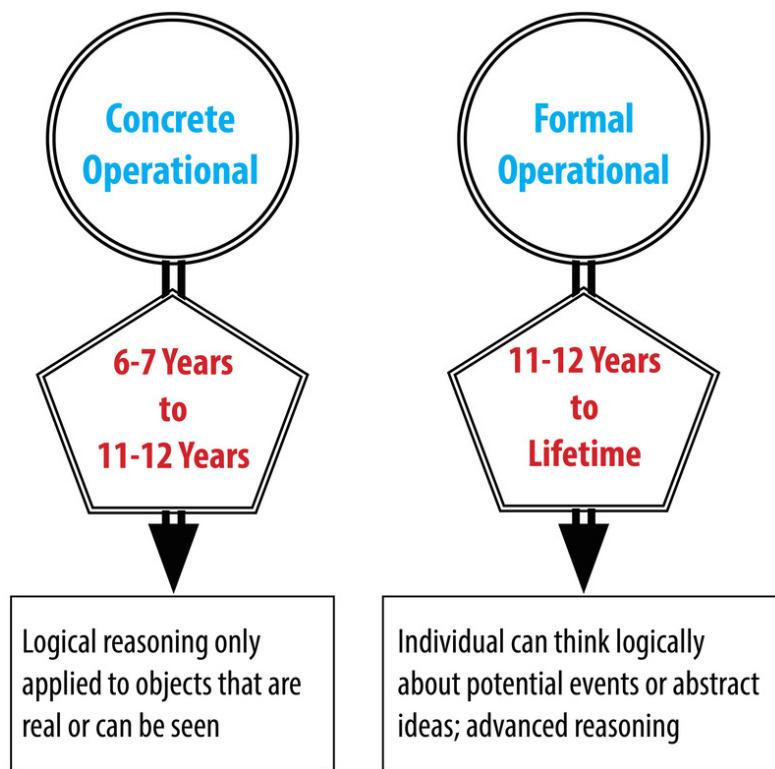


Piaget's Sensorimotor and Pre-operational Reasoning stages

Children overcome this tendency to focus on a single dimension during the **concrete operations stage**, and think logically in most situations. However, according to Piaget, they still cannot think in systematic scientific ways, even when such thinking would be useful. Thus, if asked to find out which variables influence the period that a pendulum takes to complete its arc, and given weights that they can attach to strings in order to do experiments with the pendulum to find out, most children younger than age 12, perform biased experiments from which no conclusion can be drawn, and then conclude that whatever they originally believed is correct. For example, if a boy believed that weight was the only variable that mattered, he might put the heaviest weight on the shortest string and push it the hardest, and then conclude that just as he thought, weight is the only variable that matters (Inhelder & Piaget, 1958).

Finally, in the formal operations period, children attain the reasoning power of mature adults, which allows them to solve the pendulum problem and a wide range of other problems. However, this **formal operations stage** tends not to occur without exposure to formal education in scientific reasoning, and appears to be largely or completely absent from some societies that do not provide this type of education.

Although Piaget's theory has been very influential, it has not gone unchallenged. Many more recent researchers have obtained findings indicating that cognitive development is



Piaget's Concrete and Formal Operations stages

considerably more continuous than Piaget claimed. For example, Diamond (1985) found that on the object permanence task described above, infants show earlier knowledge if the waiting period is shorter. At age 6 months, they retrieve the hidden object if the wait is no longer than 2 seconds; at 7 months, they retrieve it if the wait is no longer than 4 seconds; and so on. Even earlier, at 3 or 4 months, infants show surprise in the form of longer looking times if objects suddenly appear to vanish with no obvious cause (Baillargeon, 1987). Similarly, children's specific experiences can greatly influence when developmental changes occur. Children of pottery makers in Mexican villages, for example, know that reshaping clay does not change the amount of clay at much younger ages than children who do not have similar experiences (Price-Williams, Gordon, & Ramirez, 1969).

So, is cognitive development fundamentally continuous or fundamentally discontinuous? A reasonable answer seems to be, "It depends on how you look at it and how often you look." For example, under relatively facilitative circumstances, infants show early forms of object permanence by 3 or 4 months, and they gradually extend the range of times for which they can remember hidden objects as they grow older. However, on Piaget's original object permanence task, infants do quite quickly change toward the end of their first year from not reaching for hidden toys to reaching for them, even after they've experienced a substantial delay before being allowed to reach. Thus, the debate between those who emphasize discontinuous, stage-like changes in cognitive development and those who emphasize gradual continuous changes remains a lively one.

Applications to Education

Understanding how children think and learn has proven useful for improving education. One example comes from the area of reading. Cognitive developmental research has shown that **phonemic awareness**—that is, awareness of the component sounds within words—is a crucial skill in learning to read. To measure awareness of the component sounds within words, researchers ask children to decide whether two words rhyme, to decide whether the words start with the same sound, to identify the component sounds within words, and to indicate what would be left if a given sound were removed from a word. Kindergartners' performance on these tasks is the strongest predictor of reading achievement in third and fourth grade, even stronger than IQ or social class background (Nation, 2008). Moreover, teaching these skills to randomly chosen 4- and 5-year-olds results in their being better readers years later (National Reading Panel, 2000).

Another educational application of cognitive developmental research involves the area of mathematics. Even before they enter kindergarten, the mathematical knowledge of children



Activities like playing games that involve working with numbers and spatial relationships can give young children a developmental advantage over peers who have less exposure to the same concepts. [Image: Ben Husmann, <https://goo.gl/awOXSw>, CC BY 2.0, <https://goo.gl/9uSnqN>]

token will have traveled from the starting point, the greater the number of physical movements the child will have made in moving the token from one square to another, the greater the number of number-words the child will have said and heard, and the more time will have passed since the beginning of the game. These spatial, kinesthetic, verbal, and time-based cues provide a broad-based, multisensory foundation for knowledge of **numerical magnitudes** (the sizes of numbers), a type of knowledge that is closely related to mathematics achievement test scores (Booth & Siegler, 2006).

Playing this numerical board game for roughly 1 hour, distributed over a 2-week period, improved low-income children's knowledge of numerical magnitudes, ability to read printed numbers, and skill at learning novel arithmetic problems. The gains lasted for months after the game-playing experience (Ramani & Siegler, 2008; Siegler & Ramani, 2009). An advantage of this type of educational intervention is that it has minimal if any cost—a parent could just draw a game on a piece of paper.

Understanding of cognitive development is advancing on many different fronts. One exciting area is linking changes in brain activity to changes in children's thinking (Nelson et al., 2006). Although many people believe that brain maturation is something that occurs before birth, the brain actually continues to change in large ways for many years thereafter. For example,

from low-income backgrounds lags far behind that of children from more affluent backgrounds. Ramani and Siegler (2008) hypothesized that this difference is due to the children in middle- and upper-income families engaging more frequently in numerical activities, for example playing numerical board games such as **Chutes and Ladders**. Chutes and Ladders is a game with a number in each square; children start at the number one and spin a spinner or throw a dice to determine how far to move their token. Playing this game seemed likely to teach children about numbers, because in it, larger numbers are associated with greater values on a variety of dimensions. In particular, the higher the number that a child's token reaches, the greater the distance the

a part of the brain called the prefrontal cortex, which is located at the front of the brain and is particularly involved with planning and flexible problem solving, continues to develop throughout adolescence (Blakemore & Choudhury, 2006). Such new research domains, as well as enduring issues such as nature and nurture, continuity and discontinuity, and how to apply cognitive development research to education, insure that cognitive development will continue to be an exciting area of research in the coming years.

Conclusion

Research into cognitive development has shown us that minds don't just form according to a uniform blueprint or innate intellect, but through a combination of influencing factors. For instance, if we want our kids to have a strong grasp of language we could concentrate on phonemic awareness early on. If we want them to be good at math and science we could engage them in numerical games and activities early on. Perhaps most importantly, we no longer think of brains as empty vessels waiting to be filled up with knowledge but as adaptable organs that develop all the way through early adulthood.

Outside Resources

Book: Frye, D., Baroody, A., Burchinal, M., Carver, S. M., Jordan, N. C., & McDowell, J. (2013). Teaching math to young children: A practice guide. Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education.

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Discussion Questions

1. Why are there different theories of cognitive development? Why don't researchers agree on which theory is the right one?
2. Do children's natures differ, or do differences among children only reflect differences in their experiences?
3. Do you see development as more continuous or more discontinuous?
4. Can you think of ways other than those described in the module in which research on cognitive development could be used to improve education?

Vocabulary

Chutes and Ladders

A numerical board game that seems to be useful for building numerical knowledge.

Concrete operations stage

Piagetian stage between ages 7 and 12 when children can think logically about concrete situations but not engage in systematic scientific reasoning.

Conservation problems

Problems pioneered by Piaget in which physical transformation of an object or set of objects changes a perceptually salient dimension but not the quantity that is being asked about.

Continuous development

Ways in which development occurs in a gradual incremental manner, rather than through sudden jumps.

Depth perception

The ability to actively perceive the distance from oneself of objects in the environment.

Discontinuous development

Discontinuous development

Formal operations stage

Piagetian stage starting at age 12 years and continuing for the rest of life, in which adolescents may gain the reasoning powers of educated adults.

Information processing theories

Theories that focus on describing the cognitive processes that underlie thinking at any one age and cognitive growth over time.

Nature

The genes that children bring with them to life and that influence all aspects of their development.

Numerical magnitudes

The sizes of numbers.

Nurture

The environments, starting with the womb, that influence all aspects of children's development.

Object permanence task

The Piagetian task in which infants below about 9 months of age fail to search for an object that is removed from their sight and, if not allowed to search immediately for the object, act as if they do not know that it continues to exist.

Phonemic awareness

Awareness of the component sounds within words.

Piaget's theory

Theory that development occurs through a sequence of discontinuous stages: the sensorimotor, preoperational, concrete operational, and formal operational stages.

Preoperational reasoning stage

Period within Piagetian theory from age 2 to 7 years, in which children can represent objects through drawing and language but cannot solve logical reasoning problems, such as the conservation problems.

Qualitative changes

Large, fundamental change, as when a caterpillar changes into a butterfly; stage theories such as Piaget's posit that each stage reflects qualitative change relative to previous stages.

Quantitative changes

Gradual, incremental change, as in the growth of a pine tree's girth.

Sensorimotor stage

Period within Piagetian theory from birth to age 2 years, during which children come to represent the enduring reality of objects.

Sociocultural theories

Theory founded in large part by Lev Vygotsky that emphasizes how other people and the attitudes, values, and beliefs of the surrounding culture influence children's development.

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16

Social and Personality Development in Childhood

Ross Thompson

Childhood social and personality development emerges through the interaction of social influences, biological maturation, and the child's representations of the social world and the self. This interaction is illustrated in a discussion of the influence of significant relationships, the development of social understanding, the growth of personality, and the development of social and emotional competence in childhood.

Learning Objectives

- Provide specific examples of how the interaction of social experience, biological maturation, and the child's representations of experience and the self provide the basis for growth in social and personality development.
- Describe the significant contributions of parent-child and peer relationships to the development of social skills and personality in childhood.
- Explain how achievements in social understanding occur in childhood. Moreover, do scientists believe that infants and young children are egocentric?
- Describe the association of temperament with personality development.
- Explain what is "social and emotional competence" and provide some examples of how it develops in childhood.

Introduction

"How have I become the kind of person I am today?" Every adult ponders this question from time to time. The answers that readily come to mind include the influences of parents, peers, temperament, a moral compass, a strong sense of self, and sometimes critical life experiences such as parental divorce. Social and personality development encompasses these and many other influences on the growth of the person. In addition, it addresses questions that are at the heart of understanding how we develop as unique people. How much are we products of nature or nurture? How enduring are the influences of early experiences? The study of social and personality development offers perspective on these and other issues, often by showing how complex and multifaceted are the influences on developing children, and thus the intricate processes that have made you the person you are today (Thompson, 2006a).

Understanding social and personality development requires looking at children from three perspectives that interact to shape development. The first is the social context in which each child lives, especially the relationships that provide security, guidance, and knowledge. The second is biological maturation that supports developing social and emotional competencies and underlies temperamental individuality. The third is children's developing representations of themselves and the social world. Social and personality development is best understood as the continuous interaction between these social, biological, and representational aspects of psychological development.



Humans are inherently social creatures. Mostly, we work, play, and live together in groups. [Image: The Daring Librarian, <https://goo.gl/LmA2pS>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Relationships

This interaction can be observed in the development of the earliest relationships between infants and their parents in the first year. Virtually all infants living in normal circumstances develop strong emotional attachments to those who care for them. Psychologists believe that the development of these attachments is as biologically natural as learning to walk and not simply a byproduct of the parents' provision of food or warmth. Rather, attachments have evolved in humans because they promote children's motivation to stay close to those who care for them and, as a consequence, to benefit from the learning, security, guidance, warmth,

and affirmation that close relationships provide (Cassidy, 2008).



One of the first and most important relationships is between mothers and infants. The quality of this relationship has an effect on later psychological and social development. [Image: Premnath Thirumalaisamy, <https://goo.gl/66BROf>, CC BY-NC 2.0, <https://goo.gl/FIlc2e>]

parents are simply poorly emotionally equipped to take on the responsibility of caring for a child.

The different behaviors of securely- and insecurely-attached infants can be observed especially when the infant needs the caregiver's support. To assess the nature of attachment, researchers use a standard laboratory procedure called the "Strange Situation," which involves brief separations from the caregiver (e.g., mother) (Solomon & George, 2008). In the Strange Situation, the caregiver is instructed to leave the child to play alone in a room for a short time, then return and greet the child while researchers observe the child's response. Depending on the child's level of attachment, he or she may reject the parent, cling to the parent, or simply welcome the parent—or, in some instances, react with an agitated combination of responses.

Infants can be securely or insecurely attached with mothers, fathers, and other regular caregivers, and they can differ in their security with different people. The **security of attachment** is an important cornerstone of social and personality development, because infants and young children who are securely attached have been found to develop stronger friendships with peers, more advanced emotional understanding and early conscience

Although nearly all infants develop emotional attachments to their caregivers--parents, relatives, nannies-- their sense of security in those attachments varies. Infants become *securely* attached when their parents respond sensitively to them, reinforcing the infants' confidence that their parents will provide support when needed. Infants become *insecurely* attached when care is inconsistent or neglectful; these infants tend to respond avoidantly, resistantly, or in a disorganized manner (Belsky & Pasco Fearon, 2008). Such insecure attachments are not necessarily the result of deliberately bad parenting but are often a byproduct of circumstances. For example, an overworked single mother may find herself overstressed and fatigued at the end of the day, making fully-involved childcare very difficult. In other cases, some

development, and more positive self-concepts, compared with insecurely attached children (Thompson, 2008). This is consistent with attachment theory's premise that experiences of care, resulting in secure or insecure attachments, shape young children's developing concepts of the self, as well as what people are like, and how to interact with them.

As children mature, parent-child relationships naturally change. Preschool and grade-school children are more capable, have their own preferences, and sometimes refuse or seek to compromise with parental expectations. This can lead to greater parent-child conflict, and how conflict is managed by parents further shapes the quality of parent-child relationships. In general, children develop greater competence and self-confidence when parents have high (but reasonable) expectations for children's behavior, communicate well with them, are warm and responsive, and use reasoning (rather than coercion) as preferred responses to children's misbehavior. This kind of parenting style has been described as **authoritative** (Baumrind, 2013). Authoritative parents are supportive and show interest in their kids' activities but are not overbearing and allow them to make constructive mistakes. By contrast, some less-constructive parent-child relationships result from authoritarian, uninvolved, or permissive parenting styles (see Table 1).

		Expectations/Control	
		Low	High
Warmth/ Responsiveness	Low	uninvolved	authoritarian
	High	permissive	authoritative

Table 1: Comparison of Four Parenting Styles

Parental roles in relation to their children change in other ways, too. Parents increasingly become mediators (or gatekeepers) of their children's involvement with peers and activities outside the family. Their communication and practice of values contributes to children's academic achievement, moral development, and activity preferences. As children reach adolescence, the parent-child relationship increasingly becomes one of "coregulation," in which both the parent(s) and the child recognizes the child's growing competence and autonomy, and together they rebalance authority relations. We often see evidence of this as parents start accommodating their teenage kids' sense of independence by allowing them to

get cars, jobs, attend parties, and stay out later.

Family relationships are significantly affected by conditions outside the home. For instance, the **Family Stress Model** describes how financial difficulties are associated with parents' depressed moods, which in turn lead to marital problems and poor parenting that contributes to poorer child adjustment (Conger, Conger, & Martin, 2010). Within the home, parental marital difficulty or divorce affects more than half the children growing up today in the United States. Divorce is typically associated with economic stresses for children and parents, the renegotiation of parent-child relationships (with one parent typically as primary custodian and the other assuming a visiting relationship), and many other significant adjustments for children. Divorce is often regarded by children as a sad turning point in their lives, although for most it is not associated with long-term problems of adjustment (Emery, 1999).

Peer Relationships

Parent-child relationships are not the only significant relationships in a child's life. Peer relationships are also important. Social interaction with another child who is similar in age, skills, and knowledge provokes the development of many social skills that are valuable for the rest of life (Bukowski, Buhrmester, & Underwood, 2011). In peer relationships, children learn how to initiate and maintain social interactions with other children. They learn skills for managing conflict, such as turn-taking, compromise, and bargaining. Play also involves the mutual, sometimes complex, coordination of goals, actions, and understanding. For example, as infants, children get their first encounter with sharing (of each other's toys); during pretend play as preschoolers they create narratives together, choose roles, and collaborate to act out their stories; and in primary school, they may join a sports team, learning to work together and support each other emotionally and strategically toward a common goal. Through these experiences, children develop friendships that provide additional sources of security and support to those provided



Peer relationships are particularly important for children. They can be supportive but also challenging. Peer rejection may lead to behavioral problems later in life. [Image: Twentyfour Students, <https://goo.gl/3IS2gV>, CC BY-SA 2.0, <https://goo.gl/jSSrcO>]

by their parents.

However, peer relationships can be challenging as well as supportive (Rubin, Coplan, Chen, Bowker, & McDonald, 2011). Being accepted by other children is an important source of affirmation and self-esteem, but peer rejection can foreshadow later behavior problems (especially when children are rejected due to aggressive behavior). With increasing age, children confront the challenges of bullying, peer victimization, and managing conformity pressures. Social comparison with peers is an important means by which children evaluate their skills, knowledge, and personal qualities, but it may cause them to feel that they do not measure up well against others. For example, a boy who is not athletic may feel unworthy of his football-playing peers and revert to shy behavior, isolating himself and avoiding conversation. Conversely, an athlete who doesn't "get" Shakespeare may feel embarrassed and avoid reading altogether. Also, with the approach of adolescence, peer relationships become focused on psychological intimacy, involving personal disclosure, vulnerability, and loyalty (or its betrayal)—which significantly affects a child's outlook on the world. Each of these aspects of peer relationships requires developing very different social and emotional skills than those that emerge in parent-child relationships. They also illustrate the many ways that peer relationships influence the growth of personality and self-concept.

Social Understanding

As we have seen, children's experience of relationships at home and the peer group contributes to an expanding repertoire of social and emotional skills and also to broadened social understanding. In these relationships, children develop expectations for specific people (leading, for example, to secure or insecure attachments to parents), understanding of how to interact with adults and peers, and developing self-concept based on how others respond to them. These relationships are also significant forums for emotional development.

Remarkably, young children begin developing social understanding very early in life. Before the end of the first year, infants are aware that other people have perceptions, feelings, and other mental states that affect their behavior, and which are different from the child's own mental states. This can be readily observed in a process called **social referencing**, in which an infant looks to the mother's face when confronted with an unfamiliar person or situation (Feinman, 1992). If the mother looks calm and reassuring, the infant responds positively as if the situation is safe. If the mother looks fearful or distressed, the infant is likely to respond with wariness or distress because the mother's expression signals danger. In a remarkably insightful manner, therefore, infants show an awareness that even though they are uncertain about the unfamiliar situation, their mother is not, and that by "reading" the emotion in her

face, infants can learn about whether the circumstance is safe or dangerous, and how to respond.

Although developmental scientists used to believe that infants are egocentric—that is, focused on their own perceptions and experience—they now realize that the opposite is true. Infants are aware at an early stage that people have different mental states, and this motivates them to try to figure out what others are feeling, intending, wanting, and thinking, and how these mental states affect their behavior. They are beginning, in other words, to develop a **theory of mind**, and although their understanding of mental states begins very simply, it rapidly expands (Wellman, 2011). For example, if an 18-month-old watches an adult try repeatedly to drop a necklace into a cup but inexplicably fail each time, they will immediately put the necklace into the cup themselves—thus completing what the adult intended, but failed, to do. In doing so, they reveal their awareness of the intentions underlying the adult's behavior (Meltzoff, 1995). Carefully designed experimental studies show that by late in the preschool years, young children understand that another's beliefs can be mistaken rather than correct, that memories can affect how you feel, and that one's emotions can be hidden from others (Wellman, 2011). Social understanding grows significantly as children's theory of mind develops.

How do these achievements in social understanding occur? One answer is that young children are remarkably sensitive observers of other people, making connections between their emotional expressions, words, and behavior to derive simple inferences about mental states (e.g., concluding, for example, that what Mommy is looking at is in her mind) (Gopnik, Meltzoff, & Kuhl, 2001). This is especially likely to occur in relationships with people whom the child knows well, consistent with the ideas of attachment theory discussed above. Growing language skills give young children words with which to represent these mental states (e.g., "mad," "wants") and talk about them with others. Thus in conversation with their parents about everyday experiences, children learn much about people's mental states from how adults talk about them ("Your sister was sad because she thought Daddy was coming home.") (Thompson, 2006b). Developing social understanding is, in other words, based on children's everyday interactions with others and their careful interpretations of what they see and hear. There are also some scientists who believe that infants are biologically prepared to perceive people in a special way, as organisms with an internal mental life, and this facilitates their interpretation of people's behavior with reference to those mental states (Leslie, 1994).

Personality

Parents look into the faces of their newborn infants and wonder, "What kind of person will



Although a child's temperament is partly determined by genetics, environmental influences also contribute to shaping personality. Positive personality development is supported by a "good fit" between a child's natural temperament, environment and experiences. [Image: Thomas Hawk, <https://goo.gl/2So40O>, CC BY-NC 2.0, <https://goo.gl/FIlc2e>]

hiking and fishing trips would be a good "fit" to her lifestyle, supporting personality growth. Personality is the result, therefore, of the continuous interplay between biological disposition and experience, as is true for many other aspects of social and personality development.

Personality develops from temperament in other ways (Thompson, Winer, & Goodvin, 2010). As children mature biologically, temperamental characteristics emerge and change over time. A newborn is not capable of much self-control, but as brain-based capacities for self-control advance, temperamental changes in self-regulation become more apparent. For example, a newborn who cries frequently doesn't necessarily have a grumpy personality; over time, with sufficient parental support and increased sense of security, the child might be less likely to cry.

In addition, personality is made up of many other features besides temperament. Children's developing self-concept, their motivations to achieve or to socialize, their values and goals, their coping styles, their sense of responsibility and conscientiousness, and many other qualities are encompassed into personality. These qualities are influenced by biological dispositions, but even more by the child's experiences with others, particularly in close relationships, that guide the growth of individual characteristics.

this child will become?" They scrutinize their baby's preferences, characteristics, and responses for clues of a developing personality. They are quite right to do so, because temperament is a foundation for personality growth. But **temperament** (defined as early-emerging differences in reactivity and self-regulation) is not the whole story. Although temperament is biologically based, it interacts with the influence of experience from the moment of birth (if not before) to shape personality (Rothbart, 2011). Temperamental dispositions are affected, for example, by the support level of parental care. More generally, personality is shaped by the **goodness of fit** between the child's temperamental qualities and characteristics of the environment (Chess & Thomas, 1999). For example, an adventurous child whose parents regularly take her on weekend

Indeed, personality development begins with the biological foundations of temperament but becomes increasingly elaborated, extended, and refined over time. The newborn that parents gazed upon thus becomes an adult with a personality of depth and nuance.

Social and Emotional Competence

Social and personality development is built from the social, biological, and representational influences discussed above. These influences result in important developmental outcomes that matter to children, parents, and society: a young adult's capacity to engage in socially constructive actions (helping, caring, sharing with others), to curb hostile or aggressive impulses, to live according to meaningful moral values, to develop a healthy identity and sense of self, and to develop talents and achieve success in using them. These are some of the developmental outcomes that denote social and emotional competence.

These achievements of social and personality development derive from the interaction of many social, biological, and representational influences. Consider, for example, the development of conscience, which is an early foundation for moral development. **Conscience** consists of the cognitive, emotional, and social influences that cause young children to create and act consistently with internal standards of conduct (Kochanska, 2002). Conscience emerges from young children's experiences with parents, particularly in the development of a mutually responsive relationship that motivates young children to respond constructively to the parents' requests and expectations. Biologically based temperament is involved, as some children are temperamentally more capable of motivated self-regulation (a quality called **effortful control**) than are others, while some children are dispositionally more prone to the fear and anxiety that parental disapproval can evoke. Conscience development grows through a good fit between the child's temperamental qualities and how parents communicate and reinforce behavioral expectations. Moreover, as an illustration of the interaction of genes and experience, one research group found that young children with a particular gene allele (the 5-HTTLPR) were low on measures of conscience development when they had previously experienced unresponsive maternal care, but children with the same allele growing up with responsive care showed strong later performance on conscience measures (Kochanska, Kim, Barry, & Philibert, 2011).

Conscience development also expands as young children begin to represent moral values and think of themselves as moral beings. By the end of the preschool years, for example, young children develop a "moral self" by which they think of themselves as people who want to do the right thing, who feel badly after misbehaving, and who feel uncomfortable when others misbehave. In the development of conscience, young children become more socially and

emotionally competent in a manner that provides a foundation for later moral conduct (Thompson, 2012).

The development of gender and gender identity is likewise an interaction among social, biological, and representational influences (Ruble, Martin, & Berenbaum, 2006). Young children learn about gender from parents, peers, and others in society, and develop their own conceptions of the attributes associated with maleness or femaleness (called **gender schemas**). They also negotiate biological transitions (such as puberty) that cause their sense of themselves and their sexual identity to mature.

Each of these examples of the growth of social and emotional competence illustrates not only the interaction of social, biological, and representational influences, but also how their development unfolds over an extended period. Early influences are important, but not determinative, because the capabilities required for mature moral conduct, gender identity, and other outcomes continue to develop throughout childhood, adolescence, and even the adult years.



Social influences such as cultural norms impact children's interests, dress, style of speech and even life aspirations. [Image: Amanda Westmont, <https://goo.gl/ntS5qx>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Social influences such as cultural norms impact children's interests, dress, style of speech and even life aspirations. [Image: Amanda Westmont, <https://goo.gl/ntS5qx>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Conclusion

As the preceding sentence suggests, social and personality development continues through adolescence and the adult years, and it is influenced by the same constellation of social, biological, and representational influences discussed for childhood. Changing social relationships and roles, biological maturation and (much later) decline, and how the individual represents experience and the self continue to form the bases for development throughout life. In this respect, when an adult looks forward rather than retrospectively to ask, "what kind of person am I becoming?"—a similarly fascinating, complex, multifaceted interaction of developmental processes lies ahead.

Outside Resources

Web: Center for the Developing Child, Harvard University

<http://developingchild.harvard.edu>

Web: Collaborative for Academic, Social, and Emotional Learning

<http://casel.org>

Discussion Questions

1. If parent-child relationships naturally change as the child matures, would you expect that the security of attachment might also change over time? What reasons would account for your expectation?
2. In what ways does a child's developing theory of mind resemble how scientists create, refine, and use theories in their work? In other words, would it be appropriate to think of children as informal scientists in their development of social understanding?
3. If there is a poor goodness of fit between a child's temperament and characteristics of parental care, what can be done to create a better match? Provide a specific example of how this might occur.
4. What are the contributions that parents offer to the development of social and emotional competence in children? Answer this question again with respect to peer contributions.

Vocabulary

Authoritative

A parenting style characterized by high (but reasonable) expectations for children's behavior, good communication, warmth and nurturance, and the use of reasoning (rather than coercion) as preferred responses to children's misbehavior.

Conscience

The cognitive, emotional, and social influences that cause young children to create and act consistently with internal standards of conduct.

Effortful control

A temperament quality that enables children to be more successful in motivated self-regulation.

Family Stress Model

A description of the negative effects of family financial difficulty on child adjustment through the effects of economic stress on parents' depressed mood, increased marital problems, and poor parenting.

Gender schemas

Organized beliefs and expectations about maleness and femaleness that guide children's thinking about gender.

Goodness of fit

The match or synchrony between a child's temperament and characteristics of parental care that contributes to positive or negative personality development. A good "fit" means that parents have accommodated to the child's temperamental attributes, and this contributes to positive personality growth and better adjustment.

Security of attachment

An infant's confidence in the sensitivity and responsiveness of a caregiver, especially when he or she is needed. Infants can be securely attached or insecurely attached.

Social referencing

The process by which one individual consults another's emotional expressions to determine how to evaluate and respond to circumstances that are ambiguous or uncertain.

Temperament

Early emerging differences in reactivity and self-regulation, which constitutes a foundation for personality development.

Theory of mind

Children's growing understanding of the mental states that affect people's behavior.

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Personality and the Self

17

Personality Traits

Edward Diener & Richard E. Lucas

Personality traits reflect people's characteristic patterns of thoughts, feelings, and behaviors. Personality traits imply consistency and stability—someone who scores high on a specific trait like Extraversion is expected to be sociable in different situations and over time. Thus, trait psychology rests on the idea that people differ from one another in terms of where they stand on a set of basic trait dimensions that persist over time and across situations. The most widely used system of traits is called the Five-Factor Model. This system includes five broad traits that can be remembered with the acronym OCEAN: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Each of the major traits from the Big Five can be divided into facets to give a more fine-grained analysis of someone's personality. In addition, some trait theorists argue that there are other traits that cannot be completely captured by the Five-Factor Model. Critics of the trait concept argue that people do not act consistently from one situation to the next and that people are very influenced by situational forces. Thus, one major debate in the field concerns the relative power of people's traits versus the situations in which they find themselves as predictors of their behavior.

Learning Objectives

- List and describe the "Big Five" ("OCEAN") personality traits that comprise the Five-Factor Model of personality.
- Describe how the facet approach extends broad personality traits.
- Explain a critique of the personality-trait concept.
- Describe in what ways personality traits may be manifested in everyday behavior.
- Describe each of the Big Five personality traits, and the low and high end of the dimension.
- Give examples of each of the Big Five personality traits, including both a low and high example.

- Describe how traits and social learning combine to predict your social activities.
- Describe your theory of how personality traits get refined by social learning.

Introduction

When we observe people around us, one of the first things that strikes us is how different people are from one another. Some people are very talkative while others are very quiet. Some are active whereas others are couch potatoes. Some worry a lot, others almost never seem anxious. Each time we use one of these words, words like “talkative,” “quiet,” “active,” or “anxious,” to describe those around us, we are talking about a person’s **personality**—the characteristic ways that people differ from one another. Personality psychologists try to describe and understand these differences.

Although there are many ways to think about the personalities that people have, Gordon Allport and other “personologists” claimed that we can best understand the differences between individuals by understanding their personality traits. **Personality traits** reflect basic dimensions on which people differ (Matthews, Deary, & Whiteman, 2003). According to trait psychologists, there are a limited number of these dimensions (dimensions like Extraversion, Conscientiousness, or Agreeableness), and each individual falls somewhere on each dimension, meaning that they could be low, medium, or high on any specific trait.

An important feature of personality traits is that they reflect **continuous distributions** rather than distinct personality types. This means that when personality psychologists talk about Introverts and Extraverts, they are not really talking about two distinct types of people who are completely and qualitatively different from one another. Instead, they are talking about people who score relatively low or relatively high along a



“Are you an introvert”? In popular culture it’s common to talk about people being introverts or extroverts as if these were precise descriptions that meant the same thing for everyone. But research shows that these traits and others are quite variable within individuals. [Image: Nguyen Hung Vu, <https://goo.gl/qKJUAC>, CC BY 2.0, <https://goo.gl/BRvSA7>]

continuous distribution. In fact, when personality psychologists measure traits like **Extraversion**, they typically find that most people score somewhere in the middle, with smaller numbers showing more extreme levels. The figure below shows the distribution of Extraversion scores from a survey of thousands of people. As you can see, most people report being moderately, but not extremely, extraverted, with fewer people reporting very high or very low scores.

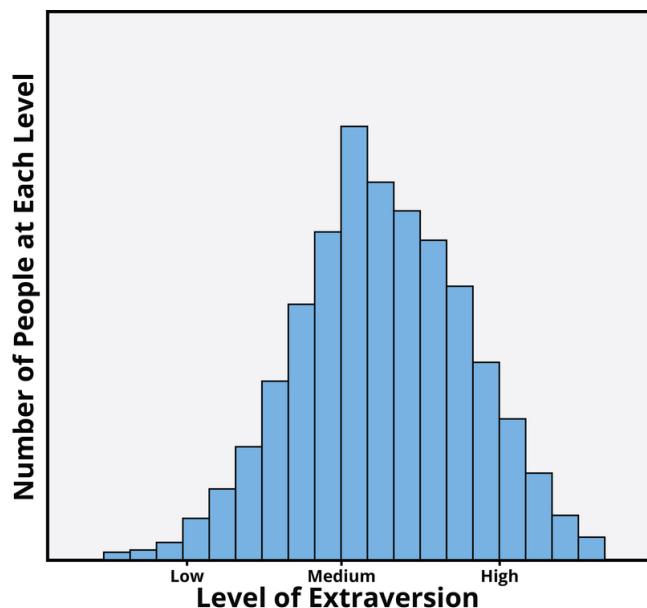


Figure 1. Distribution of Extraversion Scores in a Sample. Higher bars mean that more people have scores of that level. This figure shows that most people score towards the middle of the extraversion scale, with fewer people who are highly extraverted or highly introverted.

all individuals do these activities, and there are almost no individual differences. But people differ on how frequently they talk and how active they are, and thus personality traits such as Talkativeness and Activity Level do exist.

A challenge of the trait approach was to discover the major traits on which all people differ. Scientists for many decades generated hundreds of new traits, so that it was soon difficult to keep track and make sense of them. For instance, one psychologist might focus on individual differences in “friendliness,” whereas another might focus on the highly related concept of “sociability.” Scientists began seeking ways to reduce the number of traits in some systematic way and to discover the basic traits that describe most of the differences between people.

The way that Gordon Allport and his colleague Henry Odber approached this was to search

There are three criteria that are characterize personality traits: (1) consistency, (2) stability, and (3) individual differences.

1. To have a personality trait, individuals must be somewhat consistent across situations in their behaviors related to the trait. For example, if they are talkative at home, they tend also to be talkative at work.
2. Individuals with a trait are also somewhat stable over time in behaviors related to the trait. If they are talkative, for example, at age 30, they will also tend to be talkative at age 40.
3. People differ from one another on behaviors related to the trait. Using speech is not a personality trait and neither is walking on two feet—virtually

the dictionary for all descriptors of personality (Allport & Odber, 1936). Their approach was guided by the **lexical hypothesis**, which states that all important personality characteristics should be reflected in the language that we use to describe other people. Therefore, if we want to understand the fundamental ways in which people differ from one another, we can turn to the words that people use to describe one another. So if we want to know what words people use to describe one another, where should we look? Allport and Odber looked in the most obvious place—the dictionary. Specifically, they took all the personality descriptors that they could find in the dictionary (they started with almost 18,000 words but quickly reduced that list to a more manageable number) and then used statistical techniques to determine which words “went together.” In other words, if everyone who said that they were “friendly” also said that they were “sociable,” then this might mean that personality psychologists would only need a single trait to capture individual differences in these characteristics. Statistical techniques were used to determine whether a small number of dimensions might underlie all of the thousands of words we use to describe people.

The Five-Factor Model of Personality

Research that used the lexical approach showed that many of the personality descriptors found in the dictionary do indeed overlap. In other words, many of the words that we use to describe people are synonyms. Thus, if we want to know what a person is like, we do not necessarily need to ask how sociable they are, how friendly they are, and how gregarious they are. Instead, because sociable people tend to be friendly and gregarious, we can summarize this personality dimension with a single term. Someone who is sociable, friendly, and gregarious would typically be described as an “Extravert.” Once we know she is an extravert, we can assume that she is sociable, friendly, and gregarious.

Statistical methods (specifically, a technique called **factor analysis**) helped to determine whether a small number of dimensions underlie the diversity of words that people like Allport and Odber identified. The most widely accepted system to emerge from this approach was “The Big Five” or “**Five-Factor Model**” (Goldberg, 1990; McCrae & John, 1992; McCrae & Costa, 1987). The Big Five comprises five major traits shown in the Figure 2 below. A way to remember these five is with the acronym OCEAN (O is for **Openness**; C is for **Conscientiousness**; E is for **Extraversion**; A is for **Agreeableness**; N is for **Neuroticism**). Figure 3 provides descriptions of people who would score high and low on each of these traits.

Scores on the Big Five traits are mostly independent. That means that a person’s standing on one trait tells very little about their standing on the other traits of the Big Five. For example, a person can be extremely high in Extraversion and be either high or low on Neuroticism.

Big 5 Trait	Definition
Openness	The tendency to appreciate new art, ideas, values, feelings, and behaviors.
Conscientiousness	The tendency to be careful, on-time for appointments, to follow rules, and to be hardworking.
Extraversion	The tendency to be talkative, sociable, and to enjoy others; the tendency to have a dominant style.
Agreeableness	The tendency to agree and go along with others rather than to assert one's own opinions and choices.
Neuroticism	The tendency to frequently experience negative emotions such as anger, worry, and sadness, as well as being interpersonally sensitive.

Figure 2. Descriptions of the Big Five Personality Traits

Similarly, a person can be low in Agreeableness and be either high or low in Conscientiousness. Thus, in the Five-Factor Model, you need five scores to describe most of an individual's personality.

