Course Learning Outcomes for Unit IV

Upon completion of this unit, students should be able to:

8. Compare and contrast the various ways in which humans learn.
   8.1 Identify the key components of classical, operant, and observational theories of learning.
   8.2 Recall the concept of schedules of reinforcement and their impact on human behavior.

9. Explain cognitive functions such as those related to attention and memory.
   9.1 Compare and contrast the processes of memory encoding, storage, and retrieval.
   9.2 Describe different types of memory.
   9.3 Evaluate the theories of forgetting.

10. Analyze theories of language development and compare theories of intelligence.
    10.1 Analyze the processes associated with problem solving and critical thinking.
    10.2 Compare and contrast theories of intelligence.
    10.3 Describe the fundamental properties of language and the theories of language development.

Reading Assignment

Chapter 5: Learning
Chapter 6: Memory
Chapter 7: Thinking, Intelligence, and Language

Unit Lesson

What is learning?

- An infant who stops sucking his or her thumb.
- A child who begins using new words in new combinations to communicate his or her needs.
- A friend pondering over a puzzle and finally figuring out the answer.
- A close relative who has smoked two packs a day for thirty years, puts them down and never picks them up again.

Are these examples of learning? According to Chapter 5, learning involves a change in our behavior as a result of experience. Based on that definition, would you say the above examples qualify as learning? As you can see, learning happens at a variety of ages and in a variety of contexts. Many times, we learn things by realizing that two events happen together. You put your money in the vending machine, the desired product is dispensed. This kind of basic pairing is referred to as associative learning. Let’s consider some more examples:
• You hear a dentist’s drill on television, and your palms start to sweat.
• You catch a whiff of someone wearing your mom’s perfume in a store, and you find yourself smiling.
• You drive past a restaurant where you once got food poisoning, and you feel your stomach start to turn.
• Your dog comes running every time you turn on the can opener.

What do these examples have to do with learning? Classical conditioning is a learning process that builds on the concept of association. The credit for discovering this process goes to Ivan Pavlov. He was a scientist who was trying to conduct research on the digestive processes of dogs. Much to his chagrin, before he could collect his data, the dogs would start drooling before they even saw the food they were about to receive. In fact, the dogs began salivating when they heard a bell indicating that food was coming. He realized that what had once been neutral (e.g., a bell) had become associated with a desirable outcome (e.g., getting food). It turns out that this process is pretty powerful and can happen with positive or negative stimuli if you follow the right paradigm. It can be used to calm or create fears, to create a love for food or a non-negotiable disdain, all because of something you learned.

All Your Parents’ Tricks

It is quite possible that your parents tried to use classical conditioning on you, but more than likely they regularly attempted another learning process called operant conditioning. While classical conditioning focuses more on our more automatic responses, this type of learning is focused on teaching people to do (or stop doing) things voluntarily (see why parents would be interested?). Understanding how this type of learning works came out of the school of behaviorism (remember Unit I’s schools of thought?) and the research of B.F. Skinner. Skinner believed that people (and other animals) are more likely to engage in activities when the consequences are favorable and less likely to engage in activities where the consequences are harmful or unpleasant. Let’s consider some more examples:

• You have a headache, so you take an aspirin.

Skinner would say that since the pain medicine is likely to leave you feeling better (e.g., favorable consequence), you will be more likely to behave in the same way (e.g., take an aspirin) in the future. He referred to this strengthening of behavior as reinforcement. Since the behavior is being strengthened by taking away something unpleasant, Skinner called this type of learning negative reinforcement. Parents tend to be known more for attempting positive reinforcement:

• If you do your homework, you will be allowed to watch your favorite television show.

So, they are trying to strengthen the likelihood that you will do your homework by offering you a favorable consequence. Make sense?

If trying to strengthen a behavior is called reinforcement, what do you call it when you want to weaken a behavior (make it less likely the person will engage in it)? You guessed it—punishment. Most of us are familiar with this term (again, thanks mom and dad), but you might not have realized that according to learning research, there are actually two types of punishment.

• If you do not stop throwing a tantrum, you will have to sit in time out.

You might be surprised to know that this parental response is actually called positive punishment. With both reinforcement and punishment, when you ADD something to the situation, it is called positive. In this case, the parent is adding the unpleasant experience of time out to try to decrease the likelihood of future tantrums.

• If you do not stop throwing a tantrum, you will not be allowed to have your favorite toy at bedtime.

This type of parental response is called negative punishment. Again, with both reinforcement and punishment, when you TAKE AWAY a stimulus, it is called negative. So, in this case, the parent is taking away something desirable to try to decrease the likelihood of future tantrums.
Of course, operant conditioning has lots of applications outside of child rearing. Believe it or not, we actually experience it in the workplace quite frequently. Do you work somewhere that you have to attend to a timer, buzzer, or alarm? That is reinforcement at work. You are more likely to attend to something if it is making an annoying noise that you would like to eliminate. Would you be upset if your pay check started coming at random, unpredictable intervals? I bet you would, but it might also make you continue to show up at work in hopes that your check would be there. Determining what kind of schedule of reinforcement keeps people engaging in desired behaviors is another area of interest to psychologists (and your boss).

**Monkey See, Monkey Do?**

Another powerful type of learning is called *observational learning*, and it is especially important in humans. In fact, it is how we often first learn basic skills. We watch our parents, siblings, and peers and attempt to reproduce their behaviors. As your textbook discusses, baby monkeys will watch a model and then figure out their own way to complete the task. Baby humans will attempt to mimic the model’s procedure *exactly*. Again, imagine the impact on childrearing. If you observe your parents engaging in anti-social behaviors, how are you likely to act? If you witness your parents yelling whenever they are distressed, how will you express your own negative emotions?

**How Do I Feel About Tacos?**