In the Appendix to this module, we present a short scale to assess the Five-Factor Model of personality (Donnellan, Oswald, Baird, & Lucas, 2006). You can take this test to see where you stand in terms of your Big Five scores. John Johnson has also created a helpful website that has personality scales that can be used and taken by the general public:

<http://www.personal.psu.edu/j5j/IPIP/kipne120.htm>

After seeing your scores, you can judge for yourself whether you think such tests are valid.

Traits are important and interesting because they describe stable patterns of behavior that persist for long periods of time (Caspi, Roberts, & Shiner, 2005). Importantly, these stable patterns can have broad-ranging consequences for many areas of our life (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). For instance, think about the factors that determine success in college. If you were asked to guess what factors predict good grades in college, you might guess something like intelligence. This guess would be correct, but we know much more about who is likely to do well. Specifically, personality researchers have also found the personality traits like Conscientiousness play an important role in college and beyond, probably because highly conscientious individuals study hard, get their work done on time, and are less distracted by nonessential activities that take time away from school work. In addition, highly conscientious people are often healthier than people low in conscientiousness because they are more likely to maintain healthy diets, to exercise, and to follow basic safety procedures like wearing seat belts or bicycle helmets. Over the long term, this consistent pattern of

Big 5 Trait	Example Behavior for LOW Scorers	Example Behavior for HIGH Scorers
Openness	Prefers not to be exposed to alternative moral systems; narrow interests; inartistic; not analytical; down-to-earth	Enjoys seeing people with new types of haircuts and body piercing; curious; imaginative; untraditional
Conscientiousness	Prefers spur-of-the-moment action to planning; unreliable; hedonistic; careless; lax	Never late for a date; organized; hardworking; neat; persevering; punctual; self-disciplined
Extraversion	Preferring a quiet evening reading to a loud party; sober; aloof; unenthusiastic	Being the life of the party; active; optimistic; fun-loving; affectionate
Agreeableness	Quickly and confidently asserts own rights; irritable; manipulative; uncooperative; rude	Agrees with others about political opinions; good-natured; forgiving; gullible; helpful; forgiving
Neuroticism	Not getting irritated by small annoyances; calm, unemotional; hardy; secure; self-satisfied	Constantly worrying about little things; insecure; hypochondriacal; feeling inadequate

Figure 3. Example behaviors for those scoring low and high for the big 5 traits

behaviors can add up to meaningful differences in health and longevity. Thus, personality traits are not just a useful way to describe people you know; they actually help psychologists predict how good a worker someone will be, how long he or she will live, and the types of jobs and activities the person will enjoy. Thus, there is growing interest in personality psychology among psychologists who work in applied settings, such as health psychology or organizational psychology.

Facets of Traits (Subtraits)

So how does it feel to be told that your entire personality can be summarized with scores on just five personality traits? Do you think these five scores capture the complexity of your own and others' characteristic patterns of thoughts, feelings, and behaviors? Most people would probably say no, pointing to some exception in their behavior that goes against the general pattern that others might see. For instance, you may know people who are warm and friendly and find it easy to talk with strangers at a party yet are terrified if they have to perform in front of others or speak to large groups of people. The fact that there are different ways of being extraverted or conscientious shows that there is value in considering lower-level units of personality that are more specific than the Big Five traits. These more specific, lower-level units of personality are often called **facets**.

To give you a sense of what these narrow units are like, Figure 4 shows facets for each of the

Trait	Facets of Trait
Openness	<ul style="list-style-type: none"> • Fantasy prone • Open to feelings • Open to diverse behaviors • Open to new and different ideas • Open to various values and beliefs
Conscientiousness	<ul style="list-style-type: none"> • Competent • Orderly • Dutiful • Achievement oriented • Self-disciplined • Deliberate
Extraversion	<ul style="list-style-type: none"> • Gregarious (sociable) • Warm • Assertive • Active • Excitement-seeking • Positive emotionality
Agreeableness	<ul style="list-style-type: none"> • Trusting • Straightforward • Altruistic • Compliant • Modest • Tender-minded
Neuroticism	<ul style="list-style-type: none"> • Anxious • Angry • Depressed • Self-consciousness • Impulsive • Vulnerable

Figure 4. Facets of Traits

tend to go together (those who are gregarious are often but not always assertive), the broad trait often provides a useful summary of what a person is like. But when we really want to know a person, facet scores add to our knowledge in important ways.

Other Traits Beyond the Five-Factor Model

Despite the popularity of the Five-Factor Model, it is certainly not the only model that exists. Some suggest that there are more than five major traits, or perhaps even fewer. For example, in one of the first comprehensive models to be proposed, Hans Eysenck suggested that

Big Five traits. It is important to note that although personality researchers generally agree about the value of the Big Five traits as a way to summarize one's personality, there is no widely accepted list of facets that should be studied. The list seen here, based on work by researchers Paul Costa and Jeff McCrae, thus reflects just one possible list among many. It should, however, give you an idea of some of the facets making up each of the Five-Factor Model.

Facets can be useful because they provide more specific descriptions of what a person is like. For instance, if we take our friend who loves parties but hates public speaking, we might say that this person scores high on the "gregariousness" and "warmth" facets of extraversion, while scoring lower on facets such as "assertiveness" or "excitement-seeking." This precise profile of facet scores not only provides a better description, it might also allow us to better predict how this friend will do in a variety of different jobs (for example, jobs that require public speaking versus jobs that involve one-on-one interactions with customers; Paunonen & Ashton, 2001). Because different facets within a broad, global trait like extraversion

Extraversion and Neuroticism are most important. Eysenck believed that by combining people's standing on these two major traits, we could account for many of the differences in personality that we see in people (Eysenck, 1981). So for instance, a neurotic introvert would be shy and nervous, while a stable introvert might avoid social situations and prefer solitary activities, but he may do so with a calm, steady attitude and little anxiety or emotion. Interestingly, Eysenck attempted to link these two major dimensions to underlying differences in people's biology. For instance, he suggested that introverts experienced too much sensory stimulation and arousal, which made them want to seek out quiet settings and less stimulating environments. More recently, Jeffrey Gray suggested that these two broad traits are related to fundamental reward and avoidance systems in the brain—extraverts might be motivated to seek reward and thus exhibit assertive, reward-seeking behavior, whereas people high in neuroticism might be motivated to avoid punishment and thus may experience anxiety as a result of their heightened awareness of the threats in the world around them (Gray, 1981). This model has since been updated; see Gray & McNaughton, 2000). These early theories have led to a burgeoning interest in identifying the physiological underpinnings of the individual differences that we observe.

Another revision of the Big Five is the **HEXACO model** of traits (Ashton & Lee, 2007). This model is similar to the Big Five, but it posits slightly different versions of some of the traits, and its proponents argue that one important class of individual differences was omitted from the Five-Factor Model. The HEXACO adds Honesty-Humility as a sixth dimension of personality. People high in this trait are sincere, fair, and modest, whereas those low in the trait are manipulative, narcissistic, and self-centered. Thus, trait theorists are agreed that personality traits are important in understanding behavior, but there are still debates on the exact number and composition of the traits that are most important.

There are other important traits that are not included in comprehensive models like the Big Five. Although the five factors capture much that is important about personality, researchers have suggested other traits that capture interesting aspects of our behavior. In Figure 5 below we present just a few, out of hundreds, of the other traits that have been studied by personologists.

Not all of the above traits are currently popular with scientists, yet each of them has experienced popularity in the past. Although the Five-Factor Model has been the target of more rigorous research than some of the traits above, these additional personality characteristics give a good idea of the wide range of behaviors and attitudes that traits can cover.

The Person-Situation Debate and Alternatives to the Trait Perspective

Personality Trait	Description
Machiavellianism	Named after the famous political philosopher, Niccolo Machiavelli, this trait refers to individuals who manipulate the behavior of others, often through duplicity. Machiavellians are often interested in money and power, and pragmatically use others in this quest.
Need for Achievement	Those high in need for achievement want to accomplish a lot and set high standards of excellence for themselves. They are able to work persistently and hard for distant goals. David McClelland argued that economic growth depends in part on citizens with high need for achievement.
Need for Cognition	People high in need for cognition find it rewarding to understand things, and are willing to use considerable cognitive effort in this quest. Such individuals enjoy learning, and the process of trying to understand new things.
Authoritarianism	Authoritarians believe in strict social hierarchies, in which they are totally obedient to those above them, and expect complete obedience from their subordinates. Rigid in adherence to rules, the authoritarian personality is very uncomfortable with uncertainty.
Narcissism	The narcissistic personality has self-love that is so strong that it results in high levels of vanity, conceit, and selfishness. The narcissistic individual often has problems feeling empathetic toward others and grateful to others.
Self-esteem	The tendency to evaluate oneself positively. Self-esteem does not imply that one believes that he or she is better than others, only that he or she is a person of worth.
Optimism	The tendency to expect positive outcomes in the future. People who are optimistic expect good things to happen, and indeed they often have more positive outcomes, perhaps because they work harder to achieve them.
Alexithymia	The inability to recognize and label emotions in oneself. The individual also has a difficult time recognizing emotions in others, and often has difficulties in relationships.

Figure 5. Other Traits Beyond Those Included in the Big Five

The ideas described in this module should probably seem familiar, if not obvious to you. When asked to think about what our friends, enemies, family members, and colleagues are like, some of the first things that come to mind are their personality characteristics. We might think about how warm and helpful our first teacher was, how irresponsible and careless our brother is, or how demanding and insulting our first boss was. Each of these descriptors reflects a personality trait, and most of us generally think that the descriptions that we use for individuals accurately reflect their “characteristic pattern of thoughts, feelings, and behaviors,” or in other

words, their personality.

But what if this idea were wrong? What if our belief in personality traits were an illusion and people are not consistent from one situation to the next? This was a possibility that shook the foundation of personality psychology in the late 1960s when Walter Mischel published a book called *Personality and Assessment* (1968). In this book, Mischel suggested that if one looks closely at people's behavior across many different situations, the consistency is really not that impressive. In other words, children who cheat on tests at school may steadfastly follow all rules when playing games and may never tell a lie to their parents. In other words, he suggested, there may not be any general trait of honesty that links these seemingly related behaviors. Furthermore, Mischel suggested that observers may believe that broad personality traits like honesty exist, when in fact, this belief is an illusion. The debate that followed the publication of Mischel's book was called the **person-situation debate** because it pitted the power of personality against the power of situational factors as determinants of the behavior that people exhibit.



The way people behave is only in part a product of their natural personality. Situations also influence how a person behaves. Are you for instance a "different person" as a student in a classroom compared to when you're a member of a close-knit social group?
[Image: UO Education, <https://goo.gl/yIgV9T>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

Because of the findings that Mischel emphasized, many psychologists focused on an alternative to the trait perspective. Instead of studying broad, context-free descriptions, like the trait terms we've described so far, Mischel thought that psychologists should focus on people's distinctive reactions to specific situations. For instance, although there may not be a broad and general trait of honesty, some children may be especially likely to cheat on a test when the risk of being caught is low and the rewards for cheating are high. Others might be motivated by the sense of risk involved in cheating and may do so even when the rewards are not very high. Thus, the behavior itself results from the child's unique evaluation of the risks and rewards present at that moment, along with her evaluation of her abilities and values. Because of this, the same child might act very differently in different situations. Thus, Mischel thought that specific behaviors were driven by the interaction between very specific, psychologically meaningful features of the situation in which people found themselves, the person's unique way of perceiving that situation, and his or her abilities for dealing with it.

Mischel and others argued that it was these social-cognitive processes that underlie people's reactions to specific situations that provide some consistency when situational features are the same. If so, then studying these broad traits might be more fruitful than cataloging and measuring narrow, context-free traits like Extraversion or Neuroticism.

In the years after the publication of Mischel's (1968) book, debates raged about whether personality truly exists, and if so, how it should be studied. And, as is often the case, it turns out that a more moderate middle ground than what the situationists proposed could be reached. It is certainly true, as Mischel pointed out, that a person's behavior in one specific situation is not a good guide to how that person will behave in a very different specific situation. Someone who is extremely talkative at one specific party may sometimes be reticent to speak up during class and may even act like a wallflower at a different party. But this does not mean that personality does not exist, nor does it mean that people's behavior is completely determined by situational factors. Indeed, research conducted after the person-situation debate shows that on average, the effect of the "situation" is about as large as that of personality traits. However, it is also true that if psychologists assess a broad range of behaviors across many different situations, there are general tendencies that emerge. Personality traits give an indication about how people will act on average, but frequently they are not so good at predicting how a person will act in a specific situation at a certain moment in time. Thus, to best capture broad traits, one must assess *aggregate* behaviors, averaged over time and across many different types of situations. Most modern personality researchers agree that there is a place for broad personality traits and for the narrower units such as those studied by Walter Mischel.

Appendix

The Mini-IPIP Scale

(Donnellan, Oswald, Baird, & Lucas, 2006)

Instructions: Below are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. Please read each statement carefully, and put a number from 1 to 5 next to it to describe how accurately the statement describes you.

1 = Very inaccurate

2 = Moderately inaccurate

3 = Neither inaccurate nor accurate

4 = Moderately accurate

5 = Very accurate

1. _____ Am the life of the party (E)
2. _____ Sympathize with others' feelings (A)
3. _____ Get chores done right away (C)
4. _____ Have frequent mood swings (N)
5. _____ Have a vivid imagination (O)
6. _____ Don't talk a lot (E)
7. _____ Am not interested in other people's problems (A)
8. _____ Often forget to put things back in their proper place (C)
9. _____ Am relaxed most of the time (N)
10. _____ Am not interested in abstract ideas (O)
11. _____ Talk to a lot of different people at parties (E)
12. _____ Feel others' emotions (A)
13. _____ Like order (C)
14. _____ Get upset easily (N)
15. _____ Have difficulty understanding abstract ideas (O)
16. _____ Keep in the background (E)
17. _____ Am not really interested in others (A)
18. _____ Make a mess of things (C)
19. _____ Seldom feel blue (N)
20. _____ Do not have a good imagination (O)

Scoring: The first thing you must do is to reverse the items that are worded in the opposite direction. In order to do this, subtract the number you put for that item from 6. So if you put a 4, for instance, it will become a 2. Cross out the score you put when you took the scale, and

put the new number in representing your score subtracted from the number 6.

Items to be reversed in this way: 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20

Next, you need to add up the scores for each of the five OCEAN scales (including the reversed numbers where relevant). Each OCEAN score will be the sum of four items. Place the sum next to each scale below.

_____ Openness: Add items 5, 10, 15, 20

_____ Conscientiousness: Add items 3, 8, 13, 18

_____ Extraversion: Add items 1, 6, 11, 16

_____ Agreeableness: Add items 2, 7, 12, 17

_____ Neuroticism: Add items 4, 9, 14, 19

Compare your scores to the norms below to see where you stand on each scale. If you are low on a trait, it means you are the opposite of the trait label. For example, low on Extraversion is Introversion, low on Openness is Conventional, and low on Agreeableness is Assertive.

19–20 Extremely High, 17–18 Very High, 14–16 High,

11–13 Neither high nor low; in the middle, 8–10 Low, 6–7 Very low, 4–5 Extremely low

Outside Resources

Video 1: Gabriela Cintron's – 5 Factors of Personality (OCEAN Song). This is a student-made video which cleverly describes, through song, common behavioral characteristics of the Big 5 personality traits. It was one of the winning entries in the 2016-17 Noba + Psi Chi Student Video Award.

https://www.youtube.com/watch?feature=youtu.be&v=Rk8CDXMb8_U&app=desktop

Video 2: Michael Harris' – Personality Traits: The Big 5 and More. This is a student-made video that looks at characteristics of the OCEAN traits through a series of funny vignettes. It also presents on the Person vs Situation Debate. It was one of the winning entries in the 2016-17 Noba + Psi Chi Student Video Award.

<https://vimeo.com/218245492>

Video 3: David M. Cole's – Grouchy with a Chance of Stomping. This is a student-made video that makes a very important point about the relationship between personality traits and behavior using a handy weather analogy. It was one of the winning entries in the 2016-17 Noba + Psi Chi Student Video Award.

<https://www.youtube.com/watch?v=GnaFMjaJtIY>

Web: International Personality Item Pool

<http://ipip.ori.org/>

Web: John Johnson personality scales

<http://www.personal.psu.edu/j5j/IPIP/ipipneo120.htm>

Web: Personality trait systems compared

<http://www.personalityresearch.org/bigfive/goldberg.html>

Web: Sam Gosling website

<http://homepage.psy.utexas.edu/homepage/faculty/gosling/samgosling.htm>

Discussion Questions

1. Consider different combinations of the Big Five, such as O (Low), C (High), E (Low), A (High), and N (Low). What would this person be like? Do you know anyone who is like this? Can you select politicians, movie stars, and other famous people and rate them on the Big Five?

2. How do you think learning and inherited personality traits get combined in adult personality?
3. Can you think of instances where people do not act consistently—where their personality traits are not good predictors of their behavior?
4. Has your personality changed over time, and in what ways?
5. Can you think of a personality trait not mentioned in this module that describes how people differ from one another?
6. When do extremes in personality traits become harmful, and when are they unusual but productive of good outcomes?

Vocabulary

Agreeableness

A personality trait that reflects a person's tendency to be compassionate, cooperative, warm, and caring to others. People low in agreeableness tend to be rude, hostile, and to pursue their own interests over those of others.

Conscientiousness

A personality trait that reflects a person's tendency to be careful, organized, hardworking, and to follow rules.

Continuous distributions

Characteristics can go from low to high, with all different intermediate values possible. One does not simply have the trait or not have it, but can possess varying amounts of it.

Extraversion

A personality trait that reflects a person's tendency to be sociable, outgoing, active, and assertive.

Facets

Broad personality traits can be broken down into narrower facets or aspects of the trait. For example, extraversion has several facets, such as sociability, dominance, risk-taking and so forth.

Factor analysis

A statistical technique for grouping similar things together according to how highly they are associated.

Five-Factor Model

(also called the Big Five) The Five-Factor Model is a widely accepted model of personality traits. Advocates of the model believe that much of the variability in people's thoughts, feelings, and behaviors can be summarized with five broad traits. These five traits are Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.

HEXACO model

The HEXACO model is an alternative to the Five-Factor Model. The HEXACO model includes six traits, five of which are variants of the traits included in the Big Five (Emotionality [E], Extraversion [X], Agreeableness [A], Conscientiousness [C], and Openness [O]). The sixth

factor, Honesty-Humility [H], is unique to this model.

Independent

Two characteristics or traits are separate from one another-- a person can be high on one and low on the other, or vice-versa. Some correlated traits are relatively independent in that although there is a tendency for a person high on one to also be high on the other, this is not always the case.

Lexical hypothesis

The lexical hypothesis is the idea that the most important differences between people will be encoded in the language that we use to describe people. Therefore, if we want to know which personality traits are most important, we can look to the language that people use to describe themselves and others.

Neuroticism

A personality trait that reflects the tendency to be interpersonally sensitive and the tendency to experience negative emotions like anxiety, fear, sadness, and anger.

Openness to Experience

A personality trait that reflects a person's tendency to seek out and to appreciate new things, including thoughts, feelings, values, and experiences.

Personality

Enduring predispositions that characterize a person, such as styles of thought, feelings and behavior.

Personality traits

Enduring dispositions in behavior that show differences across individuals, and which tend to characterize the person across varying types of situations.

Person-situation debate

The person-situation debate is a historical debate about the relative power of personality traits as compared to situational influences on behavior. The situationist critique, which started the person-situation debate, suggested that people overestimate the extent to which personality traits are consistent across situations.

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18

Personality Assessment

David Watson

This module provides a basic overview to the assessment of personality. It discusses objective personality tests (based on both self-report and informant ratings), projective and implicit tests, and behavioral/performance measures. It describes the basic features of each method, as well as reviewing the strengths, weaknesses, and overall validity of each approach.

Learning Objectives

- Appreciate the diversity of methods that are used to measure personality characteristics.
- Understand the logic, strengths and weaknesses of each approach.
- Gain a better sense of the overall validity and range of applications of personality tests.

Introduction

Personality is the field within psychology that studies the thoughts, feelings, behaviors, goals, and interests of normal individuals. It therefore covers a very wide range of important psychological characteristics. Moreover, different theoretical models have generated very different strategies for measuring these characteristics. For example, humanistically oriented models argue that people have clear, well-defined goals and are actively striving to achieve them (McGregor, McAdams, & Little, 2006). It, therefore, makes sense to ask them directly about themselves and their goals. In contrast, psychodynamically oriented theories propose that people lack insight into their feelings and motives, such that their behavior is influenced by processes that operate outside of their awareness (e.g., McClelland, Koestner, &

Weinberger, 1989; Meyer & Kurtz, 2006). Given that people are unaware of these processes, it does not make sense to ask directly about them. One, therefore, needs to adopt an entirely different approach to identify these nonconscious factors. Not surprisingly, researchers have adopted a wide range of approaches to measure important personality characteristics. The most widely used strategies will be summarized in the following sections.



Do people possess the necessary awareness to see themselves as they are and provide accurate insights into their own personalities?
[Image: fotEK10, <https://goo.gl/GCBDJL>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Objective Tests

Definition

Objective tests (Loevinger, 1957; Meyer & Kurtz, 2006) represent the most familiar and widely used approach to assessing personality. Objective tests involve administering a standard set of items, each of which is answered using a limited set of response options (e.g., true or false; strongly disagree, slightly disagree, slightly agree, strongly agree). Responses to these items then are scored in a standardized, predetermined way. For example, self-ratings on items assessing talkativeness, assertiveness, sociability, adventurousness, and energy can be

summed up to create an overall score on the personality trait of extraversion.

It must be emphasized that the term “objective” refers to the method that is used to *score* a person’s responses, rather than to the responses themselves. As noted by Meyer and Kurtz (2006, p. 233), “What is *objective* about such a procedure is that the psychologist administering the test does not need to rely on judgment to classify or interpret the test-taker’s response; the intended response is clearly indicated and scored according to a pre-existing key.” In fact, as we will see, a person’s test responses may be highly subjective and can be influenced by a number of different rating biases.

Basic Types of Objective Tests

Self-report measures

Objective personality tests can be further subdivided into two basic types. The first type—which easily is the most widely used in modern personality research—asks people to describe themselves. This approach offers two key advantages. First, self-raters have access to an unparalleled wealth of information: After all, who knows more about you than you yourself? In particular, self-raters have direct access to their own thoughts, feelings, and motives, which may not be readily available to others (Oh, Wang, & Mount, 2011; Watson, Hubbard, & Weise, 2000). Second, asking people to describe themselves is the simplest, easiest, and most cost-effective approach to assessing personality. Countless studies, for instance, have involved administering self-report measures to college students, who are provided some relatively simple incentive (e.g., extra course credit) to participate.

The items included in self-report measures may consist of single words (e.g., *assertive*), short phrases (e.g., *am full of energy*), or complete sentences (e.g., *I like to spend time with others*). Table 1 presents a sample self-report measure assessing the general traits comprising the influential five-factor model (FFM) of personality: neuroticism, extraversion, openness, agreeableness, and conscientiousness (John & Srivastava, 1999; McCrae, Costa, & Martin, 2005). The sentences shown in Table 1 are modified versions of items included in the International Personality Item Pool (IPIP) (Goldberg et al., 2006), which is a rich source of personality-related content in the public domain (for more information about IPIP, go to: <http://ipip.ori.org/>).

Self-report personality tests show impressive validity in relation to a wide range of important

Please read each statement carefully and then mark the appropriate response below. Use the following scale to record your responses:

1 strongly disagree	2 slightly disagree	3 neutral or cannot decide	4 slightly agree	5 strongly agree
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- 1. I get upset easily.
----- 2. I enjoy being part of a group.
----- 3. I like to solve complex problems.
----- 4. I believe that others have good intentions.
----- 5. I am always prepared.
----- 6. I have a low opinion of myself.
----- 7. I have a natural talent for influencing people.
----- 8. I enjoy the beauty of nature.
----- 9. I try to anticipate the needs of others.
----- 10. I can be trusted to keep my promises.
----- 11. I get irritated easily.
----- 12. I have a lot of fun.
----- 13. I like to visit new places.
----- 14. I love to help others.
----- 15. I set high standards for myself and others.

Sum up the following items to see how you score on five general personality traits. The numbers below indicate which questions correspond to each trait. A high score indicates a stronger level of that trait:

1	6	11	Neuroticism
2	7	12	Extraversion
3	8	13	Openness/Intellect
4	9	14	Agreeableness
5	10	15	Conscientiousness

Table1: Sample Self-Report Personality Measure

outcomes. For example, self-ratings of conscientiousness are significant predictors of both overall academic performance (e.g., cumulative grade point average; Poropat, 2009) and job performance (Oh, Wang, and Mount, 2011). Roberts, Kuncel, Shiner, Caspi, and Goldberg (2007) reported that self-rated personality predicted occupational attainment, divorce, and mortality. Similarly, Friedman, Kern, and Reynolds (2010) showed that personality ratings collected early in life were related to happiness/well-being, physical health, and mortality risk

assessed several decades later. Finally, self-reported personality has important and pervasive links to psychopathology. Most notably, self-ratings of neuroticism are associated with a wide array of clinical syndromes, including anxiety disorders, depressive disorders, substance use disorders, somatoform disorders, eating disorders, personality and conduct disorders, and schizophrenia/schizotypy (Kotov, Gamez, Schmidt, & Watson, 2010; Mineka, Watson, & Clark, 1998).

At the same time, however, it is clear that this method is limited in a number of ways. First, raters may be motivated to present themselves in an overly favorable, socially desirable way (Paunonen & LeBel, 2012). This is a particular concern in "**high-stakes testing**," that is, situations in which test scores are used to make important decisions about individuals (e.g., when applying for a job). Second, personality ratings reflect a **self-enhancement bias** (Vazire & Carlson, 2011); in other words, people are motivated to ignore (or at least downplay) some of their less desirable characteristics and to focus instead on their more positive attributes. Third, self-ratings are subject to the **reference group effect** (Heine, Buchtel, & Norenzayan, 2008); that is, we base our self-perceptions, in part, on how we compare to others in our sociocultural reference group. For instance, if you tend to work harder than most of your friends, you will see yourself as someone who is relatively conscientious, even if you are not particularly conscientious in any absolute sense.

Informant ratings

Another approach is to ask someone who knows a person well to describe his or her personality characteristics. In the case of children or adolescents, the informant is most likely to be a parent or teacher. In studies of older participants, informants may be friends, roommates, dating partners, spouses, children, or bosses (Oh et al., 2011; Vazire & Carlson, 2011; Watson et al., 2000).

Generally speaking, informant ratings are similar in format to self-ratings. As was the case with self-report, items may consist of single words, short phrases, or complete sentences. Indeed, many popular instruments include parallel self- and informant-rating versions, and it often is relatively easy to convert a self-report measure so that it can be used to obtain informant ratings. Table 2 illustrates how the self-report instrument shown in Table 1 can be converted to obtain spouse-ratings (in this case, having a husband describe the personality characteristics of his wife).

Informant ratings are particularly valuable when self-ratings are impossible to collect (e.g., when studying young children or cognitively impaired adults) or when their validity is suspect

Please read each statement carefully and then mark the appropriate response below. For each item, select the answer that best represents the personality characteristics of *your wife*. Use the following scale to record your responses:

1 strongly disagree	2 slightly disagree	3 neutral or cannot decide	4 slightly agree	5 strongly agree
---------------------------	---------------------------	----------------------------------	------------------------	------------------------

- _____ 1. She gets upset easily.
- _____ 2. She enjoys being part of a group.
- _____ 3. She likes to solve complex problems.
- _____ 4. She believes that others have good intentions.
- _____ 5. She is always prepared.
- _____ 6. She has a low opinion of herself.
- _____ 7. She has a natural talent for influencing people.
- _____ 8. She enjoys the beauty of nature.
- _____ 9. She tries to anticipate the needs of others.
- _____ 10. She can be trusted to keep her promises.
- _____ 11. She gets irritated easily.
- _____ 12. She has a lot of fun.
- _____ 13. She likes to visit new places.
- _____ 14. She loves to help others.
- _____ 15. She sets high standards for herself and others.

Table 2: Sample Spouse-Report Personality Measure

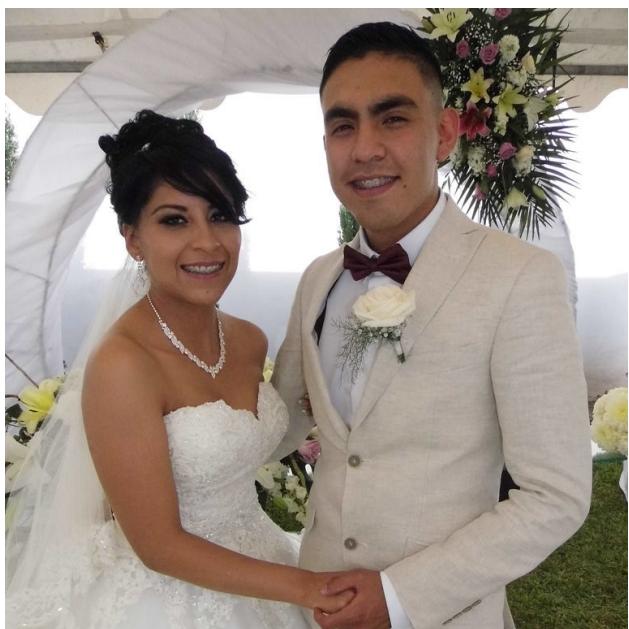
(e.g., as noted earlier, people may not be entirely honest in high-stakes testing situations). They also may be combined with self-ratings of the same characteristics to produce more **reliable** and valid measures of these attributes (McCrae, 1994).

Informant ratings offer several advantages in comparison to other approaches to assessing personality. A well-acquainted informant presumably has had the opportunity to observe large samples of behavior in the person he or she is rating. Moreover, these judgments presumably are not subject to the types of defensiveness that potentially can distort self-ratings (Vazire & Carlson, 2011). Indeed, informants typically have strong incentives for being accurate in their judgments. As Funder and Dobroth (1987, p. 409), put it, "Evaluations of the people in our social environment are central to our decisions about who to befriend and avoid, trust and distrust, hire and fire, and so on."

Informant personality ratings have demonstrated a level of validity in relation to important

life outcomes that is comparable to that discussed earlier for self-ratings. Indeed, they outperform self-ratings in certain circumstances, particularly when the assessed traits are highly evaluative in nature (e.g., intelligence, charm, creativity; see Vazire & Carlson, 2011). For example, Oh et al. (2011) found that informant ratings were more strongly related to job performance than were self-ratings. Similarly, Oltmanns and Turkheimer (2009) summarized evidence indicating that informant ratings of Air Force cadets predicted early, involuntary discharge from the military better than self-ratings.

Nevertheless, informant ratings also are subject to certain problems and limitations. One general issue is the level of relevant information that is available to the rater (Funder, 2012). For instance, even under the best of circumstances, informants lack full access to the thoughts, feelings, and motives of the person they are rating. This problem is magnified when the informant does not know the person particularly well and/or only sees him or her in a limited range of situations (Funder, 2012; Beer & Watson, 2010).



Informant personality ratings are generally a reliable and valid assessment instrument, however in certain cases the informant may have some significant biases that make the rating less reliable. Newly married individuals for example are likely to rate their partners in an unrealistically positive way. [Image: Sociales El Heraldo de Saltillo, <https://goo.gl/3g3Qhh>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

2006). This tendency for informants to produce unrealistically positive ratings has been termed the [letter of recommendation effect](#) (Leising, Erbs, & Fritz, 2010) and the [honeymoon effect](#)

Informant ratings also are subject to some of the same response biases noted earlier for self-ratings. For instance, they are not immune to the reference group effect. Indeed, it is well-established that parent ratings often are subject to a [sibling contrast effect](#), such that parents exaggerate the true magnitude of differences between their children (Pinto, Rijstdijk, Frazier-Wood, Asherson, & Kuntsi, 2012). Furthermore, in many studies, individuals are allowed to nominate (or even recruit) the informants who will rate them. Because of this, it most often is the case that informants (who, as noted earlier, may be friends, relatives, or romantic partners) like the people they are rating. This, in turn, means that informants may produce overly favorable personality ratings. Indeed, their ratings actually can be more favorable than the corresponding self-ratings (Watson & Humrichouse,

when applied to newlyweds (Watson & Humrichouse, 2006).

Other Ways of Classifying Objective Tests

Comprehensiveness

In addition to the source of the scores, there are at least two other important dimensions on which personality tests differ. The first such dimension concerns the extent to which an instrument seeks to assess personality in a reasonably comprehensive manner. At one extreme, many widely used measures are designed to assess a single core attribute. Examples of these types of measures include the Toronto Alexithymia Scale (Bagby, Parker, & Taylor, 1994), the Rosenberg Self-Esteem Scale (Rosenberg, 1965), and the Multidimensional Experiential Avoidance Questionnaire (Gamez, Chmielewski, Kotov, Ruggero, & Watson, 2011). At the other extreme, a number of omnibus inventories contain a large number of specific scales and purport to measure personality in a reasonably comprehensive manner. These instruments include the California Psychological Inventory (Gough, 1987), the Revised HEXACO Personality Inventory (HEXACO-PI-R) (Lee & Ashton, 2006), the Multidimensional Personality Questionnaire (Patrick, Curtin, & Tellegen, 2002), the NEO Personality Inventory-3 (NEO-PI-3) (McCrae et al., 2005), the Personality Research Form (Jackson, 1984), and the Sixteen Personality Factor Questionnaire (Cattell, Eber, & Tatsuoka, 1980).

Breadth of the target characteristics

Second, personality characteristics can be classified at different levels of breadth or generality. For example, many models emphasize broad, "big" traits such as neuroticism and extraversion. These general dimensions can be divided up into several distinct yet empirically correlated component traits. For example, the broad dimension of extraversion contains such specific component traits as dominance (extraverts are assertive, persuasive, and exhibitionistic), sociability (extraverts seek out and enjoy the company of others), positive emotionality (extraverts are active, energetic, cheerful, and enthusiastic), and adventurousness (extraverts enjoy intense, exciting experiences).

Some popular personality instruments are designed to assess only the broad, general traits. For example, similar to the sample instrument displayed in Table 1, the Big Five Inventory (John & Srivastava, 1999) contains brief scales assessing the broad traits of neuroticism, extraversion, openness, agreeableness, and conscientiousness. In contrast, many instruments—including several of the omnibus inventories mentioned earlier—were

designed primarily to assess a large number of more specific characteristics. Finally, some inventories—including the HEXACO-PI-R and the NEO-PI-3—were explicitly designed to provide coverage of both general and specific trait characteristics. For instance, the NEO-PI-3 contains six specific facet scales (e.g., Gregariousness, Assertiveness, Positive Emotions, Excitement Seeking) that then can be combined to assess the broad trait of extraversion.

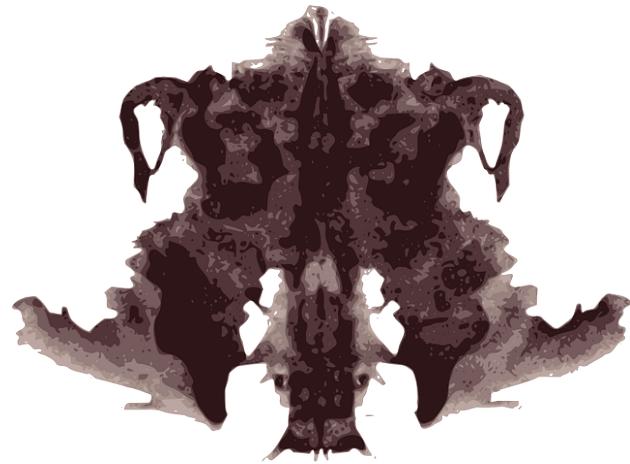
Projective and Implicit Tests

Projective Tests

As noted earlier, some approaches to personality assessment are based on the belief that important thoughts, feelings, and motives operate outside of conscious awareness. Projective tests represent influential early examples of this approach. Projective tests originally were based on the projective hypothesis (Frank, 1939; Lilienfeld, Wood, & Garb, 2000): If a person is asked to describe or interpret ambiguous stimuli—that is, things that can be understood in a number of different ways—their responses will be influenced by nonconscious needs, feelings, and experiences (note, however, that the theoretical rationale underlying these measures has evolved over time) (see, for example, Spangler, 1992). Two prominent examples of projective tests are the Rorschach Inkblot Test (Rorschach, 1921) and the Thematic Apperception Test (TAT) (Morgan & Murray, 1935). The former asks respondents to interpret symmetrical blots of ink, whereas the latter asks them to generate stories about a series of pictures.

For instance, one TAT picture depicts an elderly woman with her back turned to a young man; the latter looks downward with a somewhat perplexed expression. Another picture displays a man clutched from behind by three mysterious hands. What stories could you generate in response to these pictures?

In comparison to objective tests, projective tests tend to be somewhat cumbersome and labor intensive to administer. The biggest challenge, however, has been to develop a reliable and



Projective tests, such as the famous Rorschach inkblot test require a person to give spontaneous answers that "project" their unique personality onto an ambiguous stimulus. [Image: CCO Public Domain, <https://goo.gl/m25gce>]

valid scheme to score the extensive set of responses generated by each respondent. The most widely used Rorschach scoring scheme is the Comprehensive System developed by Exner (2003). The most influential TAT scoring system was developed by McClelland, Atkinson and colleagues between 1947 and 1953 (McClelland et al., 1989; see also Winter, 1998), which can be used to assess motives such as the need for achievement.

The validity of the Rorschach has been a matter of considerable controversy (Lilienfeld et al., 2000; Mihura, Meyer, Dumitrascu, & Bombel, 2012; Society for Personality Assessment, 2005). Most reviews acknowledge that Rorschach scores do show some ability to predict important outcomes. Its critics, however, argue that it fails to provide important incremental information beyond other, more easily acquired information, such as that obtained from standard self-report measures (Lilienfeld et al., 2000).

Validity evidence is more impressive for the TAT. In particular, reviews have concluded that TAT-based measures of the need for achievement (a) show significant validity to predict important criteria and (b) provide important information beyond that obtained from objective measures of this motive (McClelland et al., 1989; Spangler, 1992). Furthermore, given the relatively weak associations between objective and projective measures of motives, McClelland et al. (1989) argue that they tap somewhat different processes, with the latter assessing **implicit motives** (Schultheiss, 2008).

Implicit Tests

In recent years, researchers have begun to use implicit measures of personality (Back, Schmucke, & Egloff, 2009; Vazire & Carlson, 2011). These tests are based on the assumption that people form automatic or implicit associations between certain concepts based on their previous experience and behavior. If two concepts (e.g., *me* and *assertive*) are strongly associated with each other, then they should be sorted together more quickly and easily than two concepts (e.g., *me* and *shy*) that are less strongly associated. Although validity evidence for these measures still is relatively sparse, the results to date are encouraging: Back et al. (2009), for example, showed that implicit measures of the FFM personality traits predicted behavior even after controlling for scores on objective measures of these same characteristics.

Behavioral and Performance Measures

A final approach is to infer important personality characteristics from direct samples of behavior. For example, Funder and Colvin (1988) brought opposite-sex pairs of participants into the laboratory and had them engage in a five-minute “getting acquainted” conversation;



Observing real world behavior is one way to assess personality. Tendencies such as messiness and neatness are clues to personality. [Image: Crumley Roberts, <https://goo.gl/6Ahn8q>, CC BY 2.0, <https://goo.gl/BRvSA7>]

with participants' self-ratings on all five traits. Follow-up analyses indicated that conscientious students had neater rooms, whereas those who were high in openness to experience had a wider variety of books and magazines.

Behavioral measures offer several advantages over other approaches to assessing personality. First, because behavior is sampled directly, this approach is not subject to the types of response biases (e.g., self-enhancement bias, reference group effect) that can distort scores on objective tests. Second, as is illustrated by the Mehl et al. (2006) and Gosling et al. (2002) studies, this approach allows people to be studied in their daily lives and in their natural environments, thereby avoiding the artificiality of other methods (Mehl et al., 2006). Finally, this is the only approach that actually assesses what people *do*, as opposed to what they think or feel (see Baumeister, Vohs, & Funder, 2007).

At the same time, however, this approach also has some disadvantages. This assessment strategy clearly is much more cumbersome and labor intensive than using objective tests, particularly self-report. Moreover, similar to projective tests, behavioral measures generate a rich set of data that then need to be scored in a reliable and valid way. Finally, even the most ambitious study only obtains relatively small samples of behavior that may provide a somewhat distorted view of a person's true characteristics. For example, your behavior during a "getting acquainted" conversation on a single given day inevitably will reflect a number of

raters watched videotapes of these interactions and then scored the participants on various personality characteristics. Mehl, Gosling, and Pennebaker (2006) used the electronically activated recorder (EAR) to obtain samples of ambient sounds in participants' natural environments over a period of two days; EAR-based scores then were related to self- and observer-rated measures of personality. For instance, more frequent talking over this two-day period was significantly related to both self- and observer-ratings of extraversion. As a final example, Gosling, Ko, Mannarelli, and Morris (2002) sent observers into college students' bedrooms and then had them rate the students' personality characteristics on the Big Five traits. The averaged observer ratings correlated significantly

transient influences (e.g., level of stress, quality of sleep the previous night) that are idiosyncratic to that day.

Conclusion

No single method of assessing personality is perfect or infallible; each of the major methods has both strengths and limitations. By using a diversity of approaches, researchers can overcome the limitations of any single method and develop a more complete and integrative view of personality.

Discussion Questions

1. Under what conditions would you expect self-ratings to be most similar to informant ratings? When would you expect these two sets of ratings to be most different from each other?
2. The findings of Gosling, et al. (2002) demonstrate that we can obtain important clues about students' personalities from their dorm rooms. What other aspects of people's lives might give us important information about their personalities?
3. Suppose that you were planning to conduct a study examining the personality trait of honesty. What method or methods might you use to measure it?

Vocabulary

Big Five

Five, broad general traits that are included in many prominent models of personality. The five traits are neuroticism (those high on this trait are prone to feeling sad, worried, anxious, and dissatisfied with themselves), extraversion (high scorers are friendly, assertive, outgoing, cheerful, and energetic), openness to experience (those high on this trait are tolerant, intellectually curious, imaginative, and artistic), agreeableness (high scorers are polite, considerate, cooperative, honest, and trusting), and conscientiousness (those high on this trait are responsible, cautious, organized, disciplined, and achievement-oriented).

High-stakes testing

Settings in which test scores are used to make important decisions about individuals. For example, test scores may be used to determine which individuals are admitted into a college or graduate school, or who should be hired for a job. Tests also are used in forensic settings to help determine whether a person is competent to stand trial or fits the legal definition of sanity.

Honeymoon effect

The tendency for newly married individuals to rate their spouses in an unrealistically positive manner. This represents a specific manifestation of the letter of recommendation effect when applied to ratings made by current romantic partners. Moreover, it illustrates the very important role played by relationship satisfaction in ratings made by romantic partners: As marital satisfaction declines (i.e., when the "honeymoon is over"), this effect disappears.

Implicit motives

These are goals that are important to a person, but that he/she cannot consciously express. Because the individual cannot verbalize these goals directly, they cannot be easily assessed via self-report. However, they can be measured using projective devices such as the Thematic Apperception Test (TAT).

Letter of recommendation effect

The general tendency for informants in personality studies to rate others in an unrealistically positive manner. This tendency is due a pervasive bias in personality assessment: In the large majority of published studies, informants are individuals who like the person they are rating (e.g., they often are friends or family members) and, therefore, are motivated to depict them in a socially desirable way. The term reflects a similar tendency for academic letters of recommendation to be overly positive and to present the referent in an unrealistically

desirable manner.

Projective hypothesis

The theory that when people are confronted with ambiguous stimuli (that is, stimuli that can be interpreted in more than one way), their responses will be influenced by their unconscious thoughts, needs, wishes, and impulses. This, in turn, is based on the Freudian notion of projection, which is the idea that people attribute their own undesirable/unacceptable characteristics to other people or objects.

Reference group effect

The tendency of people to base their self-concept on comparisons with others. For example, if your friends tend to be very smart and successful, you may come to see yourself as less intelligent and successful than you actually are. Informants also are prone to these types of effects. For instance, the sibling contrast effect refers to the tendency of parents to exaggerate the true extent of differences between their children.

Reliability

The consistency of test scores across repeated assessments. For example, test-retest reliability examines the extent to which scores change over time.

Self-enhancement bias

The tendency for people to see and/or present themselves in an overly favorable way. This tendency can take two basic forms: defensiveness (when individuals actually believe they are better than they really are) and impression management (when people intentionally distort their responses to try to convince others that they are better than they really are). Informants also can show enhancement biases. The general form of this bias has been called the letter-of-recommendation effect, which is the tendency of informants who like the person they are rating (e.g., friends, relatives, romantic partners) to describe them in an overly favorable way. In the case of newlyweds, this tendency has been termed the honeymoon effect.

Sibling contrast effect

The tendency of parents to use their perceptions of all of their children as a frame of reference for rating the characteristics of each of them. For example, suppose that a mother has three children; two of these children are very sociable and outgoing, whereas the third is relatively average in sociability. Because of operation of this effect, the mother will rate this third child as less sociable and outgoing than he/she actually is. More generally, this effect causes parents to exaggerate the true extent of differences between their children. This effect represents a specific manifestation of the more general reference group effect when applied to ratings made by parents.

Validity

Evidence related to the interpretation and use of test scores. A particularly important type of evidence is criterion validity, which involves the ability of a test to predict theoretically relevant outcomes. For example, a presumed measure of conscientiousness should be related to academic achievement (such as overall grade point average).

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19

Self and Identity

Dan P. McAdams

For human beings, the self is what happens when “I” encounters “Me.” The central psychological question of selfhood, then, is this: How does a person apprehend and understand who he or she is? Over the past 100 years, psychologists have approached the study of self (and the related concept of identity) in many different ways, but three central metaphors for the self repeatedly emerge. First, the self may be seen as a social actor, who enacts roles and displays traits by performing behaviors in the presence of others. Second, the self is a motivated agent, who acts upon inner desires and formulates goals, values, and plans to guide behavior in the future. Third, the self eventually becomes an autobiographical author, too, who takes stock of life — past, present, and future — to create a story about who I am, how I came to be, and where my life may be going. This module briefly reviews central ideas and research findings on the self as an actor, an agent, and an author, with an emphasis on how these features of selfhood develop over the human life course.

Learning Objectives

- Explain the basic idea of reflexivity in human selfhood—how the “I” encounters and makes sense of itself (the “Me”).
- Describe fundamental distinctions between three different perspectives on the self: the self as actor, agent, and author.
- Describe how a sense of self as a social actor emerges around the age of 2 years and how it develops going forward.
- Describe the development of the self’s sense of motivated agency from the emergence of the child’s theory of mind to the articulation of life goals and values in adolescence and beyond.
- Define the term narrative identity, and explain what psychological and cultural functions

narrative identity serves.

Introduction

In the Temple of Apollo at Delphi, the ancient Greeks inscribed the words: "Know thyself." For at least 2,500 years, and probably longer, human beings have pondered the meaning of the ancient aphorism. Over the past century, psychological scientists have joined the effort. They have formulated many theories and tested countless hypotheses that speak to the central question of human selfhood: *How does a person know who he or she is?*



We work on ourselves as we would any other interesting project. And when we do we generally focus on three psychological categories - The Social Actor, The Motivated Agent, and The Autobiographical Author. [Image: MakuKulden, <https://goo.gl/sMUsnJ>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

what exactly is it that we work on?

Imagine for a moment that you have decided to improve *yourself*. You might, say, go on a diet to improve your appearance. Or you might decide to be nicer to your mother, in order to improve that important social role. Or maybe the problem is at work—you need to find a

The ancient Greeks seemed to realize that the self is inherently **reflexive**—it reflects back on itself. In the disarmingly simple idea made famous by the great psychologist William James (1892/1963), the self is what happens when "I" reflects back upon "Me." The self is both the I and the Me—it is the knower, and it is what the knower knows when the knower reflects upon itself. When you look back at yourself, what do you see? When you look inside, what do you find? Moreover, when you try to *change* your self in some way, what is it that you are trying to change? The philosopher Charles Taylor (1989) describes the self as a reflexive *project*. In modern life, Taylor argues, we often try to manage, discipline, refine, improve, or develop the self. We *work on* our selves, as we might work on any other interesting project. But

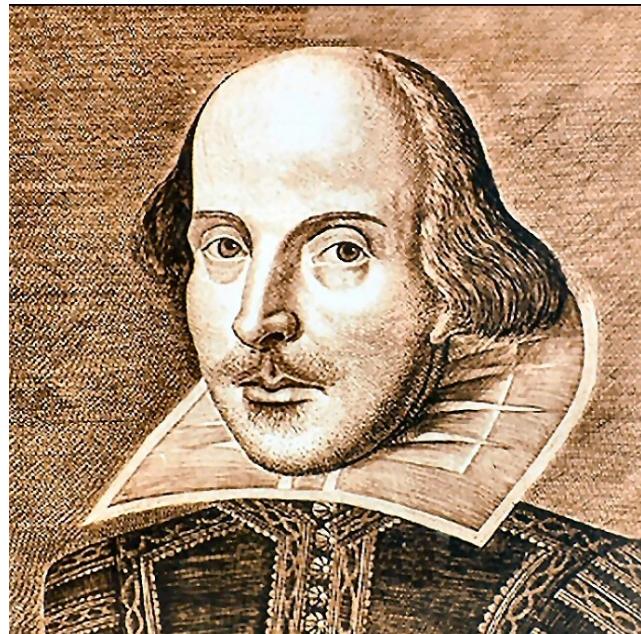
better job or go back to school to prepare for a different career. Perhaps you just need to work harder. Or get organized. Or recommit yourself to religion. Or maybe the key is to begin thinking about your whole life story in a completely different way, in a way that you hope will bring you more happiness, fulfillment, peace, or excitement.

Although there are many different ways you might reflect upon and try to improve the self, it turns out that many, if not most, of them fall roughly into three broad psychological categories (McAdams & Cox, 2010). The I may encounter the Me as (a) a social actor, (b) a motivated agent, or (c) an autobiographical author.

The Social Actor

Shakespeare tapped into a deep truth about human nature when he famously wrote, "All the world's a stage, and all the men and women merely players." He was wrong about the "merely," however, for there is nothing more important for human adaptation than the manner in which we perform our roles as actors in the everyday theatre of social life. What Shakespeare may have sensed but could not have fully understood is that human beings evolved to live in social groups. Beginning with Darwin (1872/1965) and running through contemporary conceptions of human evolution, scientists have portrayed human nature as profoundly *social* (Wilson, 2012). For a few million years, *Homo sapiens* and their evolutionary forerunners have survived and flourished

by virtue of their ability to live and work together in complex social groups, cooperating with each other to solve problems and overcome threats and competing with each other in the face of limited resources. As social animals, human beings strive to *get along* and *get ahead* in the presence of each other (Hogan, 1982). Evolution has prepared us to care deeply about social acceptance and social status, for those unfortunate individuals who do not get along well in social groups or who fail to attain a requisite status among their peers have typically been severely compromised when it comes to survival and reproduction. It makes



In some ways people are just like actors on stage. We play roles and follow scripts every day. [Image: Brian, <https://goo.gl/z0VI3t>, CC BY-SA 2.0, <https://goo.gl/i4GXf5>]

consummate evolutionary sense, therefore, that the human "I" should apprehend the "Me" first and foremost as a *social actor*.

For human beings, the sense of the self as a social actor begins to emerge around the age of 18 months. Numerous studies have shown that by the time they reach their second birthday most toddlers recognize themselves in mirrors and other reflecting devices (Lewis & Brooks-Gunn, 1979; Rochat, 2003). What they see is an embodied actor who moves through space and time. Many children begin to use words such as "me" and "mine" in the second year of life, suggesting that the I now has linguistic labels that can be applied reflexively to itself: I call myself "me." Around the same time, children also begin to express social emotions such as embarrassment, shame, guilt, and pride (Tangney, Stuewig, & Mashek, 2007). These emotions tell the social actor how well he or she is performing in the group. When I do things that win the approval of others, I feel proud of myself. When I fail in the presence of others, I may feel embarrassment or shame. When I violate a social rule, I may experience guilt, which may motivate me to make amends.

Many of the classic psychological theories of human selfhood point to the second year of life as a key developmental period. For example, Freud (1923/1961) and his followers in the psychoanalytic tradition traced the emergence of an autonomous *ego* back to the second year. Freud used the term "ego" (in German *das Ich*, which also translates into "the I") to refer to an executive self in the personality. Erikson (1963) argued that experiences of trust and interpersonal attachment in the first year of life help to consolidate the autonomy of the ego in the second. Coming from a more sociological perspective, Mead (1934) suggested that the I comes to know the Me through reflection, which may begin quite literally with mirrors but later involves the reflected appraisals of others. I come to know who I am as a social actor, Mead argued, by noting how *other people* in my social world react to my performances. In the development of the self as a social actor, other people function like mirrors—they reflect who I am back to me.

Research has shown that when young children begin to make attributions about themselves, they start simple (Harter, 2006). At age 4, Jessica knows that she has dark hair, knows that she lives in a white house, and describes herself to others in terms of simple behavioral *traits*. She may say that she is "nice," or "helpful," or that she is "a good girl most of the time." By the time, she hits fifth grade (age 10), Jessica sees herself in more complex ways, attributing traits to the self such as "honest," "moody," "outgoing," "shy," "hard-working," "smart," "good at math but not gym class," or "nice except when I am around my annoying brother." By late childhood and early adolescence, the personality traits that people attribute to themselves, as well as those attributed to them by others, tend to correlate with each other in ways that conform to a well-established taxonomy of five broad trait domains, repeatedly derived in studies of

adult personality and often called the **Big Five**: (1) extraversion, (2) neuroticism, (3) agreeableness, (4) conscientiousness, and (5) openness to experience (Roberts, Wood, & Caspi, 2008). By late childhood, moreover, self-conceptions will likely also include important social roles: "I am a good student," "I am the oldest daughter," or "I am a good friend to Sarah."

Traits and roles, and variations on these notions, are the main currency of the **self as social actor** (McAdams & Cox, 2010). Trait terms capture perceived consistencies in social performance. They convey what I reflexively perceive to be my overall acting style, based in part on how I think others see me as an actor in many different social situations. Roles capture the quality, as I perceive it, of important structured relationships in my life. Taken together, traits and roles make up the main features of my **social reputation**, as I apprehend it in my own mind (Hogan, 1982).

If you have ever tried hard to change yourself, you may have taken aim at your social reputation, targeting your central traits or your social roles. Maybe you woke up one day and decided that you must become a more optimistic and emotionally upbeat person. Taking into consideration the reflected appraisals of others, you realized that even your friends seem to avoid you because you bring them down. In addition, it feels bad to feel so bad all the time: Wouldn't it be better to feel good, to have more energy and hope? In the language of traits, you have decided to "work on" your "neuroticism." Or maybe instead, your problem is the trait of "conscientiousness": You are undisciplined and don't work hard enough, so you resolve to make changes in that area. Self-improvement efforts such as these—aimed at changing one's traits to become a more effective social actor—are sometimes successful, but they are very hard—kind of like dieting. Research suggests that broad traits tend to be stubborn, resistant to change, even with the aid of psychotherapy. However, people often have more success working directly on their social roles. To become a more effective social actor, you may want to take aim at the important roles you play in life. What can I do to become a better son or daughter? How can I find new and meaningful roles to perform at work, or in my family, or among my friends, or in my church and community? By doing concrete things that enrich your performances in important social roles, you may begin to see yourself in a new light, and others will notice the change, too. Social actors hold the potential to transform their performances across the human life course. Each time you walk out on stage, you have a chance to start anew.

The Motivated Agent

Whether we are talking literally about the theatrical stage or more figuratively, as I do in this module, about the everyday social environment for human behavior, observers can never



When we observe others we only see how they act but are never able to access the entirety of their internal experience. [Image: CC0 Public Domain, <https://goo.gl/m25gce>]

fully know what is in the actor's head, no matter how closely they watch. We can see actors act, but we cannot know for sure what they *want* or what they *value*, unless they tell us straightaway. As a social actor, a person may come across as friendly and compassionate, or cynical and mean-spirited, but in neither case can we infer their motivations from their traits or their roles. What does the friendly person want? What is the cynical father trying to achieve? Many broad psychological theories of the self prioritize the motivational qualities of human behavior—the inner needs, wants, desires, goals, values, plans, programs, fears, and aversions that seem to give behavior its direction and purpose (Bandura, 1989; Deci & Ryan, 1991; Markus & Nurius, 1986). These kinds of theories explicitly conceive of the self as a *motivated agent*.

To be an agent is to act with direction and purpose, to move forward into the future in pursuit of self-chosen and valued goals. In a sense, human beings are agents even as infants, for babies can surely act in goal-directed ways. By age 1 year, moreover, infants show a strong preference for observing and imitating the goal-directed, intentional behavior of others, rather than random behaviors (Woodward, 2009). Still, it is one thing to act in goal-directed ways; it is quite another for the I to know itself (the Me) as an intentional and purposeful force who moves forward in life in pursuit of self-chosen goals, values, and other desired end states. In order to do so, the person must first realize that people indeed have desires and goals in their minds and that these inner desires and goals *motivate* (initiate, energize, put into motion) their behavior. According to a strong line of research in developmental psychology, attaining this kind of understanding means acquiring a **theory of mind** (Wellman, 1993), which occurs for most children by the age of 4. Once a child understands that other people's behavior is often motivated by inner desires and goals, it is a small step to apprehend the self in similar terms.

Building on theory of mind and other cognitive and social developments, children begin to construct the self as a motivated agent in the elementary school years, layered over their still-developing sense of themselves as social actors. Theory and research on what developmental psychologists call **the age 5-to-7 shift** converge to suggest that children become more planful,

intentional, and systematic in their pursuit of valued goals during this time (Sameroff & Haith, 1996). Schooling reinforces the shift in that teachers and curricula place increasing demands on students to work hard, adhere to schedules, focus on goals, and achieve success in particular, well-defined task domains. Their relative success in achieving their most cherished goals, furthermore, goes a long way in determining children's **self-esteem** (Robins, Tracy, & Trzesniewski, 2008). Motivated agents feel good about themselves to the extent they believe that they are making good progress in achieving their goals and advancing their most important values.

Goals and values become even more important for the self in adolescence, as teenagers begin to confront what Erikson (1963) famously termed the developmental challenge of **identity**. For adolescents and young adults, establishing a psychologically efficacious identity involves exploring different options with respect to life goals, values, vocations, and intimate relationships and eventually committing to a motivational and ideological agenda for adult life—an integrated and realistic sense of what I want and value in life and how I plan to achieve it (Kroger & Marcia, 2011). Committing oneself to an integrated suite of life goals and values is perhaps the greatest achievement for the **self as motivated agent**. Establishing an adult identity has implications, as well, for how a person moves through life as a social actor, entailing new role commitments and, perhaps, a changing understanding of one's basic dispositional traits. According to Erikson, however, identity achievement is always provisional, for adults continue to work on their identities as they move into midlife and beyond, often relinquishing old goals in favor of new ones, investing themselves in new projects and making new plans, exploring new relationships, and shifting their priorities in response to changing life circumstances (Freund & Riediger, 2006; Josselson, 1996).

There is a sense whereby *any* time you try to change yourself, you are assuming the role of a motivated agent. After all, to strive to change something is inherently what an agent does. However, what particular feature of selfhood you try to change may correspond to your self as actor, agent, or author, or some combination. When you try to change your traits or roles, you take aim at the social actor. By contrast, when you try to change your values or life goals, you are focusing on yourself as a motivated agent. Adolescence and young adulthood are periods in the human life course when many of us focus attention on our values and life goals. Perhaps you grew up as a traditional Catholic, but now in college you believe that the values inculcated in your childhood no longer function so well for you. You no longer believe in the central tenets of the Catholic Church, say, and are now working to replace your old values with new ones. Or maybe you still want to be Catholic, but you feel that your new take on faith requires a different kind of personal ideology. In the realm of the motivated agent, moreover, changing values can influence life goals. If your new value system prioritizes alleviating the suffering of others, you may decide to pursue a degree in social work, or to

become a public interest lawyer, or to live a simpler life that prioritizes people over material wealth. A great deal of the identity work we do in adolescence and young adulthood is about values and goals, as we strive to articulate a personal vision or dream for what we hope to accomplish in the future.

The Autobiographical Author

Even as the "I" continues to develop a sense of the "Me" as both a social actor and a motivated agent, a third standpoint for selfhood gradually emerges in the adolescent and early-adult years. The third perspective is a response to Erikson's (1963) challenge of identity. According to Erikson, developing an identity involves more than the exploration of and commitment to life goals and values (the self as motivated agent), and more than committing to new roles and re-evaluating old traits (the self as social actor). It also involves achieving a sense of *temporal continuity* in life—a reflexive understanding of *how I have come to be the person I am becoming*, or put differently, how my past self has developed into my present self, and how my present self will, in turn, develop into an envisioned future self. In his analysis of identity formation in the life of the 15th-century Protestant reformer Martin Luther, Erikson (1958) describes the culmination of a young adult's search for identity in this way:

"To be adult means among other things to see one's own life in continuous perspective, both in retrospect and prospect. By accepting some definition of who he is, usually on the basis of a function in an economy, a place in the sequence of generations, and a status in the structure of society, the adult is able to *selectively reconstruct his past in such a way that, step for step, it seems to have planned him, or better, he seems to have planned it*. In this sense, psychologically we do choose our parents, our family history, and the history of our kings, heroes, and gods. By making them our own, we maneuver ourselves into the inner position of proprietors, of creators."

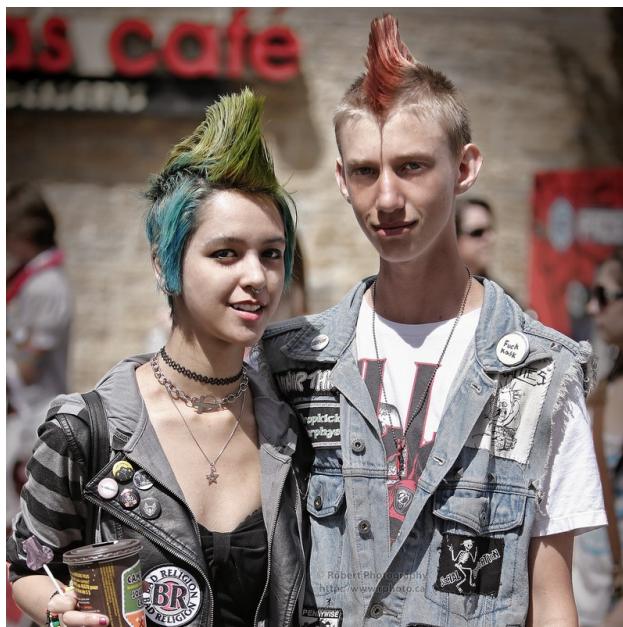
-- (Erikson, 1958, pp. 111–112; emphasis added).

In this rich passage, Erikson intimates that the development of a mature identity in young adulthood involves the I's ability to construct a retrospective and prospective *story* about the Me (McAdams, 1985). In their efforts to find a meaningful identity for life, young men and women begin "to selectively reconstruct" their past, as Erikson wrote, and imagine their future to create an integrative life story, or what psychologists today often call a narrative identity. A narrative identity is an internalized and evolving story of the self that reconstructs the past and anticipates the future in such a way as to provide a person's life with some degree of unity, meaning, and purpose over time (McAdams, 2008; McLean, Pasupathi, & Pals, 2007).

The self typically becomes an *autobiographical author* in the early-adult years, a way of being that is layered over the motivated agent, which is layered over the social actor. In order to provide life with the sense of temporal continuity and deep meaning that Erikson believed identity should confer, we must author a personalized life story that integrates our understanding of who we once were, who we are today, and who we may become in the future. The story helps to explain, for the author and for the author's world, why the social actor does what it does and why the motivated agent wants what it wants, and how the person as a whole has developed over time, from the past's reconstructed beginning to the future's imagined ending.

By the time they are 5 or 6 years of age, children can tell well-formed stories about personal events in their lives (Fivush, 2011). By the end of childhood, they usually have a good sense of what a typical biography contains and how it is sequenced, from birth to death (Thomsen & Bernsten, 2008). But it is not until adolescence, research shows, that human beings express advanced storytelling skills and what psychologists call autobiographical reasoning (Habermas & Bluck, 2000; McLean & Fournier, 2008). In autobiographical reasoning, a narrator is able to derive substantive conclusions about the self from analyzing his or her own personal experiences. Adolescents may develop the ability to string together events into causal chains and inductively derive general themes about life from a sequence of chapters and scenes (Habermas & de Silveira, 2008). For example, a 16-year-old may be able to explain to herself

and to others how childhood experiences in her family have shaped her vocation in life. Her parents were divorced when she was 5 years old, the teenager recalls, and this caused a great deal of stress in her family. Her mother often seemed anxious and depressed, but she (the now-teenager when she was a little girl—the story's protagonist) often tried to cheer her mother up, and her efforts seemed to work. In more recent years, the teenager notes that her friends often come to her with their boyfriend problems. She seems to be very adept at giving advice about love and relationships, which stems, the teenager now believes, from her early experiences with her mother. Carrying this causal narrative forward, the teenager now thinks that she would like to be a marriage



Young people often "try on" many variations of identities to see which best fits their private sense of themselves. [Image: Sangudo, <https://goo.gl/Ay3UMR>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

counselor when she grows up.

Unlike children, then, adolescents can tell a full and convincing story about an entire human life, or at least a prominent line of causation within a full life, explaining continuity and change in the story's protagonist over time. Once the cognitive skills are in place, young people seek interpersonal opportunities to share and refine their developing sense of themselves as storytellers (the I) who tell stories about themselves (the Me). Adolescents and young adults author a narrative sense of the self by telling stories about their experiences to other people, monitoring the feedback they receive from the tellings, editing their stories in light of the feedback, gaining new experiences and telling stories about those, and on and on, as selves create stories that, in turn, create new selves (McLean et al., 2007). Gradually, in fits and starts, through conversation and introspection, the I develops a convincing and coherent narrative about the Me.

Contemporary research on the **self as autobiographical author** emphasizes the strong effect of *culture* on narrative identity (Hammack, 2008). Culture provides a menu of favored plot lines, themes, and character types for the construction of self-defining life stories. Autobiographical authors sample selectively from the cultural menu, appropriating ideas that seem to resonate well with their own life experiences. As such, life stories reflect the culture, wherein they are situated as much as they reflect the authorial efforts of the autobiographical I.

As one example of the tight link between culture and narrative identity, McAdams (2013) and others (e.g., Kleinfeld, 2012) have highlighted the prominence of **redemptive narratives** in American culture. Epitomized in such iconic cultural ideals as the American dream, Horatio Alger stories, and narratives of Christian atonement, redemptive stories track the move from suffering to an enhanced status or state, while scripting the development of a chosen protagonist who journeys forth into a dangerous and unredeemed world (McAdams, 2013). Hollywood movies often celebrate redemptive quests. Americans are exposed to similar narrative messages in self-help books, 12-step programs, Sunday sermons, and in the rhetoric of political campaigns. Over the past two decades, the world's most influential spokesperson for the power of redemption in human lives may be Oprah Winfrey, who tells her own story of overcoming childhood adversity while encouraging others, through her media outlets and philanthropy, to tell similar kinds of stories for their own lives (McAdams, 2013). Research has demonstrated that American adults who enjoy high levels of mental health and civic engagement tend to construct their lives as narratives of redemption, tracking the move from sin to salvation, rags to riches, oppression to liberation, or sickness/abuse to health/recovery (McAdams, Diamond, de St. Aubin, & Mansfield, 1997; McAdams, Reynolds, Lewis, Patten, & Bowman, 2001; Walker & Frimer, 2007). In American society, these kinds of stories are often

seen to be inspirational.

At the same time, McAdams (2011, 2013) has pointed to shortcomings and limitations in the redemptive stories that many Americans tell, which mirror cultural biases and stereotypes in American culture and heritage. McAdams has argued that redemptive stories support happiness and societal engagement for some Americans, but the same stories can encourage moral righteousness and a naïve expectation that suffering will always be redeemed. For better and sometimes for worse, Americans seem to love stories of personal redemption and often aim to assimilate their autobiographical memories and aspirations to a redemptive form. Nonetheless, these same stories may not work so well in cultures that espouse different values and narrative ideals (Hammack, 2008). It is important to remember that every culture offers its own storehouse of favored narrative forms. It is also essential to know that no single narrative form captures all that is good (or bad) about a culture. In American society, the redemptive narrative is but one of many different kinds of stories that people commonly employ to make sense of their lives.

What is your story? What kind of a narrative are you working on? As you look to the past and imagine the future, what threads of continuity, change, and meaning do you discern? For many people, the most dramatic and fulfilling efforts to change the self happen when the I works hard, as an autobiographical author, to construct and, ultimately, to tell a new story about the Me. Storytelling may be the most powerful form of self-transformation that human beings have ever invented. Changing one's life story is at the heart of many forms of psychotherapy and counseling, as well as religious conversions, vocational epiphanies, and other dramatic transformations of the self that people often celebrate as turning points in their lives (Adler, 2012). Storytelling is often at the heart of the little changes, too, minor edits in the self that we make as we move through daily life, as we live and experience life, and as we later tell it to ourselves and to others.

Conclusion

For human beings, selves begin as social actors, but they eventually become motivated agents and autobiographical authors, too. The I first sees itself as an embodied actor in social space; with development, however, it comes to appreciate itself also as a forward-looking source of self-determined goals and values, and later yet, as a storyteller of personal experience, oriented to the reconstructed past and the imagined future. To "know thyself" in mature adulthood, then, is to do three things: (a) to apprehend and to perform with social approval my self-ascribed traits and roles, (b) to pursue with vigor and (ideally) success my most valued goals and plans, and (c) to construct a story about life that conveys, with vividness and cultural

resonance, how I became the person I am becoming, integrating my past as I remember it, my present as I am experiencing it, and my future as I hope it to be.

Outside Resources

Web: The website for the Foley Center for the Study of Lives, at Northwestern University. The site contains research materials, interview protocols, and coding manuals for conducting studies of narrative identity.

<http://www.sesp.northwestern.edu/foley/>

Discussion Questions

1. Back in the 1950s, Erik Erikson argued that many adolescents and young adults experience a tumultuous identity crisis. Do you think this is true today? What might an identity crisis look and feel like? And, how might it be resolved?
2. Many people believe that they have a true self buried inside of them. From this perspective, the development of self is about discovering a psychological truth deep inside. Do you believe this to be true? How does thinking about the self as an actor, agent, and author bear on this question?
3. Psychological research shows that when people are placed in front of mirrors they often behave in a more moral and conscientious manner, even though they sometimes experience this procedure as unpleasant. From the standpoint of the self as a social actor, how might we explain this phenomenon?
4. By the time they reach adulthood, does everybody have a narrative identity? Do some people simply never develop a story for their life?
5. What happens when the three perspectives on self—the self as actor, agent, and author—conflict with each other? Is it necessary for people's self-ascribed traits and roles to line up well with their goals and their stories?
6. William James wrote that the self includes all things that the person considers to be "mine." If we take James literally, a person's self might extend to include his or her material possessions, pets, and friends and family. Does this make sense?
7. To what extent can we control the self? Are some features of selfhood easier to control than others?
8. What cultural differences may be observed in the construction of the self? How might gender, ethnicity, and class impact the development of the self as actor, as agent, and as author?

Vocabulary

Autobiographical reasoning

The ability, typically developed in adolescence, to derive substantive conclusions about the self from analyzing one's own personal experiences.

Big Five

A broad taxonomy of personality trait domains repeatedly derived from studies of trait ratings in adulthood and encompassing the categories of (1) extraversion vs. introversion, (2) neuroticism vs. emotional stability, (3) agreeable vs. disagreeableness, (4) conscientiousness vs. nonconscientiousness, and (5) openness to experience vs. conventionality. By late childhood and early adolescence, people's self-attributions of personality traits, as well as the trait attributions made about them by others, show patterns of intercorrelations that confirm with the five-factor structure obtained in studies of adults.

Ego

Sigmund Freud's conception of an executive self in the personality. Akin to this module's notion of "the I," Freud imagined the ego as observing outside reality, engaging in rational thought, and coping with the competing demands of inner desires and moral standards.

Identity

Sometimes used synonymously with the term "self," identity means many different things in psychological science and in other fields (e.g., sociology). In this module, I adopt Erik Erikson's conception of identity as a developmental task for late adolescence and young adulthood. Forming an identity in adolescence and young adulthood involves exploring alternative roles, values, goals, and relationships and eventually committing to a realistic agenda for life that productively situates a person in the adult world of work and love. In addition, identity formation entails commitments to new social roles and reevaluation of old traits, and importantly, it brings with it a sense of temporal continuity in life, achieved through the construction of an integrative life story.

Narrative identity

An internalized and evolving story of the self designed to provide life with some measure of temporal unity and purpose. Beginning in late adolescence, people craft self-defining stories that reconstruct the past and imagine the future to explain how the person came to be the person that he or she is becoming.

Redemptive narratives

Life stories that affirm the transformation from suffering to an enhanced status or state. In American culture, redemptive life stories are highly prized as models for the good self, as in classic narratives of atonement, upward mobility, liberation, and recovery.

Reflexivity

The idea that the self reflects back upon itself; that the I (the knower, the subject) encounters the Me (the known, the object). Reflexivity is a fundamental property of human selfhood.

Self as autobiographical author

The sense of the self as a storyteller who reconstructs the past and imagines the future in order to articulate an integrative narrative that provides life with some measure of temporal continuity and purpose.

Self as motivated agent

The sense of the self as an intentional force that strives to achieve goals, plans, values, projects, and the like.

Self as social actor

The sense of the self as an embodied actor whose social performances may be construed in terms of more or less consistent self-ascribed traits and social roles.

Self-esteem

The extent to which a person feels that he or she is worthy and good. The success or failure that the motivated agent experiences in pursuit of valued goals is a strong determinant of self-esteem.

Social reputation

The traits and social roles that others attribute to an actor. Actors also have their own conceptions of what they imagine their respective social reputations indeed are in the eyes of others.

The Age 5-to-7 Shift

Cognitive and social changes that occur in the early elementary school years that result in the child's developing a more purposeful, planful, and goal-directed approach to life, setting the stage for the emergence of the self as a motivated agent.

The "I"

The self as knower, the sense of the self as a subject who encounters (knows, works on) itself (the Me).

The “Me”

The self as known, the sense of the self as the object or target of the I's knowledge and work.

Theory of mind

Emerging around the age of 4, the child's understanding that other people have minds in which are located desires and beliefs, and that desires and beliefs, thereby, motivate behavior.

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Social Psychology

20

Social Cognition and Attitudes

Yanine D. Hess & Cynthia L. Pickett

Social cognition is the area of social psychology that examines how people perceive and think about their social world. This module provides an overview of key topics within social cognition and attitudes, including judgmental heuristics, social prediction, affective and motivational influences on judgment, and explicit and implicit attitudes.

Learning Objectives

- Learn how we simplify the vast array of information in the world in a way that allows us to make decisions and navigate our environments efficiently.
- Understand some of the social factors that influence how we reason.
- Determine if our reasoning processes are always conscious, and if not, what some of the effects of automatic/nonconscious cognition are.
- Understand the difference between explicit and implicit attitudes, and the implications they have for behavior.

Introduction

Imagine you are walking toward your classroom and you see your teacher and a fellow student you know to be disruptive in class whispering together in the hallway. As you approach, both of them quit talking, nod to you, and then resume their urgent whispers after you pass by. What would you make of this scene? What story might you tell yourself to help explain this interesting and unusual behavior?

People know intuitively that we can better understand others' behavior if we know the thoughts contributing to the behavior. In this example, you might guess that your teacher harbors several concerns about the disruptive student, and therefore you believe their whispering is related to this. The area of social psychology that focuses on how people think about others and about the social world is called **social cognition**.

Researchers of social cognition study how people make sense of themselves and others to make judgments, form attitudes, and make predictions about the future. Much of the research in social cognition has demonstrated that humans are adept at distilling large amounts of information into smaller, more usable chunks, and that we possess many cognitive tools that allow us to efficiently navigate our environments. This research has also illuminated many social factors that can influence these judgments and predictions. Not only can our past experiences, expectations, motivations, and moods impact our reasoning, but many of our decisions and behaviors are driven by unconscious processes and implicit attitudes we are unaware of having. The goal of this module is to highlight the mental tools we use to navigate and make sense of our complex social world, and describe some of the emotional, motivational, and cognitive factors that affect our reasoning.

Simplifying Our Social World

Consider how much information you come across on any given day; just looking around your bedroom, there are hundreds of objects, smells, and sounds. How do we simplify all this information to attend to what is important and make decisions quickly and efficiently? In part, we do it by forming schemas of the various people, objects, situations, and events we encounter. A **schema** is a mental model, or representation, of any of the various things we come across in our daily lives. A schema (related to the word schematic) is kind of like a mental blueprint for how we expect something to be or behave. It is an organized body of general information or beliefs we develop from direct encounters, as well as from secondhand sources. Rather than spending copious amounts of time learning about each new individual object (e.g., each new dog we see), we rely on our schemas to tell us that a newly encountered dog probably barks, likes to fetch, and enjoys treats. In this way, our schemas greatly reduce the amount of cognitive work we need to do and allow us to "go beyond the information given" (Bruner, 1957).

We can hold schemas about almost anything—individual people (*person schemas*), ourselves (*self-schemas*), and recurring events (*event schemas*, or *scripts*). Each of these types of schemas is useful in its own way. For example, event schemas allow us to navigate new situations efficiently and seamlessly. A script for dining at a restaurant would indicate that one should

wait to be seated by the host or hostess, that food should be ordered from a menu, and that one is expected to pay the check at the end of the meal. Because the majority of dining situations conform to this general format, most diners just need to follow their mental scripts to know what to expect and how they should behave, greatly reducing their cognitive workload.



Does the person in this image fit reasonably into your heuristic of a librarian? How representative is he of that category? [Image: University Library of Kyiv-Mohyla Academy, <https://goo.gl/LxQTuD>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Another important way we simplify our social world is by employing **heuristics**, which are mental shortcuts that reduce complex problem-solving to more simple, rule-based decisions. For example, have you ever had a hard time trying to decide on a book to buy, then you see one ranked highly on a book review website? Although selecting a book to purchase can be a complicated decision, you might rely on the “rule of thumb” that a recommendation from a credible source is likely a safe bet—so you buy it. A common instance of using heuristics is when people are faced with judging whether an object belongs to a particular category. For example, you would easily classify a pit bull into the category of “dog.” But what about a coyote? Or a fox? A plastic toy dog? In order to make this classification (and many others),

people may rely on the **representativeness heuristic** to arrive at a quick decision (Kahneman & Tversky, 1972, 1973). Rather than engaging in an in-depth consideration of the object’s attributes, one can simply judge the likelihood of the object belonging to a category, based on how similar it is to one’s mental representation of that category. For example, a perceiver may quickly judge a female to be an athlete based on the fact that the female is tall, muscular, and wearing sports apparel—which fits the perceiver’s representation of an athlete’s characteristics.

In many situations, an object’s similarity to a category is a good indicator of its membership in that category, and an individual using the representativeness heuristic will arrive at a correct judgment. However, when base-rate information (e.g., the actual percentage of athletes in the area and therefore the probability that this person actually *is* an athlete) conflicts with representativeness information, use of this heuristic is less appropriate. For example, if asked to judge whether a quiet, thin man who likes to read poetry is a classics professor at a

prestigious university or a truck driver, the representativeness heuristic might lead one to guess he's a professor. However, considering the base-rates, we know there are far fewer university classics professors than truck drivers. Therefore, although the man fits the mental image of a professor, the actual probability of him being one (considering the number of professors out there) is lower than that of being a truck driver.

In addition to judging whether things belong to particular categories, we also attempt to judge the likelihood that things will happen. A commonly employed heuristic for making this type of judgment is called the **availability heuristic**. People use the availability heuristic to evaluate the frequency or likelihood of an event based on how easily instances of it come to mind (Tversky & Kahneman, 1973). Because more commonly occurring events are more likely to be cognitively accessible (or, they come to mind more easily), use of the availability heuristic can lead to relatively good approximations of frequency. However, the heuristic can be less reliable when judging the frequency of relatively infrequent *but highly accessible* events. For example, do you think there are more words that begin with "k," or more that have "k" as the third letter? To figure this out, you would probably make a list of words that start with "k" and compare it to a list of words with "k" as the third letter. Though such a quick test may lead you to believe there are more words that begin with "k," the truth is that there are 3 times as many words that have "k" as the third letter (Schwarz et al., 1991). In this case, words beginning with "k" are more readily available to memory (i.e., more accessible), so they seem to be more numerous. Another example is the very common fear of flying: dying in a plane crash is extremely rare, but people often overestimate the probability of it occurring because plane crashes tend to be highly memorable and publicized.

In summary, despite the vast amount of information we are bombarded with on a daily basis, the mind has an entire kit of "tools" that allows us to navigate that information efficiently. In addition to category and frequency judgments, another common mental calculation we perform is predicting the future. We rely on our predictions about the future to guide our actions. When deciding what entrée to select for dinner, we may ask ourselves, "How happy will I be if I choose this over that?" The answer we arrive at is an example of a future prediction. In the next section, we examine individuals' ability to accurately predict others' behaviors, as well as their own future thoughts, feelings, and behaviors, and how these predictions can impact their decisions.

Making Predictions About the Social World

Whenever we face a decision, we predict our future behaviors or feelings in order to choose the best course of action. If you have a paper due in a week and have the option of going out

to a party or working on the paper, the decision of what to do rests on a few things: the amount of time you predict you will need to write the paper, your prediction of how you will feel if you do poorly on the paper, and your prediction of how harshly the professor will grade it.

In general, we make predictions about others quickly, based on relatively little information. Research on “thin-slice judgments” has shown that perceivers are able to make surprisingly accurate inferences about another person’s emotional state, personality traits, and even sexual orientation based on just snippets of information—for example, a 10-second video clip (Ambady, Bernieri, & Richeson, 2000; Ambady, Hallahan, & Conner, 1999; Ambady & Rosenthal, 1993). Furthermore, these judgments are predictive of the target’s future behaviors. For example, one study found that students’ ratings of a teacher’s warmth, enthusiasm, and attentiveness from a 30-second video clip strongly predicted that teacher’s final student evaluations after an entire semester (Ambady & Rosenthal, 1993). As might be expected, the more information there is available, the more accurate many of these judgments become (Carney, Colvin, & Hall, 2007).

Because we seem to be fairly adept at making predictions about others, one might expect predictions about the self to be foolproof, given the considerable amount of information one has about the self compared to others. To an extent, research has supported this conclusion. For example, our own predictions of our future academic performance are more accurate than peers’ predictions of our performance, and self-expressed interests better predict occupational choice than career inventories (Shrauger & Osberg, 1981). Yet, it is not always the case that we hold greater insight into ourselves. While our own assessment of our personality traits does predict certain behavioral tendencies better than peer assessment of our personality, for certain behaviors, peer reports are more accurate than self-reports (Kolar, Funder, & Colvin, 1996; Vazire, 2010). Similarly, although we are generally aware of our knowledge, abilities, and future prospects, our perceptions are often overly positive, and we display overconfidence in their accuracy and potential (Metcalfe, 1998). For example, we tend



Although we can be reasonably certain that a winning lottery ticket will make us feel good, we tend to overestimate both how good we'll feel and for how long. [Image: CC0 Public Domain, <https://goo.gl/m25gce>]

to underestimate how much time it will take us to complete a task, whether it is writing a paper, finishing a project at work, or building a bridge—a phenomenon known as the **planning fallacy** (Buehler, Griffin, & Ross, 1994). The planning fallacy helps explain why so many college students end up pulling all-nighters to finish writing assignments or study for exams. The tasks simply end up taking longer than expected. On the positive side, the planning fallacy can also lead individuals to pursue ambitious projects that may turn out to be worthwhile. That is, if they had accurately predicted how much time and work it would have taken them, they may have never started it in the first place.

The other important factor that affects decision-making is our ability to predict how we will *feel* about certain outcomes. Not only do we predict whether we will feel positively or negatively, we also make predictions about how strongly and for how long we will feel that way. Research demonstrates that these predictions of one's future feelings—known as **affective forecasting**—are accurate in some ways but limited in others (Gilbert & Wilson, 2007). We are adept at predicting whether a future event or situation will make us feel positively or negatively (Wilson & Gilbert, 2003), but we often incorrectly predict the strength or duration of those emotions. For example, you may predict that if your favorite sports team loses an important match, you will be devastated. Although you're probably right that you will feel negative (and not positive) emotions, will you be able to accurately estimate how negative you'll feel? What about how long those negative feelings will last?

Predictions about future feelings are influenced by the **impact bias**: the tendency for a person to overestimate the *intensity* of their future feelings. For example, by comparing people's estimates of how they expected to feel after a specific event to their actual feelings after the event, research has shown that people generally overestimate how badly they will feel after a negative event—such as losing a job—and they also overestimate how happy they will feel after a positive event—such as winning the lottery (Brickman, Coates, & Janoff-Bullman, 1978). Another factor in these estimations is the **durability bias**. The durability bias refers to the tendency for people to overestimate *how long* (or, the *duration*) positive and negative events will affect them. This bias is much greater for predictions regarding negative events than positive events, and occurs because people are generally unaware of the many psychological mechanisms that help us adapt to and cope with negative events (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000).

In summary, individuals form impressions of themselves and others, make predictions about the future, and use these judgments to inform their decisions. However, these judgments are shaped by our tendency to view ourselves in an overly positive light and our inability to appreciate our habituation to both positive and negative events. In the next section, we will discuss how motivations, moods, and desires also shape social judgment.

Hot Cognition: The Influence of Motivations, Mood, and Desires on Social Judgment

Although we may believe we are always capable of rational and objective thinking (for example, when we methodically weigh the pros and cons of two laundry detergents in an unemotional—i.e., “cold”—manner), our reasoning is often influenced by our motivations and mood. **Hot cognition** refers to the mental processes that are influenced by desires and feelings. For example, imagine you receive a poor grade on a class assignment. In this situation, your ability to reason objectively about the quality of your assignment may be limited by your anger toward the teacher, upset feelings over the bad grade, and your motivation to maintain your belief that you are a good student. In this sort of scenario, we may want the situation to turn out a particular way or our belief to be the truth. When we have these **directional goals**, we are motivated to reach a particular outcome or judgment and do not process information in a cold, objective manner.



Motivated skepticism is a bias that can easily impact our views of political candidates or issues. It may be more difficult to objectively evaluate the merits of a political argument if it comes from someone we don't expect to vote for. [Image: Senado Federal, <https://goo.gl/sIPEEv>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

cautious—leading to indecision. In contrast, sometimes individuals are motivated to make a quick decision, without being particularly concerned about the quality of it. Imagine trying to

Directional goals can bias our thinking in many ways, such as leading to **motivated skepticism**, whereby we are skeptical of evidence that goes against what we want to believe despite the strength of the evidence (Ditto & Lopez, 1992). For example, individuals trust medical tests less if the results suggest they have a deficiency compared to when the results suggest they are healthy. Through this motivated skepticism, people often continue to believe what they want to believe, even in the face of nearly incontrovertible evidence to the contrary.

There are also situations in which we do not have wishes for a particular outcome but our goals bias our reasoning, anyway. For example, being motivated to reach an accurate conclusion can influence our reasoning processes by making us more

choose a restaurant with a group of friends when you're really hungry. You may choose whatever's nearby without caring if the restaurant is the best or not. This need for closure (the desire to come to a firm conclusion) is often induced by time constraints (when a decision needs to be made quickly) as well as by individual differences in the need for closure (Webster & Kruglanski, 1997). Some individuals are simply more uncomfortable with ambiguity than others, and are thus more motivated to reach clear, decisive conclusions.

Just as our goals and motivations influence our reasoning, our moods and feelings also shape our thinking process and ultimate decisions. Many of our decisions are based in part on our memories of past events, and our retrieval of memories is affected by our current mood. For example, when you are sad, it is easier to recall the sad memory of your dog's death than the happy moment you received the dog. This tendency to recall memories similar in valence to our current mood is known as mood-congruent memory (Blaney, 1986; Bower 1981, 1991; DeSteno, Petty, Wegener, & Rucker, 2000;Forgas, Bower, & Krantz, 1984; Schwarz, Strack, Kommer, & Wagner, 1987). The mood we were in when the memory was recorded becomes a retrieval cue; our present mood primes these congruent memories, making them come to mind more easily (Fiedler, 2001). Furthermore, because the availability of events in our memory can affect their perceived frequency (the availability heuristic), the biased retrieval of congruent memories can then impact the subsequent judgments we make (Tversky & Kahneman, 1973). For example, if you are retrieving many sad memories, you might conclude that you have had a tough, depressing life.

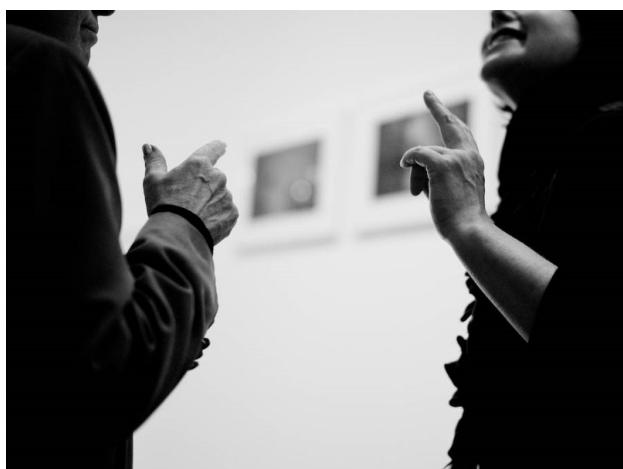
In addition to our moods influencing the specific memories we retrieve, our moods can also influence the broader judgments we make. This sometimes leads to inaccuracies when our current mood is irrelevant to the judgment at hand. In a classic study demonstrating this effect, researchers found that study participants rated themselves as less-satisfied with their lives in general if they were asked on a day when it happened to be raining vs. sunny (Schwarz & Clore, 1983). However, this occurred only if the participants were not aware that the weather might be influencing their mood. In essence, participants were in worse moods on rainy days than sunny days, and, if unaware of the weather's effect on their mood, they incorrectly used their mood as evidence of their overall life satisfaction.

In summary, our mood and motivations can influence both the way we think and the decisions we ultimately make. Mood can shape our thinking even when the mood is irrelevant to the judgment, and our motivations can influence our thinking even if we have no particular preference about the outcome. Just as we might be unaware of how our reasoning is influenced by our motives and moods, research has found that our behaviors can be determined by unconscious processes rather than intentional decisions, an idea we will explore in the next

section.

Automaticity

Do we actively choose and control all our behaviors or do some of these behaviors occur automatically? A large body of evidence now suggests that many of our behaviors are, in fact, **automatic**. A behavior or process is considered automatic if it is unintentional, uncontrollable, occurs outside of conscious awareness, or is cognitively efficient (Bargh & Chartrand, 1999). A process may be considered automatic even if it does not have all these features; for example, driving is a fairly automatic process, but is clearly intentional. Processes can become automatic through repetition, practice, or repeated associations. Staying with the driving example: although it can be very difficult and cognitively effortful at the start, over time it becomes a relatively automatic process, and aspects of it can occur outside conscious awareness.



Our tendency to subtly mimic the people we interact with is largely an unconscious behavior. [Image: Susan Sermoneta, <https://goo.gl/6yQXYp>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

mimic the postures, mannerisms, facial expressions, and other behaviors of their interaction partners—is an example of how people may engage in certain behaviors without conscious intention or awareness (Chartrand & Bargh, 1999). For example, have you ever noticed that you've picked up some of the habits of your friends? Over time, but also in brief encounters, we will nonconsciously mimic those around us because of the positive social effects of doing so. That is, automatic mimicry has been shown to lead to more positive social interactions and to increase liking between the mimicked person and the mimicking person.

When concepts and behaviors have been repeatedly associated with each other, one of them

In addition to practice leading to the learning of automatic behaviors, some automatic processes, such as fear responses, appear to be innate. For example, people quickly detect negative stimuli, such as negative words, even when those stimuli are presented subliminally (Dijksterhuis & Aarts, 2003; Pratto & John, 1991). This may represent an evolutionarily adaptive response that makes individuals more likely to detect danger in their environment. Other innate automatic processes may have evolved due to their pro-social outcomes. The **chameleon effect**—where individuals nonconsciously

can be **primed**—i.e., made more cognitively accessible—by exposing participants to the (strongly associated) other one. For example, by presenting participants with the concept of a doctor, associated concepts such as “nurse” or “stethoscope” are primed. As a result, participants recognize a word like “nurse” more quickly (Meyer, & Schvaneveldt, 1971). Similarly, stereotypes can automatically prime associated judgments and behaviors. **Stereotypes** are our general beliefs about a group of people and, once activated, they may guide our judgments outside of conscious awareness. Similar to schemas, stereotypes involve a mental representation of how we expect a person will think and behave. For example, someone’s mental schema for women may be that they’re caring, compassionate, and maternal; however, a stereotype would be that *all* women are examples of this schema. As you know, assuming all people are a certain way is not only wrong but insulting, especially if negative traits are incorporated into a schema and subsequent stereotype.

In a now classic study, Patricia Devine (1989) primed study participants with words typically associated with Blacks (e.g., “blues,” “basketball”) in order to activate the stereotype of Blacks. Devine found that study participants who were primed with the Black stereotype judged a target’s ambiguous behaviors as being more hostile (a trait stereotypically associated with Blacks) than nonprimed participants. Research in this area suggests that our social context—which constantly bombards us with concepts—may prime us to form particular judgments and influence our thoughts and behaviors.

In summary, there are many cognitive processes and behaviors that occur outside of our awareness and despite our intentions. Because automatic thoughts and behaviors do not require the same level of cognitive processing as conscious, deliberate thinking and acting, automaticity provides an efficient way for individuals to process and respond to the social world. However, this efficiency comes at a cost, as unconsciously held stereotypes and attitudes can sometimes influence us to behave in unintended ways. We will discuss the consequences of both consciously and unconsciously held attitudes in the next section.

Attitudes and Attitude Measurement

When we encounter a new object or person, we often form an attitude toward it (him/her). An **attitude** is a “psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993, p. 1). In essence, our attitudes are our general evaluations of things (i.e., do you regard this thing positively or negatively?) that can bias us toward having a particular response to it. For example, a negative attitude toward mushrooms would predispose you to avoid them and think negatively of them in other ways. This bias can be long- or short-term and can be overridden by another experience with

the object. Thus, if you encounter a delicious mushroom dish in the future, your negative attitude could change to a positive one.

Traditionally, attitudes have been measured through **explicit attitude** measures, in which participants are directly asked to provide their attitudes toward various objects, people, or issues (e.g., a survey).

For example, in a semantic-differential scale, respondents are asked to provide evaluations of an attitude object using a series of negative to positive response scales—which have something like “unpleasant” at one end of the scale and “pleasant” at the other (Osgood, Suci, & Tannenbaum, 1957). In a Likert scale, respondents are asked to indicate their agreement level with various evaluative statements, such as, “I believe that psychology is the most interesting major” (Likert, 1932). Here, participants mark their selection between something like “strongly disagree” and “strongly agree.” These explicit measures of attitudes can be used to predict people’s actual behavior, but there are limitations to them. For one thing, individuals aren’t always aware of their true attitudes, because they’re either undecided or haven’t given a particular issue much thought. Furthermore, even when individuals are aware of their attitudes, they might not want to admit to them, such as when holding a certain attitude is viewed negatively by their culture. For example, sometimes it can be difficult to measure people’s true opinions on racial issues, because participants fear that expressing their true attitudes will be viewed as socially unacceptable. Thus, explicit attitude measures may be unreliable when asking about controversial attitudes or attitudes that are not widely accepted by society.

In order to avoid some of these limitations, many researchers use more subtle or covert ways of measuring attitudes that do not suffer from such self-presentation concerns (Fazio & Olson, 2003). An **implicit attitude** is an attitude that a person does not verbally or overtly express. For example, someone may have a positive, explicit attitude toward his job; however, nonconsciously, he may have a lot of negative associations with it (e.g., having to wake up



The explicit attitudes expressed by voters are used to predict the outcomes of elections, however some people who respond to opinion questions that involve controversial issues may hide their true attitudes. [Image: SueWalkerWhite, <https://goo.gl/1jL4WP>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

early, the long commute, the office heating is broken) which results in an implicitly negative attitude. To learn what a person's implicit attitude is, you have to use **implicit measures of attitudes**. These measures infer the participant's attitude rather than having the participant explicitly report it. Many implicit measures accomplish this by recording the time it takes a participant (i.e., the reaction time) to label or categorize an attitude object (i.e., the person, concept, or object of interest) as positive or negative. For example, the faster someone categorizes his or her job (measured in milliseconds) as negative compared to positive, the more negative the implicit attitude is (i.e., because a faster categorization implies that the two concepts—"work" and "negative"—are closely related in one's mind).

One common implicit measure is the **Implicit Association Test** (IAT; Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz, 1998), which does just what the name suggests, measuring how quickly the participant pairs a concept (e.g., cats) with an attribute (e.g., good or bad). The participant's response time in pairing the concept with the attribute indicates how strongly the participant associates the two. Another common implicit measure is the **evaluative priming task** (Fazio, Jackson, Dunton, & Williams, 1995), which measures how quickly the participant labels the valence (i.e., positive or negative) of the attitude object when it appears immediately after a positive or negative image. The more quickly a participant labels the attitude object after being primed with a positive versus negative image indicates how positively the participant evaluates the object.

Individuals' implicit attitudes are sometimes inconsistent with their explicitly held attitudes. Hence, implicit measures may reveal biases that participants do not report on explicit measures. As a result, implicit attitude measures are especially useful for examining the pervasiveness and strength of controversial attitudes and stereotypic associations, such as racial biases or associations between race and violence. For example, research using the IAT has shown that about 66% of white respondents have a negative bias toward Blacks (Nosek, Banaji, & Greenwald, 2002), that bias on the IAT against Blacks is associated with more discomfort during interracial interactions (McConnell, & Leibold, 2001), and that implicit associations linking Blacks to violence are associated with a greater tendency to shoot unarmed Black targets in a video game (Payne, 2001). Thus, even though individuals are often unaware of their implicit attitudes, these attitudes can have serious implications for their behavior, especially when these individuals do not have the cognitive resources available to override the attitudes' influence.

Conclusion

Decades of research on social cognition and attitudes have revealed many of the "tricks" and

"tools" we use to efficiently process the limitless amounts of social information we encounter. These tools are quite useful for organizing that information to arrive at quick decisions. When you see an individual engage in a behavior, such as seeing a man push an elderly woman to the ground, you form judgments about his personality, predictions about the likelihood of him engaging in similar behaviors in the future, as well as predictions about the elderly woman's feelings and how you would feel if you were in her position. As the research presented in this module demonstrates, we are adept and efficient at making these judgments and predictions, but they are not made in a vacuum. Ultimately, our perception of the social world is a subjective experience, and, consequently, our decisions are influenced by our experiences, expectations, emotions, motivations, and current contexts. Being aware of when our judgments are most accurate, and how our judgments are shaped by social influences, prepares us to be in a much better position to appreciate, and potentially counter, their effects.

Outside Resources

Video: Daniel Gilbert discussing affective forecasting.

http://www.dailymotion.com/video/xebnl3_dan-gilbert-on-what-affective-forec_people#.UQlwDx3WLm4

Video: Focus on heuristics.

<http://study.com/academy/lesson/heuristics.html>

Web: BBC Horizon documentary How to Make Better Decisions that discusses many module topics (Part 1).

<http://www.youtube.com/watch?v=uI-FqOfX-t8>

Web: Implicit Attitudes Test.

<https://implicit.harvard.edu/implicit/>

Discussion Questions

1. Describe your event-schema, or script, for an event that you encounter regularly (e.g., dining at a restaurant). Now, attempt to articulate a script for an event that you have encountered only once or a few times. How are these scripts different? How confident are you in your ability to navigate these two events?
2. Think of a time when you made a decision that you thought would make you very happy (e.g., purchasing an item). To what extent were you accurate or inaccurate? In what ways were you wrong, and why do you think you were wrong?
3. What is an issue you feel strongly about (e.g., abortion, death penalty)? How would you react if research demonstrated that your opinion was wrong? What would it take before you would believe the evidence?
4. Take an implicit association test at the Project Implicit website (<https://implicit.harvard.edu/implicit>). How do your results match or mismatch your explicit attitudes.

Vocabulary

Affective forecasting

Predicting how one will feel in the future after some event or decision.

Attitude

A psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor.

Automatic

A behavior or process has one or more of the following features: unintentional, uncontrollable, occurring outside of conscious awareness, and cognitively efficient.

Availability heuristic

A heuristic in which the frequency or likelihood of an event is evaluated based on how easily instances of it come to mind.

Chameleon effect

The tendency for individuals to nonconsciously mimic the postures, mannerisms, facial expressions, and other behaviors of one's interaction partners.

Directional goals

The motivation to reach a particular outcome or judgment.

Durability bias

A bias in affective forecasting in which one overestimates for how long one will feel an emotion (positive or negative) after some event.

Evaluative priming task

An implicit attitude task that assesses the extent to which an attitude object is associated with a positive or negative valence by measuring the time it takes a person to label an adjective as good or bad after being presented with an attitude object.

Explicit attitude

An attitude that is consciously held and can be reported on by the person holding the attitude.

Heuristics

A mental shortcut or rule of thumb that reduces complex mental problems to more simple

rule-based decisions.

Hot cognition

The mental processes that are influenced by desires and feelings.

Impact bias

A bias in affective forecasting in which one overestimates the strength or intensity of emotion one will experience after some event.

Implicit Association Test

An implicit attitude task that assesses a person's automatic associations between concepts by measuring the response times in pairing the concepts.

Implicit attitude

An attitude that a person cannot verbally or overtly state.

Implicit measures of attitudes

Measures of attitudes in which researchers infer the participant's attitude rather than having the participant explicitly report it.

Mood-congruent memory

The tendency to be better able to recall memories that have a mood similar to our current mood.

Motivated skepticism

A form of bias that can result from having a directional goal in which one is skeptical of evidence despite its strength because it goes against what one wants to believe.

Need for closure

The desire to come to a decision that will resolve ambiguity and conclude an issue.

Planning fallacy

A cognitive bias in which one underestimates how long it will take to complete a task.

Primed

A process by which a concept or behavior is made more cognitively accessible or likely to occur through the presentation of an associated concept.

Representativeness heuristic

A heuristic in which the likelihood of an object belonging to a category is evaluated based on the extent to which the object appears similar to one's mental representation of the category.

Schema

A mental model or representation that organizes the important information about a thing, person, or event (also known as a script).

Social cognition

The study of how people think about the social world.

Stereotypes

Our general beliefs about the traits or behaviors shared by group of people.

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21

Conformity and Obedience

Jerry M. Burger

We often change our attitudes and behaviors to match the attitudes and behaviors of the people around us. One reason for this conformity is a concern about what other people think of us. This process was demonstrated in a classic study in which college students deliberately gave wrong answers to a simple visual judgment task rather than go against the group. Another reason we conform to the norm is because other people often have information we do not, and relying on norms can be a reasonable strategy when we are uncertain about how we are supposed to act. Unfortunately, we frequently misperceive how the typical person acts, which can contribute to problems such as the excessive binge drinking often seen in college students. Obeying orders from an authority figure can sometimes lead to disturbing behavior. This danger was illustrated in a famous study in which participants were instructed to administer painful electric shocks to another person in what they believed to be a learning experiment. Despite vehement protests from the person receiving the shocks, most participants continued the procedure when instructed to do so by the experimenter. The findings raise questions about the power of blind obedience in deplorable situations such as atrocities and genocide. They also raise concerns about the ethical treatment of participants in psychology experiments.

Learning Objectives

- Become aware of how widespread conformity is in our lives and some of the ways each of us changes our attitudes and behavior to match the norm.
- Understand the two primary reasons why people often conform to perceived norms.
- Appreciate how obedience to authority has been examined in laboratory studies and some of the implications of the findings from these investigations.
- Consider some of the remaining issues and sources of controversy surrounding Milgram's

obedience studies.

Introduction

When he was a teenager, my son often enjoyed looking at photographs of me and my wife taken when we were in high school. He laughed at the hairstyles, the clothing, and the kind of glasses people wore "back then." And when he was through with his ridiculing, we would point out that no one is immune to fashions and fads and that someday his children will probably be equally amused by his high school photographs and the trends he found so normal at the time.

Everyday observation confirms that we often adopt the actions and attitudes of the people around us. Trends in clothing, music, foods, 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 behaviors 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**.



Fashion trends serve as good, and sometimes embarrassing, examples of our own susceptibility to conformity. [Image: bianca francesca, <https://goo.gl/0rq35>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

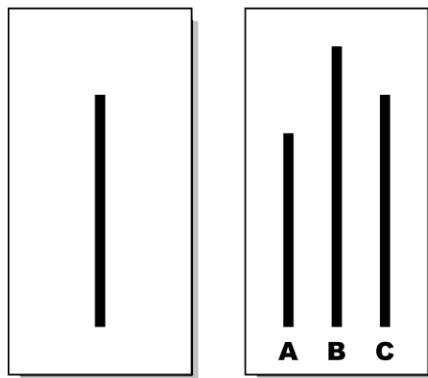
Conformity

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 behaviors 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.

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.

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,



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: Fred the Oyster, <https://goo.gl/Gi5mtu>, CC BY-SA 4.0, <https://goo.gl/zVGXn8>]

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, more conformity is found in collectivist countries such as Japan and China than in individualistic countries such as the United States (Bond & Smith, 1996). Compared with individualistic cultures, people who live in collectivist cultures place a higher value on the goals of the group than on individual preferences. They also are more motivated to maintain harmony in their interpersonal relations.

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, Reno, & Kallgren, 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. If you have ever been part of a conversation that went something like this,

"Do you think we should?"

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

"Sure. Everyone else is doing it.",

you have experienced the power of informational influence.

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 (Neighbors, Lee, Lewis, Fosso, & Larimer, 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, Haines, & Rice, 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, LaSalvia, Hendricks, Mehdipour, & Neudeck, 2011; Neighbors, Lee, Lewis, Fosso, & Walter, 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, 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



Efforts to influence people to engage in healthier or more sustainable behaviors have benefitted from the informational influence. For example, hotels have been able to significantly increase the numbers of people who re-use bath towels (reducing water and energy use) by informing them on signs in their rooms that re-using towels is a typical behavior of other hotel guests. [Image: Infrogmation of New Orleans, <https://goo.gl/5P5F0v>, CC BY 2.0, <https://goo.gl/BRvSA7>]

did (Goldstein, Cialdini, & Griskevicius, 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 behavior—massacres, atrocities, and even genocide.

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. In all but one variation of the basic procedure, participants were men recruited from the community surrounding Yale University, where the research was carried



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: ...your local connection, <https://goo.gl/ut9fvk>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

out. These citizens signed up for what they believed to be an experiment on learning and memory. In particular, they were told the research concerned the effects of punishment on learning. Three people were involved in each session. One was the participant. Another was the experimenter. The third was a confederate who pretended to be another participant.

The experimenter explained that the study consisted of a memory test and that one of the men would be the teacher and the other the learner. Through a rigged drawing, the real participant was always assigned the teacher's role and the confederate was always the learner. The teacher watched as the learner was strapped into a chair and had electrodes attached to his wrist. The teacher then moved to the room next door where he was seated in front of a large metal box the experimenter identified as a "shock generator." The front of the box displayed gauges and lights and, most noteworthy, a series of 30 levers across the bottom. Each lever was labeled with a voltage figure, starting with 15 volts and moving up in 15-volt increments to 450 volts. Labels also indicated the strength of the shocks, starting with "Slight Shock" and moving up to "Danger: Severe Shock" toward the end. The last two levers were simply labeled "XXX" in red.

Through a microphone, the teacher administered a memory test to the learner in the next room. The learner responded to the multiple-choice items by pressing one of four buttons that were barely within reach of his strapped-down hand. If the teacher saw the correct answer light up on his side of the wall, he simply moved on to the next item. But if the learner got the item wrong, the teacher pressed one of the shock levers and, thereby, delivered the learner's punishment. The teacher was instructed to start with the 15-volt lever and move up to the next highest shock for each successive wrong answer.

In reality, the learner received no shocks. But he did make a lot of mistakes on the test, which forced the teacher to administer what he believed to be increasingly strong shocks. The purpose of the study was to see how far the teacher would go before refusing to continue. The teacher's first hint that something was amiss came after pressing the 75-volt lever and hearing through the wall the learner say "Ugh!" The learner's reactions became stronger and louder with each lever press. At 150 volts, the learner yelled out, "Experimenter! That's all. Get me out of here. I told you I had heart trouble. My heart's starting to bother me now. Get me out of here, please. My heart's starting to bother me. I refuse to go on. Let me out."

The experimenter's role was to encourage the participant to continue. If at any time the teacher asked to end the session, the experimenter responded with phrases such as, "The experiment requires that you continue," and "You have no other choice, you must go on." The experimenter ended the session only after the teacher stated four successive times that he did not want to continue. All the while, the learner's protests became more intense with each shock. After 300

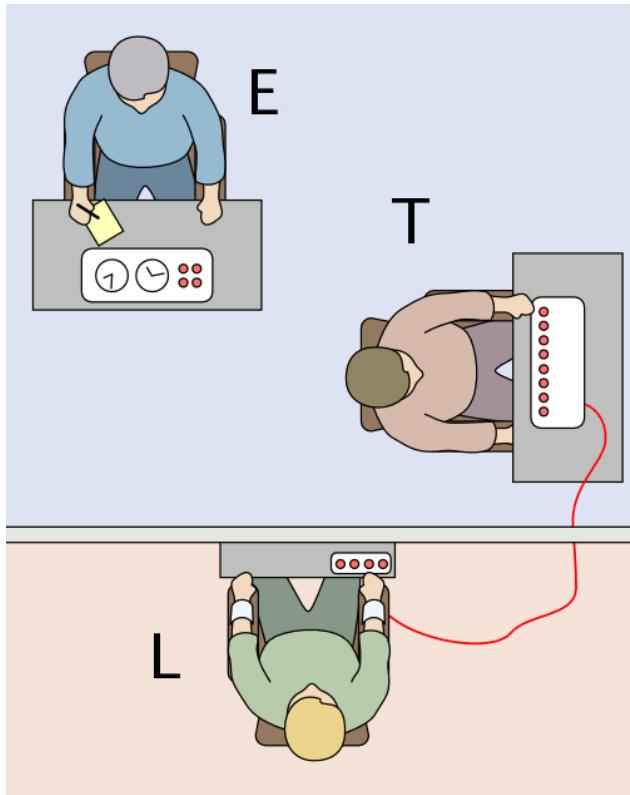


Diagram of the Milgram Experiment in which the "teacher" (T) was asked to deliver a (supposedly) painful electric shock to the "learner"(L). Would this experiment be approved by a review board today? [Image: Fred the Oyster, <https://goo.gl/ZlbQz1>, CC BY-SA 4.0, <https://goo.gl/X3i0tq>]

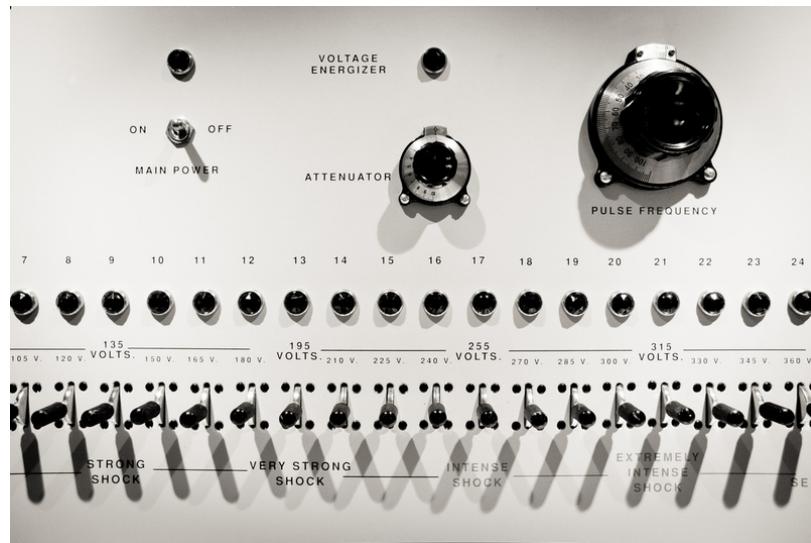
described here, 65 percent of the participants continued to administer shocks to the very end of the session. These were not brutal, sadistic men. They were ordinary citizens who nonetheless followed the experimenter's instructions to administer what they believed to be excruciating if not dangerous electric shocks to an innocent person. The disturbing implication from the findings is that, under the right circumstances, each of us may be capable of acting in some very uncharacteristic and perhaps some very unsettling ways.

Milgram conducted many variations of this basic procedure to explore some of the factors that affect obedience. He found that obedience rates decreased when the learner was in the same room as the experimenter and declined even further when the teacher had to physically touch the learner to administer the punishment. Participants also were less willing to continue the procedure after seeing other teachers refuse to press the shock levers, and they were significantly less obedient when the instructions to continue came from a person they believed to be another participant rather than from the experimenter. Finally, Milgram found that women participants followed the experimenter's instructions at exactly the same rate the men had.

volts, the learner refused to answer any more questions, which led the experimenter to say that no answer should be considered a wrong answer. After 330 volts, despite vehement protests from the learner following previous shocks, the teacher heard only silence, suggesting that the learner was now physically unable to respond. If the teacher reached 450 volts—the end of the generator—the experimenter told him to continue pressing the 450 volt lever for each wrong answer. It was only after the teacher pressed the 450-volt lever three times that the experimenter announced that the study was over.

If you had been a participant in this research, what would you have done? Virtually everyone says he or she would have stopped early in the process. And most people predict that very few if any participants would keep pressing all the way to 450 volts. Yet in the basic procedure

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 behavior 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 a half a century ago (Burger, 2009).



If you had been "a teacher" in the Milgram experiment, would you have behaved differently than the majority who delivered what they thought were massive 450-volt shocks? [Image: Sharon Drummond, <https://goo.gl/uQZGtZ>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

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 defense, 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.

Outside Resources

Student Video: Christine N. Winston and Hemali Maher's 'The Milgram Experiment' gives an excellent 3-minute overview of one of the most famous experiments in the history of psychology. It was one of the winning entries in the 2015 Noba Student Video Award.

https://www.youtube.com/watch?v=uVIUZwkM_G0

Video: An example of information influence in a field setting

<http://www.youtube.com/watch?v=4yFeaS60nWk>

Video: Scenes from a recent partial replication of Milgram's obedience studies

<http://www.youtube.com/watch?v=HwqNP9HRy7Y>

Video: Scenes from a recent replication of Asch's conformity experiment

<http://www.youtube.com/watch?v=VgDx5g9ql1g>

Web: Website devoted to scholarship and research related to Milgram's obedience studies

<http://www.stanleymilgram.com>

Discussion Questions

1. In what ways do you see normative influence operating among you and your peers? How difficult would it be to go against the norm? What would it take for you to not do something just because all your friends were doing it?
2. What are some examples of how informational influence helps us do the right thing? How can we use descriptive norm information to change problem behaviors?
3. Is conformity more likely or less likely to occur when interacting with other people through social media as compared to face-to-face encounters?
4. When is obedience to authority a good thing and when is it bad? What can be done to prevent people from obeying commands to engage in truly deplorable behavior such as atrocities and massacres?
5. In what ways do Milgram's experimental procedures fall outside the guidelines for research with human participants? Are there ways to conduct relevant research on obedience to authority without violating these guidelines?

Vocabulary

Conformity

Changing one's attitude or behavior to match a perceived social norm.

Descriptive norm

The perception of what most people do in a given situation.

Informational influence

Conformity that results from a concern to act in a socially approved manner as determined by how others act.

Normative influence

Conformity that results from a concern for what other people think of us.

Obedience

Responding to an order or command from a person in a position of authority.

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22

Persuasion: So Easily Fooled

Robert V. Levine

This module introduces several major principles in the process of persuasion. It offers an overview of the different paths to persuasion. It then describes how mindless processing makes us vulnerable to undesirable persuasion and some of the “tricks” that may be used against us.

Learning Objectives

- Recognize the difference between the central and peripheral routes to persuasion.
- Understand the concepts of trigger features, fixed action patterns, heuristics, and mindless thinking, and how these processes are essential to our survival but, at the same time, leave us vulnerable to exploitation.
- Understand some common “tricks” persuasion artists may use to take advantage of us.
- Use this knowledge to make you less susceptible to unwanted persuasion.

Introduction

Have you ever tried to swap seats with a stranger on an airline? Ever negotiated the price of a car? Ever tried to convince someone to recycle, quit smoking, or make a similar change in health behaviors? If so, you are well versed with how persuasion can show up in everyday life.

Persuasion has been defined as “the process by which a message induces change in beliefs, attitudes, or behaviors” (Myers, 2011). Persuasion can take many forms. It may, for example,

differ in whether it targets public compliance or private acceptance, is short-term or long-term, whether it involves slowly escalating commitments or sudden interventions and, most of all, in the benevolence of its intentions. When persuasion is well-meaning, we might call it education. When it is manipulative, it might be called mind control (Levine, 2003).

Whatever the content, however, there is a similarity to the form of the persuasion process itself. As the advertising commentator Sid Bernstein once observed, "Of course, you sell candidates for political office the same way you sell soap or sealing wax or whatever; because, when you get right down to it, that's the only way anything is sold" (Levine, 2003).

Persuasion is one of the most studied of all social psychology phenomena. This module provides an introduction to several of its most important components.



The instruments of persuasion work the same for selling products or politicians. [Image: ifwinterends, <https://goo.gl/BxiDC0>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

Two Paths to Persuasion

Persuasion theorists distinguish between the **central** and **peripheral** routes to persuasion (Petty & Cacioppo, 1986). The central route employs direct, relevant, logical messages. This

method rests on the assumption that the audience is motivated, will think carefully about what is presented, and will react on the basis of your arguments. The central route is intended to produce enduring agreement. For example, you might decide to vote for a particular political candidate after hearing her speak and finding her logic and proposed policies to be convincing.

The peripheral route, on the other hand, relies on superficial cues that have little to do with logic. The peripheral approach is the salesman's way of thinking. It requires a target who *isn't* thinking carefully about what you are saying. It requires low effort from the target and often exploits rule-of-thumb **heuristics** that trigger mindless reactions (see below). It may be intended to persuade you to do something you do not want to do and might later be sorry you did. Advertisements, for example, may show celebrities, cute animals, beautiful scenery, or provocative sexual images that have nothing to do with the product. The peripheral approach is also common in the darkest of persuasion programs, such as those of dictators and cult leaders. Returning to the example of voting, you can experience the peripheral route in action when you see a provocative, emotionally charged political advertisement that tugs at you to vote a particular way.

Triggers and Fixed Action Patterns

The central route emphasizes objective communication of information. The peripheral route relies on psychological techniques. These techniques may take advantage of a target's not thinking carefully about the message. The process mirrors a phenomenon in animal behavior known as **fixed action patterns (FAPs)**. These are sequences of behavior that occur in exactly the same fashion, in exactly the same order, every time they're elicited. Cialdini (2008) compares it to a prerecorded tape that is turned on and, once it is, always plays to its finish. He describes it as if the animal were turning on a tape recorder (Cialdini, 2008). There is the feeding tape, the territorial tape, the migration tape, the nesting tape, the aggressive tape—each sequence ready to be played when a situation calls for it.

In humans fixed action patterns include many of the activities we engage in while mentally on "auto-pilot." These behaviors are so automatic that it is very difficult to control them. If you ever feed a baby, for instance, nearly everyone mimics each bite the baby takes by opening and closing their own mouth! If two people near you look up and point you will automatically look up yourself. We also operate in a reflexive, non-thinking way when we make many decisions. We are more likely, for example, to be less critical about medical advice dispensed from a doctor than from a friend who read an interesting article on the topic in a popular

magazine.

A notable characteristic of fixed action patterns is how they are activated. At first glance, it appears the animal is responding to the overall situation. For example, the maternal tape appears to be set off when a mother sees her hungry baby, or the aggressive tape seems to be activated when an enemy invades the animal's territory. It turns out, however, that the on/off switch may actually be controlled by a specific, minute detail of the situation—maybe a sound or shape or patch of color. These are the hot buttons of the biological world—what Cialdini refers to as "trigger features" and biologists call "releasers."



Certain triggers can cause people to switch into an automatic pattern of behavior. In an experiment, potential customers were more easily persuaded to buy when they heard the words "for a good cause." [Image: joelorama, <https://goo.gl/FLXszT>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

cause. The phrase "for a good cause" was an influential enough hot button that the exact cause didn't seem to matter.

The effectiveness of peripheral persuasion relies on our frequent reliance on these sorts of fixed action patterns and trigger features. These mindless, rules-of-thumb are generally effective shortcuts for coping with the overload of information we all must confront. They serve as heuristics—mental shortcuts-- that enable us to make decisions and solve problems quickly and efficiently. They also, however, make us vulnerable to uninvited exploitation

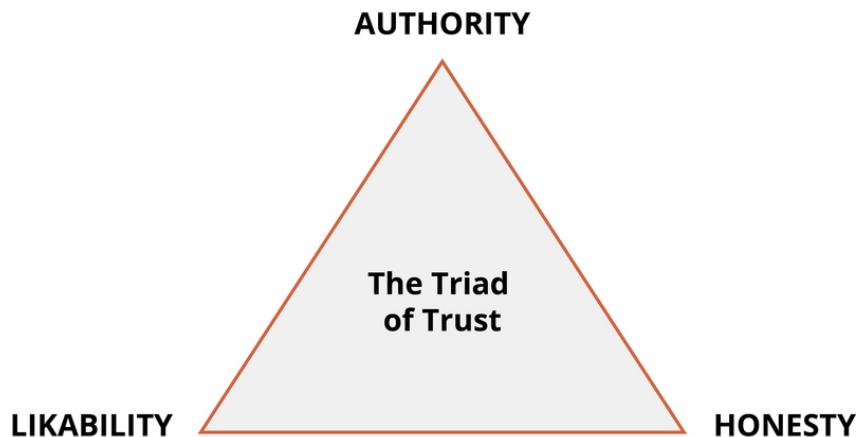
Humans are not so different. Take the example of a study conducted on various ways to promote a campus bake sale for charity (Levine, 2003). Simply displaying the cookies and other treats to passersby did not generate many sales (only 2 out of 30 potential customers made a purchase). In an alternate condition, however, when potential customers were asked to "buy a cookie for a good cause" the number rose to 12 out of 30. It seems that the phrase "a good cause" triggered a willingness to act. In fact, when the phrase "a good cause" was paired with a locally-recognized charity (known for its food-for-the-homeless program) the numbers held steady at 14 out of 30. When a fictional good cause was used instead (the make believe "Levine House") still 11 out of 30 potential customers made purchases and not one asked about the purpose or nature of the

through the peripheral route of persuasion.

The Source of Persuasion: The Triad of Trustworthiness

Effective persuasion requires trusting the source of the communication. Studies have identified three characteristics that lead to trust: perceived authority, honesty, and likability.

When the source appears to have any or all of these characteristics, people not only are more willing to agree to their request but are willing to do so without carefully considering the facts. We assume we are on safe ground and are happy to shortcut the tedious process of informed decision making. As a result, we are more susceptible to messages and requests, no matter their particular content or how peripheral they may be.



Authority

From earliest childhood, we learn to rely on authority figures for sound decision making because their authority signifies status and power, as well as expertise. These two facets often work together. Authorities such as parents and teachers are not only our primary sources of wisdom while we grow up, but they control us and our access to the things we want. In addition, we have been taught to believe that respect for authority is a moral virtue. As adults, it is natural to transfer this respect to society's designated authorities, such as judges, doctors, bosses, and religious leaders. We assume their positions give them special access to information and power. Usually we are correct, so that our willingness to defer to authorities becomes a convenient shortcut to sound decision making. Uncritical trust in authority may, however, lead to bad decisions. Perhaps the most famous study ever conducted in social psychology demonstrated that, when conditions were set up just so, two-thirds of a sample

of psychologically normal men were willing to administer potentially lethal shocks to a stranger when an apparent authority in a laboratory coat ordered them to do so (Milgram, 1974; Burger, 2009).

Uncritical trust in authority can be problematic for several reasons. First, even if the source of the message is a legitimate, well-intentioned authority, they may not always be correct. Second, when respect for authority becomes mindless, expertise in one domain may be confused with expertise in general. To assume there is credibility when a successful actor promotes a cold remedy, or when a psychology professor offers his views about politics, can lead to problems. Third, the authority may not be legitimate. It is not difficult to fake a college degree or professional credential or to buy an official-looking badge or uniform.

Honesty

Honesty is the moral dimension of trustworthiness. Persuasion professionals have long understood how critical it is to their efforts. Marketers, for example, dedicate exorbitant resources to developing and maintaining an image of honesty. A trusted brand or company name becomes a mental shortcut for consumers. It is estimated that some 50,000 new products come out each year. Forrester Research, a marketing research company,

calculates that children have seen almost six million ads by the age of 16. An established brand name helps us cut through this volume of information. It signals we are in safe territory. "The real suggestion to convey," advertising leader Theodore MacManus observed in 1910, "is that the man manufacturing the product is an honest man, and the product is an honest product, to be preferred above all others" (Fox, 1997).



People tend to favor products that are associated with people they like. This is the key ingredient to celebrity endorsements. While there are a lot of factors that can contribute to likability, being physically attractive is one of the most influential. [Image: DFID, <https://goo.gl/KfFvvi>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Likability

If we know that celebrities aren't really experts, and that they are being paid to say what they're saying, why do their endorsements sell so many products?

Ultimately, it is because we like them. More than any single quality, we trust people we like. Roger Ailes, a public relations adviser to Presidents Reagan and George H.W. Bush, observed: "If you could master one element of personal communication that is more powerful than anything . . . it is the quality of being likable. I call it the magic bullet, because if your audience likes you, they'll forgive just about everything else you do wrong. If they don't like you, you can hit every rule right on target and it doesn't matter."

The mix of qualities that make a person likable are complex and often do not generalize from one situation to another. One clear finding, however, is that physically attractive people tend to be liked more. In fact, we prefer them to a disturbing extent: Various studies have shown we perceive attractive people as smarter, kinder, stronger, more successful, more socially skilled, better poised, better adjusted, more exciting, more nurturing, and, most important, of higher moral character. All of this is based on no other information than their physical appearance (e.g., Dion, Berscheid, & Walster, 1972).

Manipulating the Perception of Trustworthiness

The perception of trustworthiness is highly susceptible to manipulation. Levine (2003) lists some of the most common psychological strategies that are used to achieve this effect:

Manipulating Trustworthiness	
Testimonials & Endorsements	Presenting the Message as Education
"Word of Mouth"	The Maven

Testimonials and Endorsement

This technique employs someone who people already trust to testify about the product or message being sold. The technique goes back to the earliest days of advertising when satisfied customers might be shown describing how a patent medicine cured their life-long battle with "nerves" or how Dr. Scott's Electric Hair Brush healed their baldness ("My hair (was) falling out, and I was rapidly becoming bald, but since using the brush a thick growth of hair has made its appearance, quite equal to that I had before previous to its falling out," reported a satisfied

customer in an 1884 ad for the product). Similarly, Kodak had Prince Henri D'Orleans and others endorse the superior quality of their camera ("The results are marvellous[sic]. The enlargements which you sent me are superb," stated Prince Henri D'Orleans in a 1888 ad).

Celebrity endorsements are a frequent feature in commercials aimed at children. The practice has aroused considerable ethical concern, and research shows the concern is warranted. In a study funded by the Federal Trade Commission, more than 400 children ages 8 to 14 were shown one of various commercials for a model racing set. Some of the commercials featured an endorsement from a famous race car driver, some included real racing footage, and others included neither. Children who watched the celebrity endorser not only preferred the toy cars more but were convinced the endorser was an expert about the toys. This held true for children of all ages. In addition, they believed the toy race cars were bigger, faster, and more complex than real race cars they saw on film. They were also less likely to believe the commercial was staged (Ross et al., 1984).

Presenting the Message as Education

The message may be framed as objective information. Salespeople, for example, may try to convey the impression they are less interested in selling a product than helping you make the best decision. The implicit message is that being informed is in everyone's best interest, because they are confident that when you understand what their product has to offer that you will conclude it is the best choice. Levine (2003) describes how, during training for a job as a used car salesman, he was instructed: "If the customer tells you they do not want to be bothered by a salesperson, your response is 'I'm not a salesperson, I'm a product consultant. I don't give prices or negotiate with you. I'm simply here to show you our inventory and help you find a vehicle that will fit your needs.'"

Word of Mouth

Imagine you read an ad that claims a new restaurant has the best food in your city. Now, imagine a friend tells you this new restaurant has the best food in the city. Who are you more likely to believe? Surveys show we turn to people around us for many decisions. A 1995 poll found that 70% of Americans rely on personal advice when selecting a new doctor. The same poll found that 53% of moviegoers are influenced by the recommendation of a person they know. In another survey, 91% said they're likely to use another person's recommendation when making a major purchase.

Persuasion professionals may exploit these tendencies. Often, in fact, they pay for the surveys.

Using this data, they may try to disguise their message as word of mouth from your peers. For example, Cornerstone Promotion, a leading marketing firm that advertises itself as under-the-radar marketing specialists, sometimes hires children to log into chat rooms and pretend to be fans of one of their clients or pays students to throw parties where they subtly circulate marketing material among their classmates.

The Maven

More persuasive yet, however, is to involve peers face-to-face. Rather than over-investing in formal advertising, businesses and organizations may plant seeds at the grassroots level hoping that consumers themselves will then spread the word to each other. The seeding process begins by identifying so-called information hubs—individuals the marketers believe can and will reach the most other people.

The seeds may be planted with established opinion leaders. Software companies, for example, give advance copies of new computer programs to professors they hope will recommend it to students and colleagues. Pharmaceutical companies regularly provide travel expenses and speaking fees to researchers willing to lecture to health professionals about the virtues of their drugs. Hotels give travel agents free weekends at their resorts in the hope they'll later recommend them to clients seeking advice.

There is a Yiddish word, maven, which refers to a person who's an expert or a connoisseur, as in a friend who knows where to get the best price on a sofa or the co-worker you can turn to for advice about where to buy a computer. They (a) know a lot of people, (b) communicate a great deal with people, (c) are more likely than others to be asked for their opinions, and (d) enjoy spreading the word about what they know and think. Most important of all, they are trusted. As a result, mavens are often targeted by persuasion professionals to help spread their message.

Other Tricks of Persuasion

There are many other mindless, mental shortcuts—heuristics and fixed action patterns—that leave us susceptible to persuasion. A few examples:

- "Free Gifts" & Reciprocity
- Social Proof
- Getting a Foot-in-the-Door

- A Door-in-the-Face
- "And That's Not All"
- The Sunk Cost Trap
- Scarcity & Psychological Reactance

Reciprocity

"There is no duty more indispensable than that of returning a kindness," wrote Cicero. Humans are motivated by a sense of equity and fairness. When someone does something for us or gives us something, we feel obligated to return the favor in kind. It triggers one of the most powerful of social norms, the **reciprocity** rule, whereby we feel compelled to repay, in equitable value, what another person has given to us.

Gouldner (1960), in his seminal study of the reciprocity rule, found it appears in every culture. It lays the basis for virtually every type of social relationship, from the legalities of business arrangements to the subtle exchanges within a romance. A salesperson may offer free gifts, concessions, or their valuable time in order to get us to do something for them in return. For example, if a colleague helps you when you're busy with a project, you might feel obliged to support her ideas for improving team processes. You might decide to buy more from a supplier if they have offered you an aggressive discount. Or, you might give money to a charity fundraiser who has given you a flower in the street (Cialdini, 2008; Levine, 2003).

Social Proof

If everyone is doing it, it must be right. People are more likely to work late if others on their team are doing the same, to put a tip in a jar that already contains money, or eat in a restaurant that is busy. This principle derives from two extremely powerful social forces—social comparison and conformity. We compare our behavior to what others are doing and, if there is a discrepancy between the other person and ourselves, we feel pressure to change (Cialdini, 2008).

The principle of **social proof** is so common that it easily passes unnoticed. Advertisements, for example, often consist of little more than attractive social models appealing to our desire to be one of the group. For example, the German candy company Haribo suggests that when you purchase their products you are joining a larger society of satisfied customers: "Kids and grown-ups love it so-- the happy world of Haribo". Sometimes social cues are presented with such specificity that it is as if the target is being manipulated by a puppeteer—for example,

the laugh tracks on situation comedies that instruct one not only when to laugh but how to laugh. Studies find these techniques work. Fuller and Skeehy-Skeffington (1974), for example, found that audiences laughed longer and more when a laugh track accompanied the show than when it did not, even though respondents knew the laughs they heard were connived by a technician from old tapes that had nothing to do with the show they were watching. People are particularly susceptible to social proof (a) when they are feeling uncertain, and (b) if the people in the comparison group seem to be similar to ourselves. As P.T. Barnum once said, "Nothing draws a crowd like a crowd."

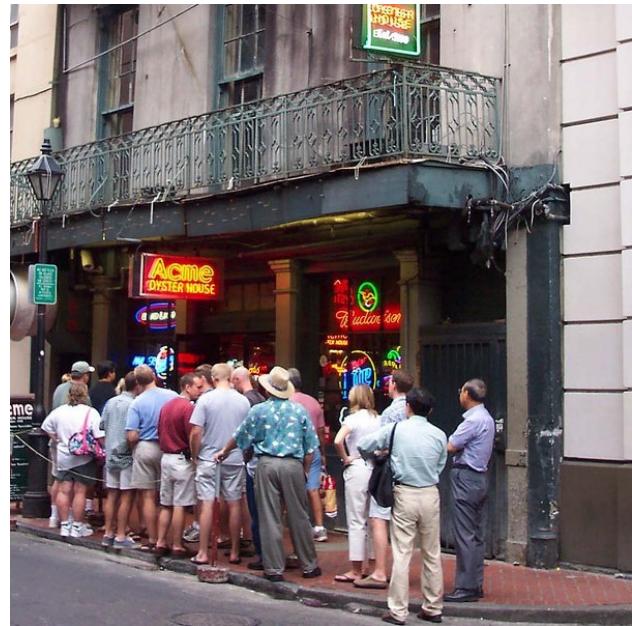
Commitment and Consistency

Westerners have a desire to both feel and be perceived to act consistently. Once we have made an initial commitment, it is more likely that we will agree to subsequent commitments that follow from the first. Knowing this, a clever persuasion artist might induce someone to agree to a difficult-to-refuse small request and follow this with progressively larger requests that were his target from the beginning. The process is known as getting a **foot in the door** and then **slowly escalating the commitments**.

Paradoxically, we are less likely to say "No" to a large request than we are to a small request when it follows this pattern. This can have costly consequences. Levine (2003), for example, found ex-cult members tend to agree with the statement: "Nobody ever joins a cult. They just postpone the decision to leave."

A Door in the Face

Some techniques bring a paradoxical approach to the escalation sequence by pushing a request to or beyond its acceptable limit and then backing off. In the door-in-the-face (sometimes called the reject-then-compromise) procedure, the persuader begins with a large request they expect will be rejected. They want the door to be slammed in their face. Looking



While few people really like to wait in long lines, we might do it anyway in certain situations. If enough people are willing to wait it (usually) is a sign that there is something worth having at the end. A line in front of a restaurant, movie, etc. is social proof that will likely influence other people to try. [Image: Bill Badzo, <https://goo.gl/fPdNVn>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

forlorn, they now follow this with a smaller request, which, unknown to the customer, was their target all along.

In one study, for example, Mowen and Cialdini (1980), posing as representatives of the fictitious "California Mutual Insurance Co.," asked university students walking on campus if they'd be willing to fill out a survey about safety in the home or dorm. The survey, students were told, would take about 15 minutes. Not surprisingly, most of the students declined—only one out of four complied with the request. In another condition, however, the researchers door-in-the-faced them by beginning with a much larger request. "The survey takes about two hours," students were told. Then, after the subject declined to participate, the experimenters retreated to the target request: ". . . look, one part of the survey is particularly important and is fairly short. It will take only 15 minutes to administer." Almost twice as many now complied.

And That's Not All!

The that's-not-all technique also begins with the salesperson asking a high price. This is followed by several seconds' pause during which the customer is kept from responding. The salesperson then offers a better deal by either lowering the price or adding a bonus product. That's-not-all is a variation on door-in-the-face. Whereas the latter begins with a request that will be rejected, however, that's-not-all gains its influence by putting the customer on the fence, allowing them to waver and then offering them a comfortable way off.

Burger (1986) demonstrated the technique in a series of field experiments. In one study, for example, an experimenter-salesman told customers at a student bake sale that cupcakes cost 75 cents. As this price was announced, another salesman held up his hand and said, "Wait a second," briefly consulted with the first salesman, and then announced ("that's-not-all") that the price today included two cookies. In a control condition, customers were offered the cupcake and two cookies as a package for 75 cents right at the onset. The bonus worked magic: Almost twice as many people bought cupcakes in the that's-not-all condition (73%) than in the control group (40%).

The Sunk Cost Trap

Sunk cost is a term used in economics referring to nonrecoverable investments of time or money. The trap occurs when a person's aversion to loss impels them to throw good money after bad, because they don't want to waste their earlier investment. This is vulnerable to manipulation. The more time and energy a cult recruit can be persuaded to spend with the group, the more "invested" they will feel, and, consequently, the more of a loss it will feel to

leave that group. Consider the advice of billionaire investor Warren Buffet: "When you find yourself in a hole, the best thing you can do is stop digging" (Levine, 2003).

Scarcity and Psychological Reactance



People may be more attracted to an opportunity when supplies or time is limited. [Image: Peter Rukavina, <https://goo.gl/KQ2LmT>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

the toy. When confronted with this wall of inaccessibility, the boys headed directly for the forbidden fruit, touching it three times as quickly as the accessible toy.

Research shows that much of that 2-year-old remains in adults, too. People resent being controlled. When a person seems too pushy, we get suspicious, annoyed, often angry, and yearn to retain our freedom of choice more than before. Brehm (1966) labeled this the principle of psychological reactance.

The most effective way to circumvent psychological reactance is to first get a foot in the door and then escalate the demands so gradually that there is seemingly nothing to react against. Hassan (1988), who spent many years as a higher-up in the "Moonies" cult, describes how they would shape behaviors subtly at first, then more forcefully. The material that would make up the new identity of a recruit was doled out gradually, piece by piece, only as fast as the person was deemed ready to assimilate it. The rule of thumb was to "tell him only what he

People tend to perceive things as more attractive when their availability is limited, or when they stand to lose the opportunity to acquire them on favorable terms (Cialdini, 2008). Anyone who has encountered a willful child is familiar with this principle. In a classic study, Brehm & Weinraub (1977), for example, placed 2-year-old boys in a room with a pair of equally attractive toys. One of the toys was placed next to a plexiglass wall; the other was set behind the plexiglass. For some boys, the wall was 1 foot high, which allowed the boys to easily reach over and touch the distant toy. Given this easy access, they showed no particular preference for one toy or the other. For other boys, however, the wall was a formidable 2 feet high, which required them to walk around the barrier to touch

can accept." He continues: "Don't sell them [the converts] more than they can handle If a recruit started getting angry because he was learning too much about us, the person working on him would back off and let another member move in"

Defending Against Unwelcome Persuasion

The most commonly used approach to help people defend against unwanted persuasion is known as the "inoculation" method. Research has shown that people who are subjected to weak versions of a persuasive message are less vulnerable to stronger versions later on, in much the same way that being exposed to small doses of a virus immunizes you against full-blown attacks. In a classic study by McGuire (1964), subjects were asked to state their opinion on an issue. They were then mildly attacked for their position and then given an opportunity to refute the attack. When later confronted by a powerful argument against their initial opinion, these subjects were more resistant than were a control group. In effect, they developed defenses that rendered them immune.

Sagrin and his colleagues have developed a more aggressive version of this technique that they refer to as "stinging" (Sagrin, Cialdini, Rice, & Serna, 2002). Their studies focused on the popular advertising tactic whereby well-known authority figures are employed to sell products they know nothing about, for example, ads showing a famous astronaut pontificating on Rolex watches. In a first experiment, they found that simply forewarning people about the deviousness of these ads had little effect on peoples' inclination to buy the product later. Next, they stung the subjects. This time, they were immediately confronted with their gullibility. "Take a look at your answer to the first question. Did you find the ad to be even somewhat convincing? If so, then you got fooled. ... Take a look at your answer to the second question. Did you notice that this 'stockbroker' was a fake?" They were then asked to evaluate a new set of ads. The sting worked. These subjects were not only more likely to recognize the manipulativeness of deceptive ads; they were also less likely to be persuaded by them.

Anti-vulnerability trainings such as these can be helpful. Ultimately, however, the most effective defense against unwanted persuasion is to accept just how vulnerable we are. One must, first, accept that it is normal to be vulnerable and, second, to learn to recognize the danger signs when we are falling prey. To be forewarned is to be forearmed.

Conclusion

This module has provided a brief introduction to the psychological processes and subsequent "tricks" involved in persuasion. It has emphasized the peripheral route of persuasion because

this is when we are most vulnerable to psychological manipulation. These vulnerabilities are side effects of “normal” and usually adaptive psychological processes. Mindless heuristics offer shortcuts for coping with a hopelessly complicated world. They are necessities for human survival. All, however, underscore the dangers that accompany any mindless thinking.

Outside Resources

Book: Ariely, D. (2008). Predictably irrational. New York, NY: Harper.

Book: Cialdini, R. B. (2008). Influence: Science and practice (5th ed.). Boston, MA: Allyn and Bacon.

Book: Gass, R., & Seiter, J. (2010). Persuasion, social influence, and compliance gaining (4th ed.). Boston, MA: Pearson.

Book: Kahneman, D. (2012). Thinking fast and slow. New York, NY: Farrar, Straus & Giroux.

Book: Levine, R. (2006). The power of persuasion: how we're bought and sold. Hoboken, NJ: Wiley
<http://www.amazon.com/The-Power-Persuasion-Were-Bought/dp/0471763179>

Book: Tavris, C., & Aronson, E. (2011). Mistakes were made (but not by me). New York, NY: Farrar, Straus & Giroux.

Student Video 2: 'Persuasion', created by Jake Teeny and Ben Oliveto, compares the central and peripheral routes to persuasion and also looks at how techniques of persuasion such as Scarcity and Social Proof influence our consumer choices. It was one of the winning entries in the 2015 Noba Student Video Award.

<https://vimeo.com/123205124>

Student Video 3: 'Persuasion in Advertising' is a humorous look at the techniques used by companies to try to convince us to buy their products. The video was created by the team of Edward Puckering, Chris Cameron, and Kevin Smith. It was one of the winning entries in the 2015 Noba Student Video Award.

<https://www.youtube.com/watch?v=B-UnkWGCKzU>

Video: A brief, entertaining interview with the celebrity pickpocket shows how easily we can be fooled. See A Pickpocket's Tale at

<http://www.newyorker.com/online/blogs/culture/2013/01/video-the-art-of-pickpocketing.html>

Video: The documentary Outfoxed provides an excellent example of how persuasion can be masked as news and education.

<http://www.outfoxed.org/>

Discussion Questions

1. Imagine you are commissioned to create an ad to sell a new beer. Can you give an example of an ad that would rely on the central route? Can you give an example of an ad that would rely on the peripheral route?
2. The reciprocity principle can be exploited in obvious ways, such as giving a customer a free sample of a product. Can you give an example of a less obvious way it might be exploited? What is a less obvious way that a cult leader might use it to get someone under his or her grip?
3. Which “trick” in this module are you, personally, most prone to? Give a personal example of this. How might you have avoided it?

Vocabulary

Central route to persuasion

Persuasion that employs direct, relevant, logical messages.

Fixed action patterns (FAPs)

Sequences of behavior that occur in exactly the same fashion, in exactly the same order, every time they are elicited.

Foot in the door

Obtaining a small, initial commitment.

Gradually escalating commitments

A pattern of small, progressively escalating demands is less likely to be rejected than a single large demand made all at once.

Heuristics

Mental shortcuts that enable people to make decisions and solve problems quickly and efficiently.

Peripheral route to persuasion

Persuasion that relies on superficial cues that have little to do with logic.

Psychological reactance

A reaction to people, rules, requirements, or offerings that are perceived to limit freedoms.

Social proof

The mental shortcut based on the assumption that, if everyone is doing it, it must be right.

The norm of reciprocity

The normative pressure to repay, in equitable value, what another person has given to us.

The rule of scarcity

People tend to perceive things as more attractive when their availability is limited, or when they stand to lose the opportunity to acquire them on favorable terms.

The triad of trust

We are most vulnerable to persuasion when the source is perceived as an authority, as honest

and likable.

Trigger features

Specific, sometimes minute, aspects of a situation that activate fixed action patterns.

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23

Prejudice, Discrimination, and Stereotyping

Susan T. Fiske

People are often biased against others outside of their own social group, showing prejudice (emotional bias), stereotypes (cognitive bias), and discrimination (behavioral bias). In the past, people used to be more explicit with their biases, but during the 20th century, when it became less socially acceptable to exhibit bias, such things like prejudice, stereotypes, and discrimination became more subtle (automatic, ambiguous, and ambivalent). In the 21st century, however, with social group categories even more complex, biases may be transforming once again.

Learning Objectives

- Distinguish prejudice, stereotypes, and discrimination.
- Distinguish old-fashioned, blatant biases from contemporary, subtle biases.
- Understand old-fashioned biases such as social dominance orientation and right-wing authoritarianism.
- Understand subtle, unexamined biases that are automatic, ambiguous, and ambivalent.
- Understand 21st century biases that may break down as identities get more complicated.

Introduction

Even in one's own family, everyone wants to be seen for who they are, not as "just another typical X." But still, people put other people into groups, using that label to inform their evaluation of the person as a whole—a process that can result in serious consequences. This



You are an individual, full of beliefs, identities, and more that help make you unique. You don't want to be labeled just by your gender or race or religion. But as complex as we perceive ourselves to be, we often define others merely by their most distinct social group. [Image: caseorganic, <https://goo.gl/PuLl4E>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

those wrongful times. Next, we will discuss late 20th century biases that affected our parents and still linger today. Finally, we will talk about today's 21st century biases that challenge fairness and respect for all.

Old-fashioned Biases: Almost Gone

You would be hard pressed to find someone today who openly admits they don't believe in equality. Regardless of one's demographics, most people believe everyone is entitled to the same, natural rights. However, as much as we now collectively believe this, not too far back in our history, this ideal of equality was an unpracticed sentiment. Of all the countries in the world, only a few have equality in their constitution, and those who do, originally defined it for a select group of people.

At the time, old-fashioned biases were simple: people openly put down those not from their own group. For example, just 80 years ago, American college students unabashedly thought Turkish people were "cruel, very religious, and treacherous" (Katz & Braly, 1933). So where did they get those ideas, assuming that most of them had never met anyone from Turkey? Old-fashioned stereotypes were overt, unapologetic, and expected to be shared by others—what

module focuses on biases against social groups, which social psychologists sort into emotional **prejudices**, mental **stereotypes**, and behavioral **discrimination**. These three aspects of bias are related, but they each can occur separately from the others (Dovidio & Gaertner, 2010; Fiske, 1998). For example, sometimes people have a negative, emotional reaction to a social group (prejudice) without knowing even the most superficial reasons to dislike them (stereotypes).

This module shows that today's biases are not yesterday's biases in many ways, but at the same time, they are troublingly similar. First, we'll discuss old-fashioned biases that might have belonged to our grandparents and great-grandparents—or even the people nowadays who have yet to leave

we now call “blatant biases.”

Blatant biases are conscious beliefs, feelings, and behavior that people are perfectly willing to admit, which mostly express hostility toward other groups (outgroups) while unduly favoring one’s own group (in-group). For example, organizations that preach contempt for other races (and praise for their own) is an example of a blatant bias. And scarily, these blatant biases tend to run in packs: People who openly hate one outgroup also hate many others. To illustrate this pattern, we turn to two personality scales next.

Social Dominance Orientation



People with a social dominance orientation are more likely to be attracted to certain types of careers, such as law enforcement, that maintain group hierarchies. [Image: Thomas Hawk, <https://goo.gl/qWQ7jE>, CC BY-NC 2.0, <https://goo.gl/VnKIK8>]

moving into this “nice neighborhood” disrupts the social hierarchy the person high in SDO believes in (i.e. living in a nice neighborhood denotes one’s place in the social hierarchy—a place reserved for one’s in-group members).

Although research has shown that people higher in SDO are more likely to be politically conservative, there are other traits that more strongly predict one’s SDO. For example, researchers have found that those who score higher on SDO are usually lower than average on tolerance, empathy, altruism, and community orientation. In general, those high in SDO

Social dominance orientation (SDO) describes a belief that group hierarchies are inevitable in all societies and are even a good idea to maintain order and stability (Sidanius & Pratto, 1999). Those who score high on SDO believe that some groups are inherently better than others, and because of this, there is no such thing as group “equality.” At the same time, though, SDO is not just about being personally dominant and controlling of others; SDO describes a preferred arrangement of groups with some on top (preferably one’s own group) and some on the bottom. For example, someone high in SDO would likely be upset if someone from an outgroup moved into his or her neighborhood. It’s not that the person high in SDO wants to “control” what this outgroup member does; it’s that

have a strong belief in work ethic—that hard work always pays off and leisure is a waste of time. People higher on SDO tend to choose and thrive in occupations that maintain existing group hierarchies (police, prosecutors, business), compared to those lower in SDO, who tend to pick more equalizing occupations (social work, public defense, psychology).

The point is that SDO—a preference for inequality as normal and natural—also predicts endorsing the superiority of certain groups: men, native-born residents, heterosexuals, and believers in the dominant religion. This means seeing women, minorities, homosexuals, and non-believers as inferior. Understandably, the first list of groups tend to score higher on SDO, while the second group tends to score lower. For example, the SDO gender difference (men higher, women lower) appears all over the world.

At its heart, SDO rests on a fundamental belief that the world is tough and competitive with only a limited number of resources. Thus, those high in SDO see groups as battling each other for these resources, with winners at the top of the social hierarchy and losers at the bottom (see Table 1).

	Social Dominance Orientation	Right-Wing Authoritarianism
Core Belief	Groups compete for economic resources	Groups compete over values
Intergroup Belief	Group hierarchies are inevitable, good	Groups must follow authority
Ingroup Belief	Ingroup must be tough, competitive	Ingroup must unite, protect
Outgroup Belief	"They" are trying to beat "us"	"They" have bad values

Table 1. Old-Fashioned Biases

Right-wing Authoritarianism

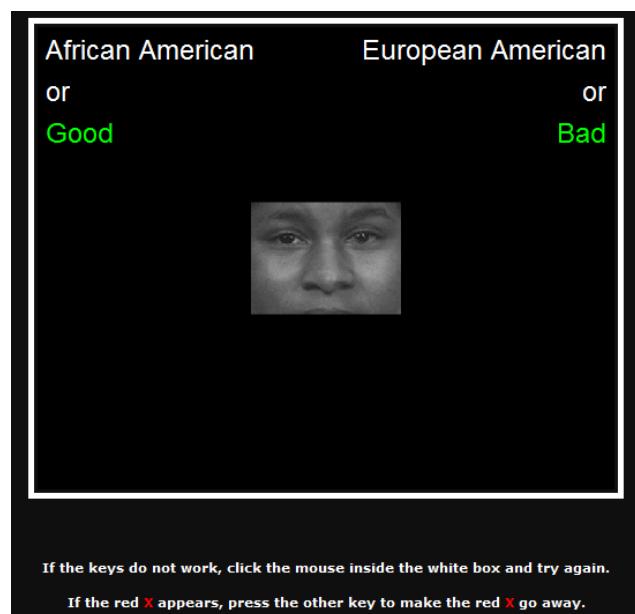
Right-wing authoritarianism (RWA) focuses on value conflicts, whereas SDO focuses on the economic ones. That is, RWA endorses respect for obedience and authority in the service of group conformity (Altemeyer, 1988). Returning to an example from earlier, the homeowner who's high in SDO may dislike the outgroup member moving into his or her neighborhood because it "threatens" one's economic resources (e.g. lowering the value of one's house; fewer openings in the school; etc.). Those high in RWA may equally dislike the outgroup member moving into the neighborhood but for different reasons. Here, it's because this outgroup

member brings in values or beliefs that the person high in RWA disagrees with, thus "threatening" the collective values of his or her group. RWA respects group unity over individual preferences, wanting to maintain group values in the face of differing opinions. Despite its name, though, RWA is not necessarily limited to people on the right (conservatives). Like SDO, there does appear to be an association between this personality scale (i.e. the preference for order, clarity, and conventional values) and conservative beliefs. However, regardless of political ideology, RWA focuses on groups' competing frameworks of values. Extreme scores on RWA predict biases against outgroups while demanding in-group loyalty and conformity. Notably, the combination of high RWA and high SDO predicts joining hate groups that openly endorse aggression against minority groups, immigrants, homosexuals, and believers in non-dominant religions (Altemeyer, 2004).

20th Century Biases: Subtle but Significant

Fortunately, old-fashioned biases have diminished over the 20th century and into the 21st century. Openly expressing prejudice is like blowing second-hand cigarette smoke in someone's face: It's just not done any more in most circles, and if it is, people are readily criticized for their behavior. Still, these biases exist in people; they're just less in view than

before. These **subtle biases** are unexamined and sometimes unconscious but real in their consequences. They are automatic, ambiguous, and ambivalent, but nonetheless biased, unfair, and disrespectful to the belief in equality.



An actual screenshot from an IAT (Implicit Association Test) that is designed to test a person's reaction time (measured in milliseconds) to an array of stimuli that are presented on the screen. This particular item is testing an individual's unconscious reaction towards members of various ethnic groups. [Image: Courtesy of Anthony Greenwald from Project Implicit]

Automatic Biases

Most people like themselves well enough, and most people identify themselves as members of certain groups but not others. Logic suggests, then, that because we like ourselves, we therefore like the groups we associate with more, whether those groups are our hometown, school, religion, gender, or ethnicity. Liking yourself and your groups is human nature. The larger issue, however, is that own-group preference often results in liking

other groups less. And whether you recognize this “favoritism” as wrong, this trade-off is relatively **automatic**, that is, unintended, immediate, and irresistible.

Social psychologists have developed several ways to measure this relatively automatic own-group preference, the most famous being the **Implicit Association Test** (IAT; Greenwald, Banaji, Rudman, Farnham, Nosek, & Mellott, 2002; Greenwald, McGhee, & Schwartz, 1998). The test itself is rather simple and you can experience it yourself if you Google “implicit” or go to *understandingprejudice.org*. Essentially, the IAT is done on the computer and measures how quickly you can sort words or pictures into different categories. For example, if you were asked to categorize “ice cream” as good or bad, you would quickly categorize it as good. However, imagine if every time you ate ice cream, you got a brain freeze. When it comes time to categorize ice cream as good or bad, you may still categorize it as “good,” but you will likely be a little slower in doing so compared to someone who has nothing but positive thoughts about ice cream. Related to group biases, people may explicitly claim they don’t discriminate against outgroups—and this is very likely true. However, when they’re given this computer task to categorize people from these outgroups, that automatic or unconscious hesitation (a result of having mixed evaluations about the outgroup) will show up in the test. And as countless studies have revealed, people are mostly faster at pairing their own group with good categories, compared to pairing others’ groups. In fact, this finding generally holds regardless if one’s group is measured according race, age, religion, nationality, and even temporary, insignificant memberships.

This all-too-human tendency would remain a mere interesting discovery except that people’s reaction time on the IAT predicts actual feelings about individuals from other groups, decisions about them, and behavior toward them, especially nonverbal behavior (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). For example, although a job interviewer may not be “blatantly biased,” his or her “automatic or implicit biases” may result in unconsciously acting distant

Type of Bias	Example	What It Shows
Automatic	Implicit Association Test	People link “good” & ingroup, “bad” & outgroup
Ambiguous	Social identity theory Self-categorized theory Aversive racism	People favor ingroup, distance from outgroup Same but emphasizes self as a member of ingroup People avoid outgroup, avoid their own prejudices
Ambivalent	Stereotype Content Model	People divide groups by warmth and competence

Table 2: Subtle Biases

and indifferent, which can have devastating effects on the hopeful interviewee's ability to perform well (Word, Zanna, & Cooper, 1973). Although this is unfair, sometimes the automatic associations—often driven by society's stereotypes—trump our own, explicit values (Devine, 1989). And sadly, this can result in consequential discrimination, such as allocating fewer resources to disliked outgroups (Rudman & Ashmore, 2009). See Table 2 for a summary of this section and the next two sections on subtle biases.

Ambiguous Biases

As the IAT indicates, people's biases often stem from the spontaneous tendency to favor their own, at the expense of the other.

Social identity theory (Tajfel, Billig, Bundy, & Flament, 1971) describes this tendency to favor one's own in-group over another's outgroup. And as a result, outgroup disliking stems from this in-group liking (Brewer & Brown, 1998). For example, if two classes of children want to play on the same soccer field, the classes will come to dislike each other not because of any real, objectionable traits about the other group. The dislike originates from each class's favoritism toward itself and the fact that only one group can play on the soccer field at a time. With this preferential perspective

for one's own group, people are not punishing the other one so much as neglecting it in favor of their own. However, to justify this preferential treatment, people will often exaggerate the differences between their in-group and the outgroup. In turn, people see the outgroup as more similar in personality than they are. This results in the perception that "they" really differ from us, and "they" are all alike. Spontaneously, people categorize people into groups just as we categorize furniture or food into one type or another. The difference is that we people inhabit categories ourselves, as **self-categorization theory** points out (Turner, 1975). Because the attributes of group categories can be either good or bad, we tend to favor the groups with people like us and incidentally disfavor the others. In-group favoritism is an ambiguous form of bias because it disfavors the outgroup by exclusion. For example, if a politician has to decide between funding one program or another, s/he may be more likely to give resources to the group that more closely represents his in-group. And this life-changing decision stems from



Whether we are aware of it or not (and usually we're not), we sort the world into "us" and "them" categories. We are more likely to treat with bias or discrimination anyone we feel is outside our own group. [Image: Keira McPhee, <https://goo.gl/gkaKBe>, CC BY 2.0, <https://goo.gl/BRvSA7>]

the simple, natural human tendency to be more comfortable with people like yourself.

A specific case of comfort with the ingroup is called aversive racism, so-called because people do not like to admit their own racial biases to themselves or others (Dovidio & Gaertner, 2010). Tensions between, say, a White person's own good intentions and discomfort with the perhaps novel situation of interacting closely with a Black person may cause the White person to feel uneasy, behave stiffly, or be distracted. As a result, the White person may give a good excuse to avoid the situation altogether and prevent any awkwardness that could have come from it. However, such a reaction will be ambiguous to both parties and hard to interpret. That is, was the White person right to avoid the situation so that neither person would feel uncomfortable? Indicators of **aversive racism** correlate with discriminatory behavior, despite being the ambiguous result of good intentions gone bad.

Bias Can Be Complicated - Ambivalent Biases

Not all stereotypes of outgroups are all bad. For example, ethnic Asians living in the United States are commonly referred to as the "model minority" because of their perceived success in areas such as education, income, and social stability. Another example includes people who feel benevolent toward traditional women but hostile toward nontraditional women. Or even ageist people who feel respect toward older adults but, at the same time, worry about the burden they place on public welfare programs. A simple way to understand these mixed feelings, across a variety of groups, results from the **Stereotype Content Model** (Fiske, Cuddy, & Glick, 2007).

When people learn about a new group, they first want to know if its intentions of the people in this group are for good or ill. Like the guard at night: "Who goes there, friend or foe?" If the other group has good, cooperative intentions, we view them as warm and trustworthy and often consider them part of "our side." However, if the other group is cold and competitive or full of exploiters, we often view them as a threat and treat them accordingly. After learning the group's intentions, though, we also want to know whether they are competent enough to act on them (if they are incompetent, or unable, their intentions matter less). These two simple dimensions—warmth and competence—together map how groups relate to each other in society.

There are common stereotypes of people from all sorts of categories and occupations that lead them to be classified along these two dimensions. For example, a stereotypical "housewife" would be seen as high in warmth but lower in competence. This is not to suggest that actual housewives are not competent, of course, but that they are not widely admired

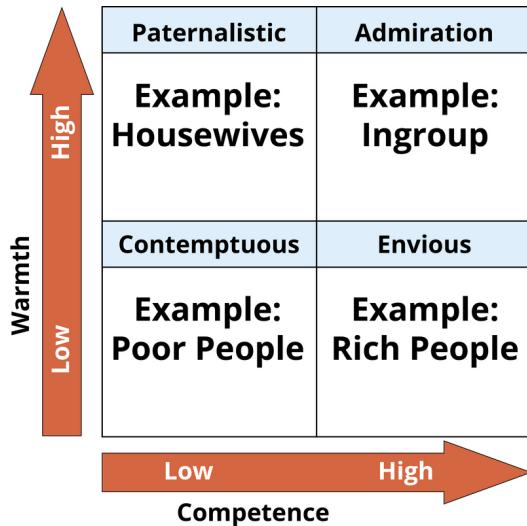


Figure 1: Stereotype Content Model - 4 kinds of stereotypes that form from perceptions of competence and warmth

for their competence in the same way as scientific pioneers, trendsetters, or captains of industry. At another end of the spectrum are homeless people and drug addicts, stereotyped as not having good intentions (perhaps exploitative for not trying to play by the rules), and likewise being incompetent (unable) to do anything useful. These groups reportedly make society more disgusted than any other groups do.

Some group stereotypes are mixed, high on one dimension and low on the other. Groups stereotyped as competent but not warm, for example, include rich people and outsiders good at business. These groups that are seen as "competent but cold" make people feel some envy, admitting that these others may have some talent but resenting them for not being "people like us." The "model minority" stereotype mentioned earlier includes people with this excessive competence but deficient sociability.

The other mixed combination is high warmth but low competence. Groups who fit this combination include older people and disabled people. Others report pitying them, but only so long as they stay in their place. In an effort to combat this negative stereotype, disability- and elderly-rights activists try to eliminate that pity, hopefully gaining respect in the process.

Altogether, these four kinds of stereotypes and their associated emotional prejudices (pride, disgust, envy, pity) occur all over the world for each of society's own groups. These maps of the group terrain predict specific types of discrimination for specific kinds of groups, underlining how bias is not exactly equal opportunity.

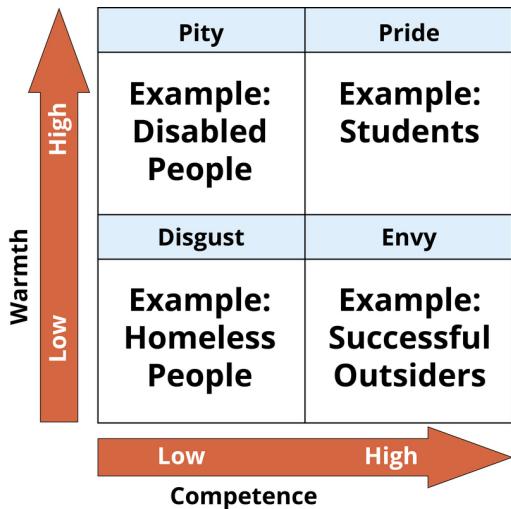


Figure 2: Combinations of perceived warmth and confidence and the associated behaviors/emotional prejudices.

Conclusion: 21st Century Prejudices

As the world becomes more interconnected—more collaborations between countries, more intermarrying between different groups—more and more people are encountering greater diversity of others in everyday life. Just ask yourself if you've ever been asked, "What *are* you?" Such a question would be preposterous if you were only surrounded by members of your own group. Categories, then, are becoming more and more uncertain, unclear, volatile, and complex (Bodenhausen & Peery, 2009). People's identities are multifaceted, intersecting across gender, race, class, age, region, and more. Identities are not so simple, but maybe as the 21st century unfurls, we will recognize each other by the content of our character instead of the cover on our outside.

Outside Resources

Web: Website exploring the causes and consequences of prejudice.

<http://www.understandingprejudice.org/>

Web: Website that provides helpful information about prejudice including definition and statistics. This content is provided by OnlinePsychology@Pepperdine, the Online Master of Psychology program from Pepperdine University.

<https://onlinepsych.pepperdine.edu/blog/prejudice-discrimination-coping-skills/>

Discussion Questions

1. Do you know more people from different kinds of social groups than your parents did?
2. How often do you hear people criticizing groups without knowing anything about them?
3. Take the IAT. Could you feel that some associations are easier than others?
4. What groups illustrate ambivalent biases, seemingly competent but cold, or warm but incompetent?
5. Do you or someone you know believe that group hierarchies are inevitable? Desirable?
6. How can people learn to get along with people who seem different from them?

Vocabulary

Automatic bias

Automatic biases are unintended, immediate, and irresistible.

Aversive racism

Aversive racism is unexamined racial bias that the person does not intend and would reject, but that avoids inter-racial contact.

Blatant biases

Blatant biases are conscious beliefs, feelings, and behavior that people are perfectly willing to admit, are mostly hostile, and openly favor their own group.

Discrimination

Discrimination is behavior that advantages or disadvantages people merely based on their group membership.

Implicit Association Test

Implicit Association Test (IAT) measures relatively automatic biases that favor own group relative to other groups.

Prejudice

Prejudice is an evaluation or emotion toward people merely based on their group membership.

Right-wing authoritarianism

Right-wing authoritarianism (RWA) focuses on value conflicts but endorses respect for obedience and authority in the service of group conformity.

Self-categorization theory

Self-categorization theory develops social identity theory's point that people categorize themselves, along with each other into groups, favoring their own group.

Social dominance orientation

Social dominance orientation (SDO) describes a belief that group hierarchies are inevitable in all societies and even good, to maintain order and stability.

Social identity theory

Social identity theory notes that people categorize each other into groups, favoring their own group.

Stereotype Content Model

Stereotype Content Model shows that social groups are viewed according to their perceived warmth and competence.

Stereotypes

Stereotype is a belief that characterizes people based merely on their group membership.

Subtle biases

Subtle biases are automatic, ambiguous, and ambivalent, but real in their consequences.

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Cooperation and Prosocial Behavior

24

Cooperation

Jake P. Moskowitz & Paul K. Piff

Humans are social animals. This means we work together in groups to achieve goals that benefit everyone. From building skyscrapers to delivering packages to remote island nations, modern life requires that people cooperate with one another. However, people are also motivated by self-interest, which often stands as an obstacle to effective cooperation. This module explores the concept of cooperation and the processes that both help and hinder it.

Learning Objectives

- Define "cooperation"
- Distinguish between different social value orientations
- List 2 influences on cooperation
- Explain 2 methods psychologists use to research cooperation

Introduction

As far back as the early 1800s, people imagined constructing a tunnel under the sea to connect France and England. But, digging under the English Channel—a body of water spanning more than 20 miles (32 km)—would be an enormous and difficult undertaking. It would require a massive amount of resources as well as coordinating the efforts of people from two separate nations, speaking two different languages. Not until 1988 did the idea of the Channel Tunnel (or “Chunnel” as it is known) change from dream to reality, as construction began. It took ten different construction companies-- financed by three separate banks-- six years to complete

the project. Even today, decades later, the Chunnel is an amazing feat of engineering and collaboration. Seen through the lens of psychological science, it stands as an inspiring example of what is possible when people work together. Humans *need* to cooperate with others to survive and to thrive. **Cooperation**, or the coordination of multiple individuals toward a goal that benefits the entire group, is a fundamental feature of human social life.



The Channel Tunnel – an example of real-world cooperation between people. [Image: Sam Churchill, <http://goo.gl/ildZrk>, CC BY 2.0, <http://goo.gl/v4Y0Zv>]

Whether on the playground with friends, at home with family, or at work with colleagues, cooperation is a natural instinct (Keltner, Kogan, Piff, & Saturn, 2014). Children as young as 14 months cooperate with others on joint tasks (Warneken, Chen, & Tomasello 2006; Warneken & Tomasello, 2007). Humans' closest evolutionary relatives, chimpanzees and bonobos, maintain long-term cooperative relationships as well, sharing resources and caring for each other's young (de Waal & Lanting, 1997; Langergraber, Mitani, & Vigilant, 2007). Ancient animal remains found near early human settlements suggest that our ancestors hunted in cooperative groups (Mithen, 1996). Cooperation, it seems, is embedded in our evolutionary heritage.

Yet, cooperation can also be difficult to achieve; there are often breakdowns in people's ability to work effectively in teams, or in their willingness to collaborate with others. Even with issues that can only be solved through large-scale cooperation, such as climate change and world hunger, people can have difficulties joining forces with others to take collective action. Psychologists have identified numerous individual and situational factors that influence the effectiveness of cooperation across many areas of life. From the trust that people place in

others to the lines they draw between “us” and “them,” many different processes shape cooperation. This module will explore these individual, situational, and cultural influences on cooperation.

The Prisoner’s Dilemma

Imagine that you are a participant in a social experiment. As you sit down, you are told that you will be playing a game with another person in a separate room. The other participant is also part of the experiment but the two of you will never meet. In the experiment, there is the possibility that you will be awarded some money. Both you and your unknown partner are required to make a choice: either choose to “cooperate,” maximizing your combined reward, or “defect,” (not cooperate) and thereby maximize your individual reward. The choice you make, along with that of the other participant, will result in one of three unique outcomes to this task, illustrated below in Figure 1. If you and your partner *both cooperate* (1), you will each receive \$5. If you and your partner *both defect* (2), you will each receive \$2. However, if *one partner defects and the other partner cooperates* (3), the defector will receive \$8, while the cooperator will receive nothing. Remember, you and your partner cannot discuss your strategy. Which would you choose? Striking out on your own promises big rewards but you could also lose everything. Cooperating, on the other hand, offers the best benefit for the most people but requires a high level of trust.

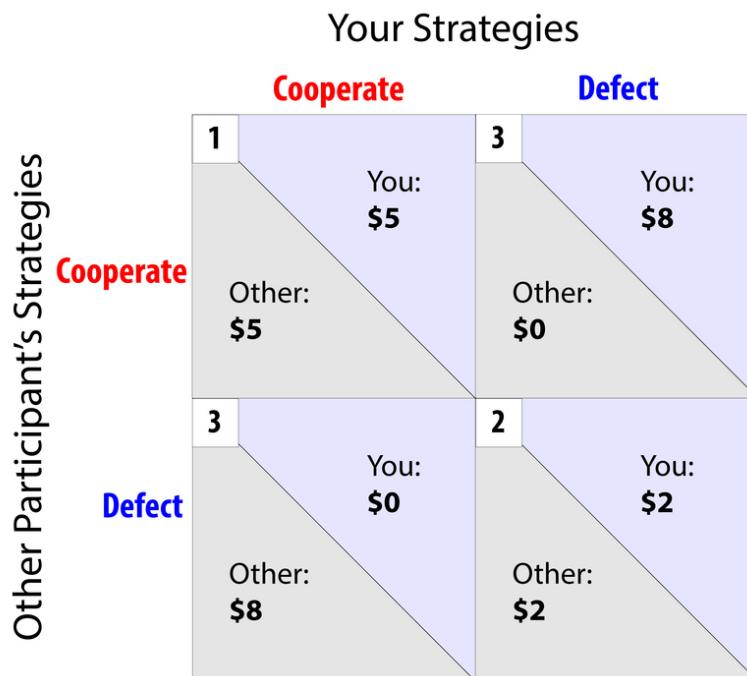


Figure 1. The various possible outcomes of a prisoner’s dilemma scenario

This scenario, in which two people independently choose between cooperation and defection, is known as the **prisoner's dilemma**. It gets its name from the situation in which two prisoners who have committed a crime are given the opportunity to either (A) both confess their crime (and get a moderate sentence), (B) rat out their accomplice (and get a lesser sentence), or (C) both remain silent (and avoid punishment altogether). Psychologists use various forms of the prisoner's dilemma scenario to study self-interest and cooperation. Whether framed as a monetary game or a prison game, the prisoner's dilemma illuminates a conflict at the core of many decisions to cooperate: it pits the motivation to maximize *personal reward* against the motivation to maximize *gains for the group* (you and your partner combined).

For someone trying to maximize his or her own personal reward, the most "rational" choice is to defect (not cooperate), because defecting always results in a larger personal reward, regardless of the partner's choice. However, when the two participants view their partnership as a joint effort (such as a friendly relationship), cooperating is the best strategy of all, since it provides the largest combined sum of money (\$10—which they share), as opposed to partial cooperation (\$8), or mutual defection (\$4). In other words, although defecting represents the "best" choice from an individual perspective, it is also the worst choice to make for the group as a whole.

This divide between personal and collective interests is a key obstacle that prevents people from cooperating. Think back to our earlier definition of cooperation: cooperation is when multiple partners work together toward a common goal that will benefit everyone. As is frequent in these types of scenarios, even though cooperation may benefit the whole group, individuals are often able to earn even larger, personal rewards by defecting—as demonstrated in the prisoner's dilemma example above.

Do you like music? You can see a small, real-world example of the prisoner's dilemma phenomenon at live music concerts. At venues with seating, many audience members will choose to stand, hoping to get a better view of the musicians onstage. As a result, the people sitting directly behind those now-standing people are also forced to stand to see the action onstage. This creates a chain reaction in which the entire audience now has to stand, just to see over the heads of the crowd in front of them. While choosing to stand may improve one's own concert experience, it creates a literal barrier for the rest of the audience, hurting the overall experience of the group.

Simple models of **rational self-interest** predict 100% defection in cooperative tasks. That is, if people were only interested in benefiting themselves, we would always expect to see selfish behavior. Instead, there is a surprising tendency to cooperate in the prisoner's dilemma and similar tasks (Batson & Moran, 1999; Oosterbeek, Sloof, Van De Kuilen, 2004). Given the clear

benefits to defect, why then do some people choose to cooperate, whereas others choose to defect?

Individual Differences in Cooperation

Social Value Orientation

One key factor related to individual differences in cooperation is the extent to which people value not only their own outcomes, but also the outcomes of others. Social value orientation (SVO) describes people's preferences when dividing important resources between themselves and others (Messick & McClintock, 1968). A person might, for example, generally be competitive with others, or cooperative, or self-sacrificing. People with different social values differ in the importance they place on their own positive outcomes relative to the outcomes of others. For example, you might give your friend gas money because she drives you to school, even though that means you will have less spending money for the weekend. In this example, you are demonstrating a cooperative orientation.

People generally fall into one of three categories of SVO: cooperative, individualistic, or competitive. While most people want to bring about positive outcomes for all (cooperative orientation), certain types of people are less concerned about the outcomes of others (individualistic), or even seek to undermine others in order to get ahead (competitive orientation).

Are you curious about your own orientation? One technique psychologists use to sort people into one of these categories is to have them play a series of decomposed games—short laboratory exercises that involve making a choice from various distributions of resources between oneself and an “other.” Consider the example shown in Figure 2, which offers three

<i>SVO decomposed game</i>	A	B	C
You get	500	500	550
Other gets	100	500	300

Figure 2. Example of an SVO decomposed game used to determine how competitive or cooperative a person is.

different ways to distribute a valuable resource (such as money). People with *competitive* SVOs, who try to maximize their relative advantage over others, are most likely to pick option A. People with *cooperative* SVOs, who try to maximize joint gain for both themselves and others, are more likely to split the resource evenly, picking option B. People with *individualistic* SVOs, who always maximize gains to the self, regardless of how it affects others, will most likely pick option C.

Researchers have found that a person's SVO predicts how cooperative he or she is in both laboratory experiments and the outside world. For example, in one laboratory experiment, groups of participants were asked to play a **commons dilemma game**. In this game, participants each took turns drawing from a central collection of points to be exchanged for real money at the end of the experiment. These points represented a **common-pool resource** for the group, like valuable goods or services in society (such as farm land, ground water, and air quality) that are freely accessible to everyone but prone to overuse and degradation. Participants were told that, while the common-pool resource would gradually replenish after the end of every turn, taking too much of the resource too quickly would eventually deplete it. The researchers found that participants with cooperative SVOs withdrew fewer resources from the common-pool than those with competitive and individualistic SVOs, indicating a greater willingness to cooperate with others and act in a way that is sustainable for the group (Kramer, McClintock, & Messick, 1986; Roch & Samuelson, 1997).

Research has also shown that people with cooperative SVOs are more likely to commute to work using public transportation—an act of cooperation that can help reduce carbon emissions—rather than drive themselves, compared to people with competitive and individualistic SVOs (Van Vugt, Meertens, & Van Lange, 1995; Van Vugt, Van Lange, & Meertens, 1996). People with cooperative SVOs also more frequently engage in behavior intended to help others, such as volunteering and giving money to charity (McClintock & Allison, 1989; Van Lange, Bekkers, Schuyt, Van Vugt, 2007). Taken together, these findings show that people with cooperative SVOs act with greater consideration for the overall well-being of others and the group as a whole, using resources in moderation and taking more effortful measures (like using public transportation to protect the environment) to benefit the group.

Empathic Ability

Empathy is the ability to feel and understand another's emotional experience. When we empathize with someone else, we take on that person's perspective, imagining the world from his or her point of view and vicariously experiencing his or her emotions (Davis, 1994; Goetz, Keltner, & Simon-Thomas, 2010). Research has shown that when people empathize with their



Feelings of empathy lead to greater levels of cooperation. Research shows that even young children cooperate more when experiencing feelings of empathy. [Image: US Army, <https://goo.gl/psWXOe>, CC BY 2.0, <https://goo.gl/BRvSA7>]

rough breakup and needed some cheering up. While half of the subjects were urged by the experimenters to “remain objective and detached,” the other half were told to “try and imagine how the other person feels.” Though both groups received the same information about their partner, those who were encouraged to engage in empathy—by actively experiencing their partner’s emotions—acted with greater cooperation in the economic game (Batson & Moran, 1999). The researchers also found that people who empathized with their partners were more likely to act cooperatively, even after being told that their partner had already made a choice to *not* cooperate (Batson & Ahmad, 2001)! Evidence of the link between empathy and cooperation has even been found in studies of preschool children (Marcus, Telleen, & Roke, 1979). From a very early age, emotional understanding can foster cooperation.

Although empathizing with a partner can lead to more cooperation between two people, it can also undercut cooperation within larger groups. In groups, empathizing with a single person can lead people to abandon broader cooperation in favor of helping only the target individual. In one study, participants were asked to play a cooperative game with three partners. In the game, participants were asked to (A) donate resources to a central pool, (B) donate resources to a specific group member, or (C) keep the resources for themselves. According to the rules, all donations to the central pool would be increased by 50% then distributed evenly, resulting in a net gain to the entire group. Objectively, this might seem to be the best option. However, when participants were encouraged to imagine the feelings of

partner, they act with greater cooperation and overall **altruism**—the desire to help the partner, even at a potential cost to the self. People that can experience and understand the emotions of others are better able to work with others in groups, earning higher job performance ratings on average from their supervisors, even after adjusting for different types of work and other aspects of personality (Co^té & Miners, 2006).

When empathizing with a person in distress, the natural desire to help is often expressed as a desire to cooperate. In one study, just before playing an economic game with a partner in another room, participants were given a note revealing that their partner had just gone through a

one of their partners said to be in distress, they were more likely to donate their tickets to that partner and not engage in cooperation with the group—rather than remaining detached and objective (Batson et al., 1995). Though empathy can create strong cooperative bonds between individuals, it can sometimes lead to actions that, despite being well-intentioned, end up undermining the group's best interests.

Situational Influences of Cooperation

Communication and Commitment

Open communication between people is one of the best ways to promote cooperation (Dawes, McTavish, & Shaklee, 1977; Dawes, 1988). This is because communication provides an opportunity to size up the trustworthiness of others. It also affords us a chance to prove our own trustworthiness, by verbally committing to cooperate with others. Since cooperation requires people to enter a **state of vulnerability** and trust with partners, we are very sensitive to the social cues and interactions of potential partners before deciding to cooperate with them.

In one line of research, groups of participants were allowed to chat for five minutes before playing a multi-round “public goods” game. During the chats, the players were allowed to discuss game strategies and make verbal commitments about their in-game actions. While some groups were able to reach a consensus on a strategy (e.g., “always cooperate”), other groups failed to reach a consensus within their allotted five minutes or even picked strategies that ensured *noncooperation* (e.g., “every person for themselves”). The researchers found that when group members made explicit commitments to each other to cooperate, they ended up honoring those commitments and acting with greater cooperation. Interestingly, the effect of face-to-face verbal commitments persisted even when the cooperation game itself was completely anonymous (Kerr and Kaufman-Gilliland, 1994; Kerr, Garst, Lewandowski, & Harris, 1997). This suggests that those who explicitly commit to cooperate are driven not by the fear of external punishment by group members, but by their own personal desire to honor such commitments. In other words, once people make a specific promise to cooperate, they are driven by “that still, small voice”—the voice of their own inner conscience—to fulfill that commitment (Kerr et al., 1997).

Trust

When it comes to cooperation, trust is key (Pruitt & Kimmel, 1977; Parks, Henager, &



Trust is essential for cooperation, people are much more motivated to cooperate if they know others in the group will support one another. [Image: Wesley Fryer, <https://goo.gl/LKNLWp>, CC BY-SA 2.0, <https://goo.gl/rxiUsF>]

about “social loafing”—the way that one person expends less effort but still benefits from the efforts of the group. Imagine, for example, that you and five other students are assigned to work together on a difficult class project. At first, you and your group members split the work up evenly. As the project continues, however, you notice that one member of your team isn’t doing his “fair share.” He fails to show up to meetings, his work is sloppy, and he seems generally uninterested in contributing to the project. After a while, you might begin to suspect that this student is trying to get by with minimal effort, perhaps assuming others will pick up the slack. Your group now faces a difficult choice: either join the slacker and abandon all work on the project, causing it to collapse, or keep cooperating and allow for the possibility that the uncooperative student may receive a decent grade for others’ work.

If this scenario sounds familiar to you, you’re not alone. Economists call this situation the **free rider problem**—when individuals benefit from the cooperation of others without contributing anything in return (Grossman & Hart, 1980). Although these sorts of actions may benefit the free rider in the short-term, free riding can have a negative impact on a person’s social reputation over time. In the above example, for instance, the “free riding” student may develop a reputation as lazy or untrustworthy, leading others to be less willing to work with him in the future.

Indeed, research has shown that a poor reputation for cooperation can serve as a warning

Scamahorn, 1996; Chaudhuri, Sopher, & Strand, 2002). Working with others toward a common goal requires a level of faith that our partners will repay our hard work and generosity, and not take advantage of us for their own selfish gains. Social trust, or the belief that another person’s actions will be beneficial to one’s own interests (Kramer, 1999), enables people to work together as a single unit, pooling their resources to accomplish more than they could individually. Trusting others, however, depends on their actions and reputation.

One common example of the difficulties in trusting others that you might recognize from being a student occurs when you are assigned a group project. Many students dislike group projects because they worry

sign for others *not* to cooperate with the person in disrepute. For example, in one experiment involving a group economic game, participants seen as being uncooperative were punished harshly by their fellow participants. According to the rules of the game, individuals took turns being either a “donor” or a “receiver” over the course of multiple rounds. If donors chose to give up a small sum of actual money, receivers would receive a slightly larger sum, resulting in an overall net gain. However, unbeknownst to the group, one participant was secretly instructed *never* to donate. After just a few rounds of play, this individual was effectively shunned by the rest of the group, receiving almost zero donations from the other members (Milinski, Semmann, Bakker, & Krambeck, 2001). When someone is seen being consistently uncooperative, other people have no incentive to trust him/her, resulting in a collapse of cooperation.

On the other hand, people are more likely to cooperate with others who have a good reputation for cooperation and are therefore deemed trustworthy. In one study, people played a group economic game similar to the one described above: over multiple rounds, they took turns choosing whether to donate to other group members. Over the course of the game, donations were more frequently given to individuals who had been generous in earlier rounds of the game (Wedekind & Milinski, 2000). In other words, individuals seen cooperating with others were afforded a reputational advantage, earning them more partners willing to cooperate and a larger overall monetary reward.

Group Identification

Another factor that can impact cooperation is a person’s **social identity**, or the extent to which he or she identifies as a member of a particular social group (Tajfel & Turner, 1979/1986). People can identify with groups of all shapes and sizes: a group might be relatively small, such as a local high school class, or very large, such as a national citizenship or a political party. While these groups are often bound together by shared goals and values, they can also form according to seemingly arbitrary qualities, such as musical taste, hometown, or even completely randomized assignment, such as a coin toss (Tajfel, Billig,



Sometimes the groups with which we identify can be formed based on preferences. Are you a dog person or a cat person? Just knowing that someone else shares your preference can affect the cooperation between you. [Image: Doris Meta F, <https://goo.gl/k8Zi6N>, CC BY-NC 2.0, <https://goo.gl/tgFydH>]

Bundy, & Flament, 1971; Bigler, Brown, & Markell, 2001; Locksley, Ortiz, & Hepburn, 1980). When members of a group place a high value on their group membership, their identity (the way they view themselves) can be shaped in part by the goals and values of that group.

When people strongly identify with a group, their own well-being becomes bound to the welfare of that group, increasing their willingness to make personal sacrifices for its benefit. We see this with sports fans. When fans heavily identify with a favorite team, they become elated when the team wins and sad when the team loses. Die-hard fans often make personal sacrifices to support their team, such as braving terrible weather, paying high prices for tickets, and standing and chanting during games.

Research shows that when people's group identity is emphasized (for example, when laboratory participants are referred to as "group members" rather than "individuals"), they are less likely to act selfishly in a commons dilemma game. In such experiments, so-called "group members" withdraw fewer resources, with the outcome of promoting the sustainability of the group (Brewer & Kramer, 1986). In one study, students who strongly identified with their university were less likely to leave a cooperative group of fellow students when given an attractive option to exit (Van Vugt & Hart, 2004). In addition, the strength of a person's identification with a group or organization is a key driver behind participation in large-scale cooperative efforts, such as collective action in political and workers' groups (Klandersman, 2002), and engaging in organizational citizenship behaviors (Cropanzano & Byrne, 2000).

Emphasizing group identity is not without its costs: although it can increase cooperation *within* groups, it can also undermine cooperation *between* groups. Researchers have found that groups interacting with other groups are more competitive and less cooperative than individuals interacting with other individuals, a phenomenon known as interindividual-intergroup discontinuity (Schopler & Insko, 1999; Wildschut, Pinter, Vevea, Insko, & Schopler, 2003). For example, groups interacting with other groups displayed greater self-interest and reduced cooperation in a prisoner's dilemma game than did individuals completing the same tasks with other individuals (Insko et al., 1987). Such problems with trust and cooperation are largely due to people's general reluctance to cooperate with members of an outgroup, or those outside the boundaries of one's own social group (Allport, 1954; Van Vugt, Biel, Snyder, & Tyler, 2000). Outgroups do not have to be explicit rivals for this effect to take place. Indeed, in one study, simply telling groups of participants that other groups preferred a different style of painting led them to behave less cooperatively than pairs of individuals completing the same task (Insko, Kirchner, Pinter, Efaw, & Wildschut, 2005). Though a strong group identity can bind individuals within the group together, it can also drive divisions between different groups, reducing overall trust and cooperation on a larger scope.

Culture



There are cultural differences in how and how much people cooperate. Some societies require more cooperation to ensure survival. [Image: Cindy Cornett Seigle, <http://goo.gl/u0kE9Z>, CC BY-NC-SA 2.0, <http://goo.gl/iF4hmM>]

were asked to play the **ultimatum game**, a task similar in nature to the prisoner's dilemma. The game has two players: Player A (the "allocator") is given a sum of money (equal to two days' wages) and allowed to donate any amount of it to Player B (the "responder"). Player B can then either accept or reject Player A's offer. If Player B accepts the offer, both players keep their agreed-upon amounts. However, if Player B rejects the offer, then neither player receives anything. In this scenario, the responder can use his/her authority to punish unfair offers, even though it requires giving up his or her own reward. In turn, Player A must be careful to propose an acceptable offer to Player B, while still trying to maximize his/her own outcome in the game.

According to a model of rational economics, a self-interested Player B should always choose to accept any offer, no matter how small or unfair. As a result, Player A should always try to offer the minimum possible amount to Player B, in order to maximize his/her own reward. Instead, the researchers found that people in these 15 societies donated on average 39% of the sum to their partner (Henrich et al., 2001). This number is almost identical to the amount that people of Western cultures donate when playing the ultimatum game (Oosterbeek et al., 2004). These findings suggest that allocators in the game, instead of offering the least possible amount, try to maintain a sense of fairness and "shared rewards" in the game, in part so that

Culture can have a powerful effect on people's beliefs about and ways they interact with others. Might culture also affect a person's tendency toward cooperation? To answer this question, Joseph Henrich and his colleagues surveyed people from 15 small-scale societies around the world, located in places such as Zimbabwe, Bolivia, and Indonesia. These groups varied widely in the ways they traditionally interacted with their environments: some practiced small-scale agriculture, others foraged for food, and still others were nomadic herders of animals (Henrich et al., 2001).

To measure their tendency toward cooperation, individuals of each society

their offers will not be rejected by the responder.

Henrich and colleagues (2001) also observed significant variation between cultures in terms of their level of cooperation. Specifically, the researchers found that the extent to which individuals in a culture needed to collaborate with each other to gather resources to survive predicted how likely they were to be cooperative. For example, among the people of the Lamelara in Indonesia, who survive by hunting whales in groups of a dozen or more individuals, donations in the ultimatum game were extremely high—approximately 58% of the total sum. In contrast, the Machiguenga people of Peru, who are generally economically independent at the family level, donated much less on average—about 26% of the total sum. The interdependence of people for survival, therefore, seems to be a key component of why people decide to cooperate with others.

Though the various survival strategies of small-scale societies might seem quite remote from your own experiences, take a moment to think about how your life is dependent on collaboration with others. Very few of us in industrialized societies live in houses we build ourselves, wear clothes we make ourselves, or eat food we grow ourselves. Instead, we depend on others to provide specialized resources and products, such as food, clothing, and shelter that are essential to our survival. Studies show that Americans give about 40% of their sum in the ultimatum game—less than the Lamelara give, but on par with most of the small-scale societies sampled by Henrich and colleagues (Oosterbeek et al., 2004). While living in an industrialized society might not require us to hunt in groups like the Lamelara do, we still depend on others to supply the resources we need to survive.

Conclusion

Cooperation is an important part of our everyday lives. Practically every feature of modern social life, from the taxes we pay to the street signs we follow, involves multiple parties working together toward shared goals. There are many factors that help determine whether people will successfully cooperate, from their culture of origin and the trust they place in their partners, to the degree to which they empathize with others. Although cooperation can sometimes be difficult to achieve, certain diplomatic practices, such as emphasizing shared goals and engaging in open communication, can promote teamwork and even break down rivalries. Though choosing not to cooperate can sometimes achieve a larger reward for an individual in the short term, cooperation is often necessary to ensure that the group as a whole—including all members of that group—achieves the optimal outcome.

Outside Resources

Article: Weber, J. M., Kopelman, S., & Messick, D. M. (2004). A conceptual review of decision making in social dilemmas: Applying a logic of appropriateness. *Personality and Social Psychology Review, 8*(3), 281-307.

<http://psr.sagepub.com/content/8/3/281.abstract>

Video: A clip from a reality TV show, "Golden Balls", that pits players against each other in a high-stakes Prisoners' Dilemma situation.

<https://www.youtube.com/watch?v=p3Uos2fzIJ0>

Video: Describes recent research showing how chimpanzees naturally cooperate with each other to accomplish tasks.

https://www.youtube.com/watch?v=fME0_RsEXil

Video: The Empathic Civilization - A 10 minute, 39 second animated talk that explores the topics of empathy.

<https://www.youtube.com/watch?v=xjarMIXA2q8>

Video: Tragedy of the Commons, Part 1 - What happens when many people seek to share the same, limited resource?

<https://www.youtube.com/watch?v=KZDjPnzoge0>

Video: Tragedy of the Commons, Part 2 - This video (which is 1 minute, 27 seconds) discusses how cooperation can be a solution to the commons dilemma.

<https://www.youtube.com/watch?v=lVwk6VlxBXg>

Video: Understanding the Prisoners' Dilemma.

<https://www.youtube.com/watch?v=t9Lo2fgxWHw>

Video: Why Some People are More Altruistic Than Others - A 12 minute, 21 second TED talk about altruism. A psychologist, Abigail Marsh, discusses the research about altruism.

<https://www.youtube.com/watch?v=m4KbUSRfnR4>

Web: Take an online test to determine your Social Values Orientation (SVO).

<http://vlab.ethz.ch/svo/index-normal.html>

Web: What is Social Identity? - A brief explanation of social identity, which includes specific

examples.

<http://people.howstuffworks.com/what-is-social-identity.htm>

Discussion Questions

1. Which groups do you identify with? Consider sports teams, home towns, and universities. How does your identification with these groups make you feel about other members of these groups? What about members of competing groups?
2. Thinking of all the accomplishments of humanity throughout history which do you believe required the greatest amounts of cooperation? Why?
3. In your experience working on group projects—such as group projects for a class—what have you noticed regarding the themes presented in this module (eg. Competition, free riding, cooperation, trust)? How could you use the material you have just learned to make group projects more effective?

Vocabulary

Altruism

A desire to improve the welfare of another person, at a potential cost to the self and without any expectation of reward.

Common-pool resource

A collective product or service that is freely available to all individuals of a society, but is vulnerable to overuse and degradation.

Commons dilemma game

A game in which members of a group must balance their desire for personal gain against the deterioration and possible collapse of a resource.

Cooperation

The coordination of multiple partners toward a common goal that will benefit everyone involved.

Decomposed games

A task in which an individual chooses from multiple allocations of resources to distribute between him- or herself and another person.

Empathy

The ability to vicariously experience the emotions of another person.

Free rider problem

A situation in which one or more individuals benefit from a common-pool resource without paying their share of the cost.

Interindividual-intergroup discontinuity

The tendency for relations between groups to be less cooperative than relations between individuals.

Outgroup

A social category or group with which an individual does not identify.

Prisoner's dilemma

A classic paradox in which two individuals must independently choose between defection

(maximizing reward to the self) and cooperation (maximizing reward to the group).

Rational self-interest

The principle that people will make logical decisions based on maximizing their own gains and benefits.

Social identity

A person's sense of who they are, based on their group membership(s).

Social value orientation (SVO)

An assessment of how an individual prefers to allocate resources between him- or herself and another person.

State of vulnerability

When a person places him or herself in a position in which he or she might be exploited or harmed. This is often done out of trust that others will not exploit the vulnerability.

Ultimatum game

An economic game in which a proposer (Player A) can offer a subset of resources to a responder (Player B), who can then either accept or reject the given proposal.

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25

Helping and Prosocial Behavior

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People often act to benefit other people, and these acts are examples of prosocial behavior. Such behaviors 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?

Learning Objectives

- Learn which situational and social factors affect when a bystander will help another in need.
- Understand which personality and individual difference factors make some people more likely to help than others.
- Discover whether we help others out of a sense of altruistic concern for the victim, for more self-centered and egoistic motives, or both.

Introduction

Go to YouTube and search for episodes of “Primetime: What Would You Do?” You will find



People often overestimate their willingness to help others in need especially when they are asked about a hypothetical situation rather than encountering one in real life. [Image: Ed Yourdon, <https://goo.gl/BYFmcu>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

question: Who helps when and why?

When Do People Help?

Social psychologists are interested in answering this question because it is apparent that people vary in their tendency to help others. In 2010 for instance, Hugo Alfredo Tale-Yax was stabbed when he apparently tried to intervene in an argument between a man and 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, as the segments on “What Would You Do?” show. 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

video segments in which apparently innocent individuals are victimized, while onlookers typically fail to intervene. The events are all staged, but they are very real to the bystanders on the scene. The entertainment offered is the nature of the bystanders' responses, and viewers are outraged when bystanders fail to intervene. They are convinced that they would have helped. But would they? Viewers are overly optimistic in their beliefs that they would play the hero. Helping may occur frequently, but help is not always given to those in need. So *when* do people help, and when do they not? All people are not equally helpful—*who* helps? *Why* would a person help another in the first place? Many factors go into a person's decision to help—a fact that the viewers do not fully appreciate. This module will answer the

3. how the costs and benefits of intervening affect their decisions of whether to help.

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 action 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.

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



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: flowcomm, <https://goo.gl/tiRPch>, CC BY 2.0, <https://goo.gl/BRvSA7>]

personal responsibility, so bystanders do not intervene. This phenomenon is known as **diffusion of responsibility** (Darley & Latané, 1968).

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.

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 someone who is bullying your friend 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 cost, helping is more likely.

Who Helps?

Do you know someone who always seems to be ready, willing, and able to help? Do you know someone who never helps out? It seems there are personality and individual differences in the helpfulness of others. To answer the question of who chooses to help, researchers have examined 1) the role that sex and gender play in helping, 2) what personality traits are associated with helping, and 3) the characteristics of the “prosocial personality.”

Who are more helpful—men or women?

In terms of individual differences that might matter, one obvious question is whether men or women are more likely to help. In one of the “What Would You Do?” segments, a man takes a woman’s purse from the back of her chair and then leaves the restaurant. Initially, no one responds, but as soon as the woman asks about her missing purse, a group of men immediately rush out the door to catch the thief. So, are men more helpful than women? The quick answer is “not necessarily.” It all depends on the type of help needed. To be very clear, the general level of helpfulness may be pretty much equivalent between the sexes, but men and women help in different ways (Becker & Eagly, 2004; Eagly & Crowley, 1986). What accounts for these differences?

Two factors help to explain sex and gender differences in helping. The first is related to the cost–benefit analysis process discussed previously. Physical differences between men and women may come into play (e.g., Wood & Eagly, 2002); the fact that men tend to have greater upper body strength than women makes the cost of intervening in some situations less for a man. Confronting a thief is a risky proposition, and some strength may be needed in case the perpetrator decides to fight. A bigger, stronger bystander is less likely to be injured and more likely to be successful.

The second explanation is simple socialization. Men and women have traditionally been raised to play different social roles that prepare them to respond differently to the needs of others,



Sometimes there are situations that override the gender divide between the helpfulness of men and women and they offer help in equal numbers - for example, volunteering. [Image: Daniel Thornton, <https://goo.gl/Rn7yL0>, CC BY 2.0, <https://goo.gl/BRvSA7>]

and people tend to help in ways that are most consistent with their gender roles. Female gender roles encourage women to be compassionate, caring, and nurturing; male gender roles encourage men to take physical risks, to be heroic and chivalrous, and to be protective of those less powerful. As a consequence of social training and the gender roles that people have assumed, men may be more likely to jump onto subway tracks to save a fallen passenger, but women are more likely to give comfort to a friend with personal problems (Diekman & Eagly, 2000; Eagly & Crowley, 1986). There may be some specialization in the types of help given by the two sexes, but it is nice to know that there is someone out there—man or woman—who is able to give you the help that you need, regardless of what kind of help it might be.

A trait for being helpful: Agreeableness

Graziano and his colleagues (e.g., Graziano & Tobin, 2009; Graziano, Habishi, Sheese, & Tobin, 2007) have explored how **agreeableness**—one of the Big Five personality dimensions (e.g., Costa & McCrae, 1988)—plays an important role in **prosocial behavior**. Agreeableness is a core trait that includes such dispositional characteristics as being sympathetic, generous, forgiving, and helpful, and behavioral tendencies toward harmonious social relations and likeability. At the conceptual level, a positive relationship between agreeableness and helping may be expected, and research by Graziano et al. (2007) has found that those higher on the agreeableness dimension are, in fact, more likely than those low on agreeableness to help siblings, friends, strangers, or members of some other group. Agreeable people seem to expect that others will be similarly cooperative and generous in interpersonal relations, and they, therefore, act in helpful ways that are likely to elicit positive social interactions.

Searching for the prosocial personality

Rather than focusing on a single trait, Penner and his colleagues (Penner, Fritzsche, Craiger, & Freifeld, 1995; Penner & Orom, 2010) have taken a somewhat broader perspective and identified what they call the **prosocial personality orientation**. Their research indicates that two major characteristics are related to the prosocial personality and prosocial behavior. The first characteristic is called **other-oriented empathy**: People high on this dimension have a strong sense of social responsibility, empathize with and feel emotionally tied to those in need, understand the problems the victim is experiencing, and have a heightened sense of moral obligation to be helpful. This factor has been shown to be highly correlated with the trait of agreeableness discussed previously. The second characteristic, **helpfulness**, is more behaviorally oriented. Those high on the helpfulness factor have been helpful in the past, and because they believe they can be effective with the help they give, they are more likely to be helpful in the future.

Why Help?

Finally, the question of *why* a person would help needs to be asked. What motivation is there for that behavior? Psychologists have suggested that 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.

Evolutionary roots for prosocial behavior



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: TimJN1, <https://goo.gl/iTQfWk>, CC BY-SA 2.0, <https://goo.gl/eH69he>]

Our evolutionary past may provide keys about 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, Crandall, & Kitayama, 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 favoritism shown for helping our blood relatives is called kin selection (Hamilton, 1964).

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 the chance that someone will take advantage of your help and not return your favors. 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?

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, Darby, & Vincent, 1973; Cialdini, Kenrick, & Baumann, 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, Dovidio, Gaertner, & Clark, 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. 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.

Altruistic help



Altruism is helping with the aim of improving the wellbeing of others. Having a feeling of empathy for others is an important aspect of altruism. [Image: Ed Yourdon, <https://goo.gl/MWCLK1>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

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

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 for 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

motives, it is important to recognize that, while helpers may derive some personal rewards by helping another, the help that has been given is also benefitting 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).

Conclusion

We started this module by asking the question, "Who helps when and why?" As we have shown, the question of when help will be given is not quite as simple as the viewers of "What Would You Do?" believe. The power of the situation that operates on potential helpers in real time is not fully considered. What might appear to be a split-second decision to help is actually the result of consideration of multiple situational factors (e.g., the helper's interpretation of the situation, the presence and ability of others to provide the help, the results of a cost-benefit analysis) (Dovidio et al., 2006). We have found that men and women tend to help in different ways—men are more impulsive and physically active, while women are more nurturing and supportive. Personality characteristics such as agreeableness and the prosocial personality orientation also affect people's likelihood of giving assistance to others. And, why would people help in the first place? In addition to evolutionary forces (e.g., kin selection, reciprocal altruism), there is extensive evidence to show that helping and prosocial acts may be motivated by selfish, egoistic desires; by selfless, altruistic goals; or by some combination of egoistic and altruistic motives. (For a fuller consideration of the field of prosocial behavior, we refer you to Dovidio et al. [2006].)



Helping feels good to the one who helps and the one who is being helped. [Image: International of Red Cross and Red Crescent Societies, <https://goo.gl/0DXo8S>, CC BY-NC-SA 2.0, <https://goo.gl/Toc0ZF>]

Outside Resources

Article: Alden, L. E., & Trew, J. L. (2013). If it makes you happy: Engaging in kind acts increases positive affect in socially anxious individuals. *Emotion*, 13, 64-75. doi:10.1037/a0027761

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Book: Mikuliner, M., & Shaver, P. R. (2010). Prosocial motives, emotions, and behavior: The better angels of our nature. Washington, DC: American Psychological Association.

Book: Schroeder, D. A. & Graziano, W. G. (forthcoming). The Oxford handbook of prosocial behavior. New York, NY: Oxford University Press.

Institution: Center for Generosity, University of Notre Dame, 936 Flanner Hall, Notre Dame, IN 46556.

<http://www.generosityresearch.nd.edu>

Institution: The Greater Good Science Center, University of California, Berkeley.

<http://www.greatergood.berkeley.edu>

News Article: Bystanders Stop Suicide Attempt

<http://jfmueler.faculty.noctrl.edu/crow/bystander.pdf>

Social Psychology Network (SPN)

<http://www.socialpsychology.org/social.htm#prosocial>

Video: Episodes (individual) of "Primetime: What Would You Do?"

<http://www.YouTube.com>

Video: Episodes of "Primetime: What Would You Do?" that often include some commentary from experts in the field may be available at

<http://www.abc.com>

Video: From The Inquisitive Mind website, a great overview of different aspects of helping and pro-social behavior including - pluralistic ignorance, diffusion of responsibility, the bystander effect, and empathy.

https://www.youtube.com/watch?v=i2aVjU3F_t0

Discussion Questions

1. Pluralistic ignorance suggests that inactions 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?
2. In addition to those mentioned in the module, what other costs and rewards might affect a potential helper's decision of whether to help? Receiving help to solve some problem is an obvious benefit for someone in need; are there any costs that a person might have to bear as a result of receiving help from someone?
3. 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?
4. Do you think that sex and gender differences in the frequency of helping and the kinds of helping have changed over time? Why? Do you think that we might expect more changes in the future?
5. What do you think is the primary motive for helping behavior: egoism or altruism? Are there any professions in which people are being "pure" altruists, or are some egoistic motivations always playing a role?
6. There are other prosocial behaviors in addition to the kind of helping discussed here. People volunteer to serve many different causes and organizations. People come together to cooperate with one another to achieve goals that no one individual could reach alone. How do you think the factors that affect helping might affect prosocial actions such as volunteering and cooperating? Do you think that there might be other factors that make people more or less likely to volunteer their time and energy or to cooperate in a group?

Vocabulary

Agreeableness

A core personality trait that includes such dispositional characteristics as being sympathetic, generous, forgiving, and helpful, and behavioral tendencies toward harmonious social relations and likeability.

Altruism

A motivation for helping that has the improvement of another's welfare as its ultimate goal, with no expectation of any benefits for the helper.

Arousal: cost-reward model

An egoistic theory proposed by Piliavin et al. (1981) that claims that seeing a person in need leads to the arousal of unpleasant feelings, and observers are motivated to eliminate that aversive state, often by helping the victim. A cost-reward analysis may lead observers to react in ways other than offering direct assistance, including indirect help, reinterpretation of the situation, or fleeing the scene.

Bystander intervention

The phenomenon whereby people intervene to help others in need even if the other is a complete stranger and the intervention puts the helper at risk.

Cost-benefit analysis

A decision-making process that compares the cost of an action or thing against the expected benefit to help determine the best course of action.

Diffusion of responsibility

When deciding whether to help a person in need, knowing that there are others who could also provide assistance relieves bystanders of some measure of personal responsibility, reducing the likelihood that bystanders will intervene.

Egoism

A motivation for helping that has the improvement of the helper's own circumstances as its primary goal.

Empathic concern

According to Batson's empathy-altruism hypothesis, observers who empathize with a person in need (that is, put themselves in the shoes of the victim and imagine how that person feels)

will experience empathic concern and have an altruistic motivation for helping.

Empathy–altruism model

An altruistic theory proposed by Batson (2011) that claims that people who put themselves in the shoes of a victim and imagining how the victim feel will experience empathic concern that evokes an altruistic motivation for helping.

Helpfulness

A component of the prosocial personality orientation; describes individuals who have been helpful in the past and, because they believe they can be effective with the help they give, are more likely to be helpful in the future.

Helping

Prosocial acts that typically involve situations in which one person is in need and another provides the necessary assistance to eliminate the other's need.

Kin selection

According to evolutionary psychology, the favoritism shown for helping our blood relatives, with the goals of increasing the likelihood that some portion of our DNA will be passed on to future generations.

Negative state relief model

An egoistic theory proposed by Cialdini et al. (1982) that claims that people have learned through socialization that helping can serve as a secondary reinforcement that will relieve negative moods such as sadness.

Other-oriented empathy

A component of the prosocial personality orientation; describes individuals who have a strong sense of social responsibility, empathize with and feel emotionally tied to those in need, understand the problems the victim is experiencing, and have a heightened sense of moral obligations to be helpful.

Personal distress

According to Batson's empathy–altruism hypothesis, observers who take a detached view of a person in need will experience feelings of being "worried" and "upset" and will have an egoistic motivation for helping to relieve that distress.

Pluralistic ignorance

Relying on the actions of others to define an ambiguous need situation and to then erroneously

conclude that no help or intervention is necessary.

Prosocial behavior

Social behavior that benefits another person.

Prosocial personality orientation

A measure of individual differences that identifies two sets of personality characteristics (other-oriented empathy, helpfulness) that are highly correlated with prosocial behavior.

Reciprocal altruism

According to evolutionary psychology, a genetic predisposition for people to help those who have previously helped them.

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Happiness and Well-Being

26

Happiness: The Science of Subjective Well-Being

Edward Diener

Subjective well-being (SWB) is the scientific term for happiness and life satisfaction—thinking and feeling that your life is going well, not badly. Scientists rely primarily on self-report surveys to assess the happiness of individuals, but they have validated these scales with other types of measures. People's levels of subjective well-being are influenced by both internal factors, such as personality and outlook, and external factors, such as the society in which they live. Some of the major determinants of subjective well-being are a person's inborn temperament, the quality of their social relationships, the societies they live in, and their ability to meet their basic needs. To some degree people adapt to conditions so that over time our circumstances may not influence our happiness as much as one might predict they would. Importantly, researchers have also studied the outcomes of subjective well-being and have found that "happy" people are more likely to be healthier and live longer, to have better social relationships, and to be more productive at work. In other words, people high in subjective well-being seem to be healthier and function more effectively compared to people who are chronically stressed, depressed, or angry. Thus, happiness does not just feel good, but it is good for people and for those around them.

Learning Objectives

- Describe three major forms of happiness and a cause of each of them.
- Be able to list two internal causes of subjective well-being and two external causes of subjective well-being.
- Describe the types of societies that experience the most and least happiness, and why they do.
- Describe the typical course of adaptation to events in terms of the time course of SWB.

- Describe several of the beneficial outcomes of being a happy person.
- Describe how happiness is typically measured.

Introduction

When people describe what they most want out of life, happiness is almost always on the list, and very frequently it is at the top of the list. When people describe what they want in life for their children, they frequently mention health and wealth, occasionally they mention fame or success—but they almost always mention happiness. People will claim that whether their kids are wealthy and work in some prestigious occupation or not, “I just want my kids to be happy.” Happiness appears to be one of the most important goals for people, if not the most important. But what is it, and how do people get it?

In this module I describe “**happiness**” or subjective well-being (SWB) as a process—it results from certain **internal** and **external causes**, and in turn it influences the way people behave, as well as their physiological states. Thus, high SWB is not just a pleasant outcome but is an important factor in our future success. Because scientists have developed valid ways of measuring “happiness,” they have come in the past decades to know much about its causes and consequences.



If you had only one gift to give your child, what would it be? Happiness? [Image: mynameisharsha, <https://goo.gl/216PFr>, CC BY-SA 3.0, <https://goo.gl/eLCn2O>]

Types of Happiness

Philosophers debated the nature of happiness for thousands of years, but scientists have recently discovered that happiness means different things. Three major types of happiness are high **life satisfaction**, frequent **positive feelings**, and infrequent **negative feelings** (Diener,

1984). “**Subjective well-being**” is the label given by scientists to the various forms of happiness taken together. Although there are additional forms of SWB, the three in the table below have been studied extensively. The table also shows that the causes of the different types of happiness can be somewhat different.

Three Types of Happiness	Examples	Causes
Life Satisfaction	<ul style="list-style-type: none"> • I think my life is great • I am satisfied with my job 	<ul style="list-style-type: none"> • A good income • Achieving one's goals • High self-esteem
Positive Feelings	<ul style="list-style-type: none"> • Enjoying life • Loving others 	<ul style="list-style-type: none"> • Supportive friends • Interesting work • Extroverted personality
Low Negative Feelings	<ul style="list-style-type: none"> • Few chronic worries • Rarely sad or angry 	<ul style="list-style-type: none"> • Low neuroticism • One's goals are in harmony • A positive outlook

Table 1: Three Types of Subjective Well-Being

You can see in the table that there are different causes of happiness, and that these causes are not identical for the various types of SWB. Therefore, there is no single key, no magic wand—high SWB is achieved by combining several different important elements (Diener & Biswas-Diener, 2008). Thus, people who promise to know *the key to happiness* are oversimplifying.

Some people experience all three elements of happiness—they are very satisfied, enjoy life, and have only a few worries or other unpleasant emotions. Other unfortunate people are missing all three. Most of us also know individuals who have one type of happiness but not another. For example, imagine an elderly person who is completely satisfied with her life—she has done most everything she ever wanted—but is not currently enjoying life that much because of the infirmities of age. There are others who show a different pattern, for example, who really enjoy life but also experience a lot of stress, anger, and worry. And there are those who are having fun, but who are dissatisfied and believe they are wasting their lives. Because there are several components to happiness, each with somewhat different causes, there is no magic single cure-all that creates all forms of SWB. This means that to be happy, individuals must acquire each of the different elements that cause it.

Causes of Subjective Well-Being

There are external influences on people's happiness—the circumstances in which they live. It is possible for some to be happy living in poverty with ill health, or with a child who has a serious disease, but this is difficult. In contrast, it is easier to be happy if one has supportive family and friends, ample resources to meet one's needs, and good health. But even here there are exceptions—people who are depressed and unhappy while living in excellent circumstances. Thus, people can be happy or unhappy because of their personalities and the way they think about the world or because of the external circumstances in which they live. People vary in their propensity to happiness—in their personalities and outlook—and this means that knowing their living conditions is not enough to predict happiness.

Internal Causes (Top-down influences)	Description
Inborn temperament	Studies of monozygotic (identical) twins raised apart indicate that our genes influence our happiness. Even when raised apart, identical twins tend to be similar in their levels of subjective well-being.
Personality and temperament	Personality is partly inborn and partly learned, and it influences our happiness. For example: Extroverts tend to have more positive feelings. Neurotics tend to have more negative feelings.
Outlook	People can develop habits of noticing the good things in life and interpreting ambiguous events in positive ways. Other people develop negative mental habits, leading to more unhappiness. One's culture also can influence whether we take an optimistic or pessimistic view of life.
Resilience	Happy individuals tend to bounce back more quickly after losses and negative events.
External Causes (Bottom-up influences)	Description
Sufficient material resources	People have enough money to meet their basic needs and fulfill their major goals.
Sufficient social resources	People differ in their need for social contact, but everyone needs some supportive and trusted others: family, a friend, or a partner, or sometimes all three. We need other people to lead a fulfilled life.
Desirable society	Our own efforts and circumstances influence our happiness, but so does the society in which we live. A society of hunger, war, conflict, and corruption is much less happy than one with material resources, high levels of trust and cooperation, and people who want to help each other.

Table 2: Internal and External Causes of Subjective Well-Being

In the table below are shown internal and external circumstances that influence happiness. There are individual differences in what makes people happy, but the causes in the table are important for most people (Diener, Suh, Lucas, & Smith, 1999; Lyubomirsky, 2013; Myers, 1992).

Societal Influences on Happiness

When people consider their own happiness, they tend to think of their relationships, successes and failures, and other personal factors. But a very important influence on how happy people are is the society in which they live. It is easy to forget how important societies and neighborhoods are to people's happiness or unhappiness. In Figure 1, I present life satisfaction around the world. You can see that some nations, those with the darkest shading on the map, are high in life satisfaction. Others, the lightest shaded areas, are very low. The grey areas in the map are places we could not collect happiness data—they were just too dangerous or inaccessible.

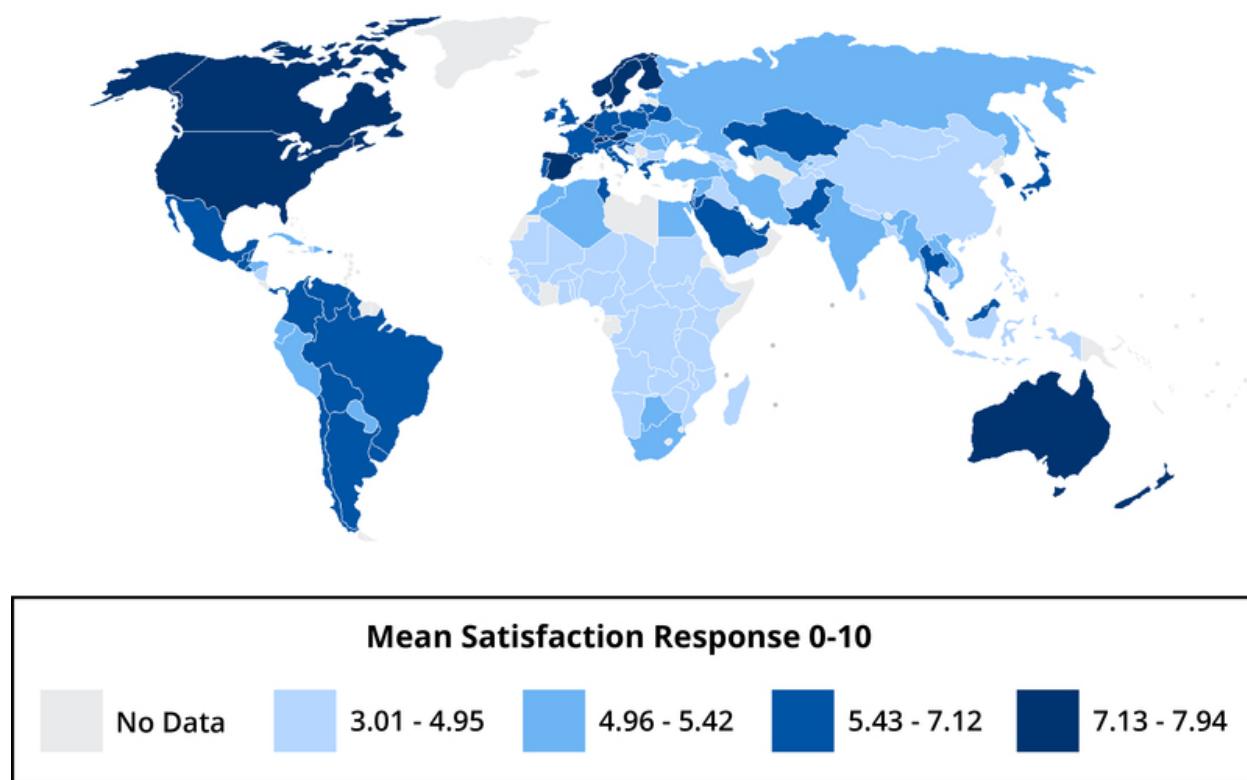


Figure 1

Can you guess what might make some societies happier than others? Much of North America

and Europe have relatively high life satisfaction, and much of Africa is low in life satisfaction. For life satisfaction living in an economically developed nation is helpful because when people must struggle to obtain food, shelter, and other basic necessities, they tend to be dissatisfied with lives. However, other factors, such as trusting and being able to count on others, are also crucial to the happiness within nations. Indeed, for enjoying life our relationships with others seem more important than living in a wealthy society. One factor that predicts unhappiness is conflict—individuals in nations with high internal conflict or conflict with neighboring nations tend to experience low SWB.

Money and Happiness

Will money make you happy? A certain level of income is needed to meet our needs, and very poor people are frequently dissatisfied with life (Diener & Seligman, 2004). However, having more and more money has diminishing returns—higher and higher incomes make less and less difference to happiness. Wealthy nations tend to have higher average life satisfaction than poor nations, but the United States has not experienced a rise in life satisfaction over the past decades, even as income has doubled. The goal is to find a level of income that you can live with and earn. Don't let your aspirations continue to rise so that you always feel poor, no matter how much money you have. Research shows that materialistic people often tend to be less happy, and putting your emphasis on relationships and other areas of life besides just money is a wise strategy. Money can help life satisfaction, but when too many other valuable things are sacrificed to earn a lot of money—such as relationships or taking a less enjoyable job—the pursuit of money can harm happiness.

There are stories of wealthy people who are unhappy and of janitors who are very happy. For instance, a number of extremely wealthy people in South Korea have committed suicide recently, apparently brought down by stress and other negative feelings. On the other hand, there is the hospital janitor who loved her life because she felt that her work in keeping the hospital clean was so important for the patients and nurses. Some millionaires are dissatisfied because they want to be billionaires. Conversely, some people with ordinary incomes are quite happy because they have learned to live within their means and enjoy the less expensive things in life.

It is important to always keep in mind that high materialism seems to lower life satisfaction—valuing money over other things such as relationships can make us dissatisfied. When people think money is more important than everything else, they seem to have a harder time being happy. And unless they make a great deal of money, they are not on average as happy as others. Perhaps in seeking money they sacrifice other important things too much, such as

relationships, spirituality, or following their interests. Or it may be that materialists just can never get enough money to fulfill their dreams—they always want more.

To sum up what makes for a happy life, let's take the example of Monoj, a rickshaw driver in Calcutta. He enjoys life, despite the hardships, and is reasonably satisfied with life. How could he be relatively happy despite his very low income, sometimes even insufficient to buy enough food for his family? The things that make Monoj happy are his family and friends, his religion, and his work, which he finds meaningful. His low income does lower his life satisfaction to some degree, but he finds his children to be very rewarding, and he gets along well with his neighbors. I also suspect that Monoj's positive temperament and his enjoyment of social relationships help to some degree to overcome his poverty and earn him a place among the happy. However, Monoj would also likely be even more satisfied with life if he had a higher income that allowed more food, better housing, and better medical care for his family.



Monoj, a happy rickshaw driver in Calcutta.

Besides the internal and external factors that influence happiness, there are psychological influences as well—such as our aspirations, social comparisons, and adaptation. People's aspirations are what they want in life, including income, occupation, marriage, and so forth. If people's aspirations are high, they will often strive harder, but there is also a risk of them falling short of their aspirations and being dissatisfied. The goal is to have challenging aspirations but also to be able to adapt to what actually happens in life.

One's outlook and resilience are also always very important to happiness. Every person will have disappointments in life, fail at times, and have problems. Thus, happiness comes not to people who never have problems—there are no such individuals—but to people who are able to bounce back from failures and adapt to disappointments. This is why happiness is never caused just by what happens to us but always includes our outlook on life.

Adaptation to Circumstances

The process of **adaptation** is important in understanding happiness. When good and bad events occur, people often react strongly at first, but then their reactions adapt over time and they return to their former levels of happiness. For instance, many people are euphoric when they first marry, but over time they grow accustomed to the marriage and are no longer ecstatic. The marriage becomes commonplace and they return to their former level of happiness. Few of us think this will happen to us, but the truth is that it usually does. Some people will be a bit happier even years after marriage, but nobody carries that initial “high” through the years.

People also adapt over time to bad events. However, people take a long time to adapt to certain negative events such as unemployment. People become unhappy when they lose their work, but over time they recover to some extent. But even after a number of years, unemployed individuals sometimes have lower life satisfaction, indicating that they have not completely habituated to the experience. However, there are strong individual differences in adaptation, too. Some people are resilient and bounce back quickly after a bad event, and others are fragile and do not ever fully adapt to the bad event. Do you adapt quickly to bad events and bounce back, or do you continue to dwell on a bad event and let it keep you down?

An example of adaptation to circumstances is shown in Figure 3, which shows the daily moods of “Harry,” a college student who had Hodgkin’s lymphoma (a form of cancer). As can be seen, over the 6-week period when I studied Harry’s moods, they went up and down. A few times his moods dropped into the negative zone below the horizontal blue line. Most of the time Harry’s moods were in the positive zone above the line. But about halfway through the study Harry was told that his cancer was in remission—effectively cured—and his moods on that day spiked way up. But notice that he quickly adapted—the effects of the good news wore off, and Harry adapted back toward where he was before. So even the very best news one can imagine—recovering from cancer—was not enough to give Harry a permanent “high.” Notice too, however, that Harry’s moods averaged a bit higher after cancer remission. Thus, the typical pattern is a strong response to the event, and then a dampening of this joy over time. However, even in the long run, the person might be a bit happier or unhappier than before.

Outcomes of High Subjective Well-Being

Is the state of happiness truly a good thing? Is happiness simply a feel-good state that leaves us unmotivated and ignorant of the world’s problems? Should people strive to be happy, or are they better off to be grumpy but “realistic”? Some have argued that happiness is actually a bad thing, leaving us superficial and uncaring. Most of the evidence so far suggests that

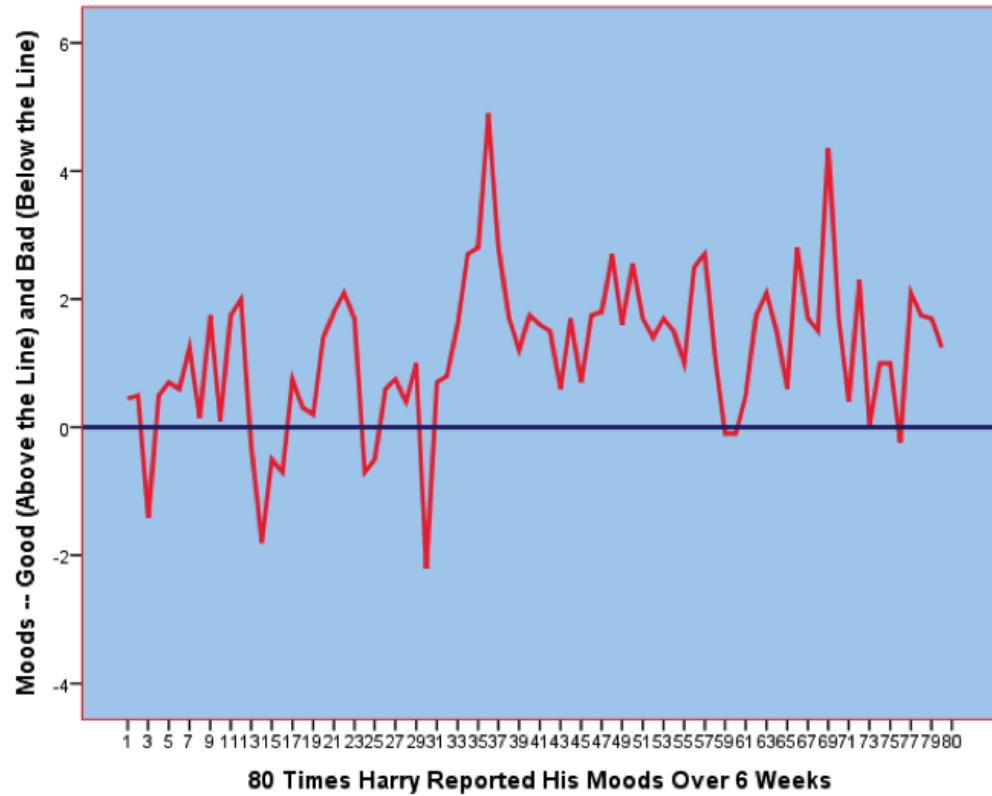


Figure 3. Harry's Daily Moods

Positive Outcomes	Description of Some of the Benefits
Health and Longevity	Happy and optimistic people have stronger immune systems and fewer cardiovascular diseases. Happy people are more likely to perform healthy behaviors, such as wearing seat belts and adhere to medical regimens. They also seem on average to live longer.
Social Relationships	Happy people are more popular, and their relationships are more stable and rewarding. For example, they get divorced less and are fired from work less. They support others more, and receive more support from others in return.
Productivity	Organizations in which people are positive and satisfied seem to be more successful. Work units with greater subjective well-being are more productive, and companies with happy workers tend to earn more money and develop higher stock prices.
Citizenship	Happy people are more likely to donate their time and money to charitable causes and to help others at work.

Table 3: Benefits of Happiness

happy people are healthier, more sociable, more productive, and better citizens (Diener & Tay, 2012; Lyubomirsky, King, & Diener, 2005). Research shows that the happiest individuals are usually very sociable. The table below summarizes some of the major findings.

Although it is beneficial generally to be happy, this does not mean that people should be constantly euphoric. In fact, it is appropriate and helpful sometimes to be sad or to worry. At times a bit of worry mixed with positive feelings makes people more creative. Most successful people in the workplace seem to be those who are mostly positive but sometimes a bit negative. Thus, people need not be a superstar in happiness to be a superstar in life. What is not helpful is to be chronically unhappy. The important question is whether people are satisfied with how happy they are. If you feel mostly positive and satisfied, and yet occasionally worry and feel stressed, this is probably fine as long as you feel comfortable with this level of happiness. If you are a person who is chronically unhappy much of the time, changes are needed, and perhaps professional intervention would help as well.

Measuring Happiness

SWB researchers have relied primarily on **self-report scales** to assess happiness—how people rate their own happiness levels on self-report surveys. People respond to numbered scales to indicate their levels of satisfaction, positive feelings, and lack of negative feelings. You can see where you stand on these scales by going to <http://internal.psychology.illinois.edu/~e-diener/scales.html> or by filling out the Flourishing Scale below. These measures will give you an idea of what popular scales of happiness are like.

The self-report scales have proved to be relatively valid (Diener, Inglehart, & Tay, 2012), although people can lie, or fool themselves, or be influenced by their current moods or situational factors. Because the scales are imperfect, well-being scientists also sometimes use biological measures of happiness (e.g., the strength of a person's immune system, or measuring various brain areas that are associated with greater happiness). Scientists also use reports by family, coworkers, and friends—these people reporting how happy they believe the target person is. Other measures are used as well to help overcome some of the shortcomings of the self-report scales, but most of the field is based on people telling us how happy they are using numbered scales.

There are scales to measure life satisfaction (Pavot & Diener, 2008), positive and negative feelings, and whether a person is psychologically flourishing (Diener et al., 2009). Flourishing has to do with whether a person feels meaning in life, has close relationships, and feels a sense of mastery over important life activities. You can take the well-being scales created in

Below are eight statements with which you may agree or disagree. Using the 1–7 scale, indicate your agreement with each item by picking the appropriate response for each statement.

7 – Strongly agree

6 – Agree

5 – Slightly agree

4 – Neither agree nor disagree

3 – Slightly disagree

2 – Disagree

1 – Strongly disagree

I lead a purposeful and meaningful life

My social relationships are supportive and rewarding

I am engaged and interested in my daily activities

I actively contribute to the happiness and well-being of others

I am competent and capable in the activities that are important to me

I am a good person and live a good life

I am optimistic about my future

People respect me

Scoring:

Add the responses, varying from 1 to 7, for all eight items. The possible range of scores is from 8 (lowest possible) to 56 (highest PWB possible). A high score represents a person with many psychological resources and strengths.

The Flourishing Scale

the Diener laboratory, and let others take them too, because they are free and open for use.

Some Ways to Be Happier

Most people are fairly happy, but many of them also wish they could be a bit more satisfied and enjoy life more. Prescriptions about how to achieve more happiness are often oversimplified because happiness has different components and prescriptions need to be aimed at where each individual needs improvement—one size does not fit all. A person might be strong in one area and deficient in other areas. People with prolonged serious unhappiness

might need help from a professional. Thus, recommendations for how to achieve happiness are often appropriate for one person but not for others. With this in mind, I list in Table 4 below some general recommendations for you to be happier (see also Lyubomirsky, 2013):

Self-Questions for Becoming Happier
Are there controllable things in your life that could be changed to make your life more meaningful and happy? What are the avenues to change and why haven't you taken them?
Do you generally see the bright side of things - the part of the glass that is half full, or do you always see the dark side of things? Can you change this outlook on life by working to break the empty-glass view of life? Can you develop more positive mental habits, such as being grateful to others for all of the things they do for you?
Are there people around you who make you feel good about yourself and who make your life more enjoyable? How can you reduce the number of "downers" who might surround you?
In your relationships, seek to make others happy and help others, not just receive support from others. The happiest and healthiest people are often those who help others and the world. Beyond actually helping others, express gratefulness to them and be a person who gives lots of compliments.
Find work that you will love and be good at, while being realistic about your chances of finding certain jobs. Don't over-weigh the importance of money or status in selecting an occupation. Find a job that interests you and plays to your strengths. If you find a job you love, this can be a big boost to happiness.

Table 4: Self-Examination

Outside Resources

Web: Barbara Fredrickson's website on positive emotions

<http://www.unc.edu/peplab/news.html>

Web: Ed Diener's website

<http://internal.psychology.illinois.edu/~ediener/>

Web: International Positive Psychology Association

<http://www.ippanetwork.org/>

Web: Positive Acorn Positive Psychology website

<http://positiveacorn.com/>

Web: Sonja Lyubomirsky's website on happiness

<http://sonjalyubomirsky.com/>

Web: University of Pennsylvania Positive Psychology Center website

<http://www.ppc.sas.upenn.edu/>

Web: World Database on Happiness

<http://www1.eur.nl/fsw/happiness/>

Discussion Questions

1. Which do you think is more important, the “top-down” personality influences on happiness or the “bottom-up” situational circumstances that influence it? In other words, discuss whether internal sources such as personality and outlook or external factors such as situations, circumstances, and events are more important to happiness. Can you make an argument that both are very important?
2. Do you know people who are happy in one way but not in others? People who are high in life satisfaction, for example, but low in enjoying life or high in negative feelings? What should they do to increase their happiness across all three types of subjective well-being?
3. Certain sources of happiness have been emphasized in this book, but there are others. Can you think of other important sources of happiness and unhappiness? Do you think religion, for example, is a positive source of happiness for most people? What about age

or ethnicity? What about health and physical handicaps? If you were a researcher, what question might you tackle on the influences on happiness?

4. Are you satisfied with your level of happiness? If not, are there things you might do to change it? Would you function better if you were happier?
5. How much happiness is helpful to make a society thrive? Do people need some worry and sadness in life to help us avoid bad things? When is satisfaction a good thing, and when is some dissatisfaction a good thing?
6. How do you think money can help happiness? Interfere with happiness? What level of income will you need to be satisfied?

Vocabulary

Adaptation

The fact that after people first react to good or bad events, sometimes in a strong way, their feelings and reactions tend to dampen down over time and they return toward their original level of subjective well-being.

"Bottom-up" or external causes of happiness

Situational factors outside the person that influence his or her subjective well-being, such as good and bad events and circumstances such as health and wealth.

Happiness

The popular word for subjective well-being. Scientists sometimes avoid using this term because it can refer to different things, such as feeling good, being satisfied, or even the causes of high subjective well-being.

Life satisfaction

A person reflects on their life and judges to what degree it is going well, by whatever standards that person thinks are most important for a good life.

Negative feelings

Undesirable and unpleasant feelings that people tend to avoid if they can. Moods and emotions such as depression, anger, and worry are examples.

Positive feelings

Desirable and pleasant feelings. Moods and emotions such as enjoyment and love are examples.

Subjective well-being

The name that scientists give to happiness—thinking and feeling that our lives are going very well.

Subjective well-being scales

Self-report surveys or questionnaires in which participants indicate their levels of subjective well-being, by responding to items with a number that indicates how well off they feel.

"Top-down" or internal causes of happiness

The person's outlook and habitual response tendencies that influence their happiness—for

example, their temperament or optimistic outlook on life.

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27

The Healthy Life

Emily Hooker & Sarah Pressman

Our emotions, thoughts, and behaviors play an important role in our health. Not only do they influence our day-to-day health practices, but they can also influence how our body functions. This module provides an overview of health psychology, which is a field devoted to understanding the connections between psychology and health. Discussed here are examples of topics a health psychologist might study, including stress, psychosocial factors related to health and disease, how to use psychology to improve health, and the role of psychology in medicine.

Learning Objectives

- Describe basic terminology used in the field of health psychology.
- Explain theoretical models of health, as well as the role of psychological stress in the development of disease.
- Describe psychological factors that contribute to resilience and improved health.
- Defend the relevance and importance of psychology to the field of medicine.

What Is Health Psychology?

Today, we face more **chronic disease** than ever before because we are living longer lives while also frequently behaving in unhealthy ways. One example of a chronic disease is coronary heart disease (CHD): It is the number one cause of death worldwide (World Health Organization, 2013). CHD develops slowly over time and typically appears midlife, but related

heart problems can persist for years after the original diagnosis or cardiovascular event. In managing illnesses that persist over time (other examples might include cancer, diabetes, and long-term disability) many psychological factors will determine the progression of the ailment. For example, do patients seek help when appropriate? Do they follow doctor recommendations? Do they develop negative psychological symptoms due to lasting illness (e.g., depression)? Also important is that psychological factors can play a significant role in *who* develops these diseases, the prognosis, and the nature of the symptoms related to the illness. Health psychology is a relatively new, interdisciplinary field of study that focuses on these very issues, or more specifically, the role of psychology in maintaining health, as well as preventing and treating illness.

Consideration of how psychological and social factors influence health is especially important today because many of the leading causes of illness in developed countries are often attributed to psychological and behavioral factors. In the case of CHD, discussed above, psychosocial factors, such as excessive stress, smoking, unhealthy eating habits, and some personality traits can also lead to increased risk of disease and worse health outcomes. That being said, many of these factors can be adjusted using psychological techniques. For example, clinical health psychologists can improve health practices like poor dietary choices and smoking, they can teach important stress reduction techniques, and they can help treat psychological disorders tied to poor health. Health psychology considers how the choices we make, the behaviors we engage in, and even the emotions that we feel, can play an important role in our overall health (Cohen & Herbert, 1996; Taylor, 2012).



Health psychologists are helping people to adapt behaviors to avoid disease, reduce stress, and improve overall health. [Image: Adelphi Lab Center, <https://goo.gl/N9wXon>, CC BY 2.0, <https://goo.gl/BRvSA7>]

Health psychology relies on the **Biopsychosocial Model of Health**. This model posits that biology, psychology, and social factors are just as important in the development of disease as biological causes (e.g., germs, viruses), which is consistent with the World Health Organization (1946) definition of **health**. This model replaces the older **Biomedical Model of Health**, which primarily considers the physical, or pathogenic, factors contributing to illness. Thanks to

advances in medical technology, there is a growing understanding of the physiology underlying the **mind-body connection**, and in particular, the role that different feelings can have on our body's function. Health psychology researchers working in the fields of **psychosomatic medicine** and **psychoneuroimmunology**, for example, are interested in understanding how psychological factors can "get under the skin" and influence our physiology in order to better understand how factors like stress can make us sick.

Stress And Health

You probably know exactly what it's like to feel stress, but what you may not know is that it can objectively influence your health. Answers to questions like, "How stressed do you feel?" or "How overwhelmed do you feel?" can predict your likelihood of developing both minor illnesses as well as serious problems like future heart attack (Cohen, Janicki-Deverts, & Miller, 2007). (Want to measure your own stress level? Check out the links at the end of the module.) To understand how health psychologists study these types of associations, we will describe one famous example of a stress and health study. Imagine that you are a research subject for a moment. After you check into a hotel room as part of the study, the researchers ask you to report your general levels of stress. Not too surprising; however, what happens next is that you receive droplets of *cold virus* into your nose! The researchers intentionally try to make you sick by exposing you to an infectious illness. After they expose you to the virus, the researchers will then evaluate you for several days by asking you questions about your symptoms, monitoring how much mucus you are producing by weighing your used tissues, and taking body fluid samples—all to see if you are objectively ill with a cold. Now, the

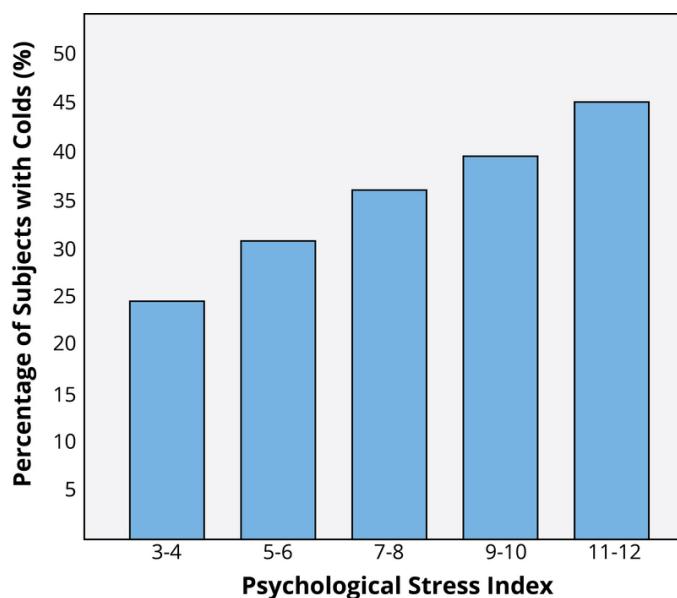


Figure 1: Adapted from Cohen et al. 1991

interesting thing is that not everyone who has drops of cold virus put in their nose develops the illness. Studies like this one find that people who are less stressed and those who are more positive at the beginning of the study are at a decreased risk of developing a cold (Cohen, Tyrrell, & Smith, 1991; Cohen, Alper, Doyle, Treanor, & Turner, 2006) (see Figure 1 for an example).

Importantly, it is not just major life **stressors** (e.g., a family death, a natural disaster) that increase the likelihood of getting sick. Even small **daily hassles** like getting stuck in traffic or fighting with your girlfriend can raise your blood pressure, alter your stress hormones, and even suppress your immune system function (DeLongis, Folkman, & Lazarus, 1988; Twisk, Snel, Kemper, & van Machelen, 1999).

It is clear that stress plays a major role in our mental and physical health, but what exactly is it? The term **stress** was originally derived from the field of mechanics where it is used to describe materials under pressure. The word was first used in a *psychological* manner by researcher Hans Selye. He was examining the effect of an ovarian hormone that he thought caused sickness in a sample of rats. Surprisingly, he noticed that almost any injected hormone produced this same sickness. He smartly realized that it was not the hormone under investigation that was causing these problems, but instead, the aversive experience of being handled and injected by researchers that led to high physiological arousal and, eventually, to health problems like ulcers. Selye (1946) coined the term stressor to label a stimulus that had this effect on the body and developed a model of the stress response called the **General Adaptation Syndrome**. Since then, psychologists have studied stress in a myriad of ways, including stress as negative events (e.g., natural disasters or major life changes like dropping out of school), as chronically difficult situations (e.g., taking care of a loved one with Alzheimer's), as short-term hassles, as a biological fight-or-flight response, and even as clinical illness like post-traumatic stress disorder (PTSD). It continues to be one of the most important and well-studied psychological correlates of illness, because excessive stress causes potentially damaging wear and tear on the body and can influence almost any imaginable disease process.

Protecting Our Health

An important question that health psychologists ask is: What keeps us protected from disease and alive longer? When considering this issue of **resilience** (Rutter, 1985), five factors are often studied in terms of their ability to protect (or sometimes harm) health. They are:

1. Coping

2. Control and Self-Efficacy
3. Social Relationships
4. Dispositions and Emotions
5. Stress Management

Coping Strategies

How individuals cope with the stressors they face can have a significant impact on health. Coping is often classified into two categories: problem-focused coping or emotion-focused coping (Carver, Scheier, & Weintraub, 1989). **Problem-focused coping** is thought of as actively addressing the event that is causing stress in an effort to solve the issue at hand. For example, say you have an important exam coming up next week. A problem-focused strategy might be to spend additional time over the weekend studying to make sure you understand all of the material. **Emotion-focused coping**, on the other hand, regulates the emotions that come with stress. In the above examination example, this might mean watching a funny movie to take your mind off the anxiety you are feeling. In the short term, emotion-focused coping might reduce feelings of stress, but problem-focused coping seems to have the greatest impact on mental wellness (Billings & Moos, 1981; Herman-Stabl, Stemmler, & Petersen, 1995). That being said, when events are uncontrollable (e.g., the death of a loved one), emotion-focused coping directed at managing your feelings, at first, might be the better strategy. Therefore, it is always important to consider the match of the stressor to the coping strategy when evaluating its plausible benefits.



Feeling a sense of control in one's life is important. Something as simple as having control over the care of a houseplant has been shown to improve health and longevity. [Image: JJ Harrison, <https://goo.gl/82FsdV>, CC BY-SA 2.5, <https://goo.gl/SRALwa>]

Control and Self-Efficacy

Another factor tied to better health outcomes and an improved ability to cope with stress is having the belief that you have **control** over a situation. For example, in one study where participants were forced to listen to unpleasant (stressful) noise, those who were led to believe that they had control over the noise performed much better on proofreading tasks afterwards (Glass & Singer, 1972). In other words, even though participants *did not* have actual

control over the noise, the control *belief* aided them in completing the task. In similar studies, perceived control benefited immune system functioning (Sieber et al., 1992). Outside of the laboratory, studies have shown that older residents in assisted living facilities, which are notorious for low control, lived *longer* and showed *better* health outcomes when given control over something as simple as watering a plant or choosing when student volunteers came to visit (Rodin & Langer, 1977; Schulz & Hanusa, 1978). In addition, feeling in control of a threatening situation can actually change stress hormone levels (Dickerson & Kemeny, 2004). Believing that you have control over your own behaviors can also have a positive influence on important outcomes like smoking cessation, contraception use, and weight management (Wallston & Wallston, 1978). When individuals do not believe they have control, they do not try to change. **Self-efficacy** is closely related to control, in that people with high levels of this trait believe they can complete tasks and reach their goals. Just as feeling in control can reduce stress and improve health, higher self-efficacy can reduce stress and negative **health behaviors**, and is associated with better health (O'Leary, 1985).

Social Relationships

Research has shown that the impact of social isolation on our risk for disease and death is similar in magnitude to the risk associated with smoking regularly (Holt-Lunstad, Smith, & Layton, 2010; House, Landis, & Umberson, 1988). In fact, the importance of social relationships for our health is so significant that some scientists believe our body has developed a physiological system that encourages us to seek out our relationships, especially in times of stress (Taylor et al., 2000). **Social integration** is the concept used to describe the number of social roles that you have (Cohen & Wills, 1985), as well as the lack of isolation. For example, you might be a daughter, a basketball team member, a Humane Society volunteer, a coworker, and a student. Maintaining these different roles can improve your health via encouragement from those around you to maintain a healthy lifestyle. Those in your social network might also provide you with **social support** (e.g., when you are under stress). This support might include emotional help (e.g., a hug when you need it), tangible help (e.g., lending you money), or advice. By helping to improve health behaviors and reduce stress, social relationships can have a powerful, protective impact on health, and in some cases, might even help people with serious illnesses stay alive longer (Spiegel, Kraemer, Bloom, & Gottheil, 1989).

Dispositions and Emotions: What's Risky and What's Protective?

Negative dispositions and personality traits have been strongly tied to an array of health risks. One of the earliest negative trait-to-health connections was discovered in the 1950s by two cardiologists. They made the interesting discovery that there were common behavioral and

psychological patterns among their heart patients that were not present in other patient samples. This pattern included being competitive, impatient, hostile, and time urgent. They labeled it **Type A Behavior**. Importantly, it was found to be associated with *double* the risk of heart disease as compared with **Type B Behavior** (Friedman & Rosenman, 1959). Since the 1950s, researchers have discovered that it is the **hostility** and competitiveness components of Type A that are especially harmful to heart health (Iribarren et al., 2000; Matthews, Glass, Rosenman, & Bortner, 1977; Miller, Smith, Turner, Guijarro, & Hallet, 1996). Hostile individuals are quick to get upset, and this angry arousal can damage the arteries of the heart. In addition, given their negative personality style, hostile people often lack a health-protective supportive social network.

Positive traits and states, on the other hand, are often health protective. For example, characteristics like positive emotions (e.g., feeling happy or excited) have been tied to a wide range of benefits such as increased longevity, a reduced likelihood of developing some illnesses, and better outcomes once you are diagnosed with certain diseases (e.g., heart disease, HIV) (Pressman & Cohen, 2005). Across the world, even in the most poor and

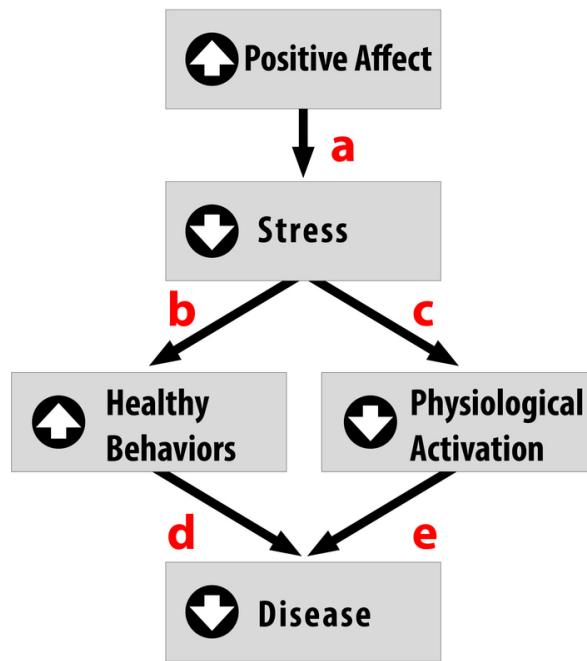


Figure 2. This figure illustrates one possible way that positive affect protects individuals against disease. Positive affect can reduce stress perceptions (a), thereby improving health behaviors (b) and lowering physiological stress responses (c) (e.g., decreased cardiovascular reactivity, lower stress hormones, non-suppressed immune activity). As a result, there is likely to be less incidence of disease (d, e). (Adapted from Pressman & Cohen, 2005)

underdeveloped nations, positive emotions are consistently tied to better health (Pressman, Gallagher, & Lopez, 2013). Positive emotions can also serve as the “antidote” to stress, protecting us against some of its damaging effects (Fredrickson, 2001; Pressman & Cohen, 2005; see Figure 2). Similarly, looking on the bright side can also improve health. Optimism has been shown to improve coping, reduce stress, and predict better disease outcomes like recovering from a heart attack more rapidly (Kubzansky, Sparrow, Vokonas, & Kawachi, 2001; Nes & Segerstrom, 2006; Scheier & Carver, 1985; Segerstrom, Taylor, Kemeny, & Fahey, 1998).

Stress Management

About 20 percent of Americans report having stress, with 18–33 year-olds reporting the highest levels (American Psychological Association, 2012). Given that the sources of our stress are often difficult to change (e.g., personal finances, current job), a number of interventions have been designed to help reduce the aversive responses to duress. For example, relaxation activities and forms of meditation are techniques that allow individuals to reduce their stress via breathing exercises, muscle relaxation, and mental imagery. Physiological arousal from stress can also be reduced via **biofeedback**, a technique where the individual is shown bodily information that is not normally available to them (e.g., heart rate), and then taught strategies to alter this signal. This type of intervention has even shown promise in reducing heart and hypertension risk, as well as other serious conditions (e.g., Moravec, 2008; Patel, Marmot, & Terry, 1981). But reducing stress does not have to be complicated! For example, exercise is a great stress reduction activity (Salmon, 2001) that has a myriad of health benefits.

The Importance Of Good Health Practices

As a student, you probably strive to maintain good grades, to have an active social life, and to stay healthy (e.g., by getting enough sleep), but there is a popular joke about what it’s like to be in college: you can only pick two of these things (see Figure 3 for an example). The busy life of a college student doesn’t always allow you to maintain all three areas of your life, especially during test-taking periods. In one study, researchers found that students taking exams were more stressed and, thus, smoked more, drank more caffeine, had less physical activity, and had worse sleep habits (Oaten & Chang, 2005), all of which could have detrimental effects on their health. Positive health practices are *especially* important in times of stress when your immune system is compromised due to high stress and the elevated frequency of exposure to the illnesses of your fellow students in lecture halls, cafeterias, and dorms.

Psychologists study both **health behaviors** and health habits. The former are behaviors that can improve or harm your health. Some examples include regular exercise, flossing, and

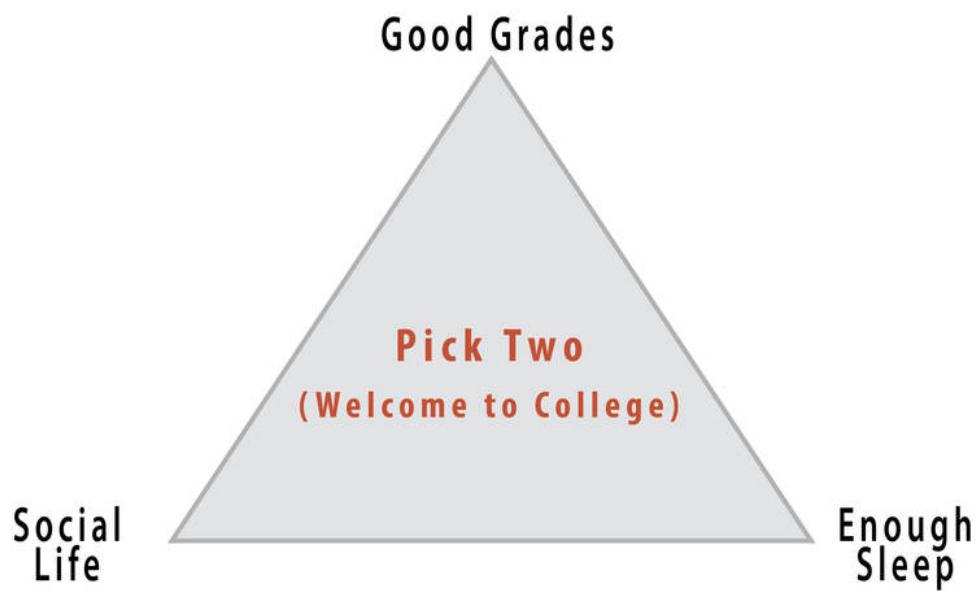


Figure 3: A popular joke about how difficult it is to stay balanced and healthy during college.

wearing sunscreen, versus negative behaviors like drunk driving, pulling all-nighters, or smoking. These behaviors become *habits* when they are firmly established and performed automatically. For example, do you have to think about putting your seatbelt on or do you do it automatically? Habits are often developed early in life thanks to parental encouragement or the influence of our peer group.

While these behaviors sound minor, studies have shown that those who engaged in more of these protective habits (e.g., getting 7–8 hours of sleep regularly, not smoking or drinking excessively, exercising) had fewer illnesses, felt better, and were less likely to die over a 9–12-year follow-up period (Belloc & Breslow 1972; Breslow & Enstrom 1980). For college students, health behaviors can even influence academic performance. For example, poor sleep quality and quantity are related to weaker learning capacity and academic performance (Curcio, Ferrara, & De Gennaro, 2006). Due to the effects that health behaviors can have, much effort is put forward by psychologists to understand *how* to change unhealthy behaviors, and to understand *why* individuals fail to act in healthy ways. Health promotion involves enabling individuals to improve health by focusing on behaviors that pose a risk for future illness, as well as spreading knowledge on existing risk factors. These might be genetic risks you are born with, or something you developed over time like obesity, which puts you at risk for Type 2 diabetes and heart disease, among other illnesses.

Psychology And Medicine

There are many psychological factors that influence medical treatment outcomes. For example, older individuals, (Meara, White, & Cutler, 2004), women (Briscoe, 1987), and those from higher socioeconomic backgrounds (Adamson, Ben-Shlomo, Chaturvedi, & Donovan, 2008) are all *more* likely to seek medical care. On the other hand, some individuals who need care might avoid it due to financial obstacles or preconceived notions about medical practitioners or the illness. Thanks to the growing amount of medical information online, many people now use the Internet for health information and 38% percent report that this influences their decision to see a doctor (Fox & Jones, 2009). Unfortunately, this is not always a good thing because individuals tend to do a poor job assessing the credibility of health information. For example, college-student participants reading online articles about HIV and syphilis rated a physician's article and a college student's article as *equally* credible if the participants said they were familiar with the health topic (Eastin, 2001). Credibility of health information often means how accurate or trustworthy the information is, and it can be influenced by irrelevant factors, such as the website's design, logos, or the organization's contact information (Freeman & Spyridakis, 2004). Similarly, many people post health questions on online, unmoderated forums where *anyone* can respond, which allows for the possibility of inaccurate information being provided for serious medical conditions by unqualified individuals.

The screenshot shows the WebMD homepage with a navigation bar at the top. Below the navigation, a main content area features a map of Ohio showing cold and flu symptom levels. A modal window is open over the map, specifically for the state of Ohio, indicating a 'Moderate-Severe' level. To the right of the map, there are two advertisements for Mucinex products: 'Multi-Symptom Cold Relief' and 'Mucinex® Fast-Max® Multi-Symptom Cold Relief'. Both ads include product images and a 'Buy Now' button. At the bottom of the page, there is a note about the map's power source and a copyright notice.

While the Internet has increased the amount of medical information available to the public and created greater access, there are real concerns about how people are making decisions about their health based on that information. [Image: Mapbox, <https://goo.gl/UNhm5>, CC BY 2.0, <https://goo.gl/BRvSA7>]

After individuals decide to seek care, there is also variability in the information they give their medical provider. Poor communication (e.g., due to embarrassment or feeling rushed) can influence the accuracy of the diagnosis and the effectiveness of the prescribed treatment. Similarly, there is variation following a visit to the doctor. While most individuals are tasked with a health recommendation (e.g., buying and using a medication appropriately, losing weight, going to another expert), not everyone *adheres* to medical recommendations (Dunbar-Jacob & Mortimer-Stephens, 2010). For example, many individuals take medications inappropriately (e.g., stopping early, not filling prescriptions) or fail to change their behaviors (e.g., quitting smoking). Unfortunately, getting patients to follow medical orders is not as easy as one would think. For example, in one study, over one third of diabetic patients failed to get proper medical care that would prevent or slow down diabetes-related blindness (Schoenfeld, Greene, Wu, & Leske, 2001)! Fortunately, as mobile technology improves, physicians now have the ability to monitor **adherence** and work to improve it (e.g., with pill bottles that monitor if they are opened at the right time). Even text messages are useful for improving treatment adherence and outcomes in depression, smoking cessation, and weight loss (Cole-Lewis, & Kershaw, 2010).

Being A Health Psychologist

Training as a clinical health psychologist provides a variety of possible career options. Clinical health psychologists often work on teams of physicians, social workers, allied health professionals, and religious leaders. These teams may be formed in locations like rehabilitation centers, hospitals, primary care offices, emergency care centers, or in chronic illness clinics. Work in each of these settings will pose unique challenges in patient care, but the primary responsibility will be the same. Clinical health psychologists will evaluate physical, personal, and environmental factors contributing to illness and preventing improved health. In doing so, they will then help create a treatment strategy that takes into account all dimensions of a person's life and health, which maximizes its potential for success. Those who specialize in health psychology can also conduct research to discover new health predictors and risk factors, or develop interventions to prevent and treat illness. Researchers studying health psychology work in numerous locations, such as universities, public health departments, hospitals, and private organizations. In the related field of **behavioral medicine**, careers focus on the application of this type of research. Occupations in this area might include jobs in occupational therapy, rehabilitation, or preventative medicine. Training as a health psychologist provides a wide skill set applicable in a number of different professional settings and career paths.

The Future Of Health Psychology

Much of the past medical research literature provides an incomplete picture of human health. "Health care" is often "illness care." That is, it focuses on the management of symptoms and illnesses as they arise. As a result, in many developed countries, we are faced with several health epidemics that are difficult and costly to treat. These include obesity, diabetes, and cardiovascular disease, to name a few. The National Institutes of Health have called for researchers to use the knowledge we have about risk factors to design effective interventions to reduce the prevalence of *preventable* illness. Additionally, there are a growing number of individuals across developed countries with *multiple* chronic illnesses and/or lasting disabilities, especially with older age. Addressing their needs and maintaining their quality of life will require skilled individuals who understand how to properly treat these populations. Health psychologists will be on the forefront of work in these areas.

With this focus on prevention, it is important that health psychologists move beyond studying risk (e.g., depression, stress, hostility, low socioeconomic status) in isolation, and move toward studying factors that confer resilience and protection from disease. There is, fortunately, a growing interest in studying the positive factors that protect our health (e.g., Diener & Chan, 2011; Pressman & Cohen, 2005; Richman, Kubzansky, Maselko, Kawachi, Choo, & Bauer, 2005) with evidence strongly indicating that people with higher positivity live longer, suffer fewer illnesses, and generally feel better. Seligman (2008) has even proposed a field of "Positive Health" to specifically study those who exhibit "above average" health—something we do not think about enough. By shifting some of the research focus to identifying and understanding these health-promoting factors, we may capitalize on this information to improve public health.

Innovative interventions to improve health are already in use and continue to be studied. With recent advances in technology, we are starting to see great strides made to improve health with the aid of computational tools. For example, there are hundreds of simple applications (apps) that use email and text messages to send reminders to take medication, as well as mobile apps that allow us to monitor our exercise levels and food intake (in the growing mobile-health, or m-health, field). These m-health applications can be used to raise health awareness, support treatment and compliance, and remotely collect data on a variety of outcomes. Also exciting are devices that allow us to monitor physiology in real time; for example, to better understand the stressful situations that raise blood pressure or heart rate. With advances like these, health psychologists will be able to serve the population better, learn more about health and health behavior, and develop excellent health-improving strategies that could be specifically targeted to certain populations or individuals. These leaps in equipment development, partnered with growing health psychology knowledge and exciting advances in neuroscience and genetic research, will lead health researchers and practitioners into an exciting new time where, hopefully, we will understand more and more

about how to keep people healthy.

Outside Resources

App: 30 iPhone apps to monitor your health

<http://www.hongkiat.com/blog/iphone-health-app/>

Quiz: Hostility

http://www.mhhe.com/socscience/hhp/fahey7e/wellness_worksheets/wellness Worksheet_090.html

Self-assessment: Perceived Stress Scale

http://www.ncsu.edu/assessment/resources/perceived_stress_scale.pdf

Video: Try out a guided meditation exercise to reduce your stress

<https://www.youtube.com/watch?v=dEzbdLn2bJc>

Web: American Psychosomatic Society

<http://www.psychosomatic.org/home/index.cfm>

Web: APA Division 38, Health Psychology

<http://www.health-psych.org>

Web: Society of Behavioral Medicine

<http://www.sbm.org>

Discussion Questions

1. What psychological factors contribute to health?
2. Which psychosocial constructs and behaviors might help protect us from the damaging effects of stress?
3. What kinds of interventions might help to improve resilience? Who will these interventions help the most?
4. How should doctors use research in health psychology when meeting with patients?
5. Why do clinical health psychologists play a critical role in improving public health?

Vocabulary

Adherence

In health, it is the ability of a patient to maintain a health behavior prescribed by a physician. This might include taking medication as prescribed, exercising more, or eating less high-fat food.

Behavioral medicine

A field similar to health psychology that integrates psychological factors (e.g., emotion, behavior, cognition, and social factors) in the treatment of disease. This applied field includes clinical areas of study, such as occupational therapy, hypnosis, rehabilitation or medicine, and preventative medicine.

Biofeedback

The process by which physiological signals, not normally available to human perception, are transformed into easy-to-understand graphs or numbers. Individuals can then use this information to try to change bodily functioning (e.g., lower blood pressure, reduce muscle tension).

Biomedical Model of Health

A reductionist model that posits that ill health is a result of a deviation from normal function, which is explained by the presence of pathogens, injury, or genetic abnormality.

Biopsychosocial Model of Health

An approach to studying health and human function that posits the importance of biological, psychological, and social (or environmental) processes.

Chronic disease

A health condition that persists over time, typically for periods longer than three months (e.g., HIV, asthma, diabetes).

Control

Feeling like you have the power to change your environment or behavior if you need or want to.

Daily hassles

Irritations in daily life that are not necessarily traumatic, but that cause difficulties and repeated stress.

Emotion-focused coping

Coping strategy aimed at reducing the negative emotions associated with a stressful event.

General Adaptation Syndrome

A three-phase model of stress, which includes a mobilization of physiological resources phase, a coping phase, and an exhaustion phase (i.e., when an organism fails to cope with the stress adequately and depletes its resources).

Health

According to the World Health Organization, it is a complete state of physical, mental, and social well-being and not merely the absence of disease or infirmity.

Health behavior

Any behavior that is related to health—either good or bad.

Hostility

An experience or trait with cognitive, behavioral, and emotional components. It often includes cynical thoughts, feelings of emotion, and aggressive behavior.

Mind-body connection

The idea that our emotions and thoughts can affect how our body functions.

Problem-focused coping

A set of coping strategies aimed at improving or changing stressful situations.

Psychoneuroimmunology

A field of study examining the relationship among psychology, brain function, and immune function.

Psychosomatic medicine

An interdisciplinary field of study that focuses on how biological, psychological, and social processes contribute to physiological changes in the body and health over time.

Resilience

The ability to “bounce back” from negative situations (e.g., illness, stress) to normal functioning or to simply not show poor outcomes in the face of adversity. In some cases, resilience may lead to better functioning following the negative experience (e.g., post-traumatic growth).

Self-efficacy

The belief that one can perform adequately in a specific situation.

Social integration

The size of your social network, or number of social roles (e.g., son, sister, student, employee, team member).

Social support

The perception or actuality that we have a social network that can help us in times of need and provide us with a variety of useful resources (e.g., advice, love, money).

Stress

A pattern of physical and psychological responses in an organism after it perceives a threatening event that disturbs its homeostasis and taxes its abilities to cope with the event.

Stressor

An event or stimulus that induces feelings of stress.

Type A Behavior

Type A behavior is characterized by impatience, competitiveness, neuroticism, hostility, and anger.

Type B Behavior

Type B behavior reflects the absence of Type A characteristics and is represented by less competitive, aggressive, and hostile behavior patterns.

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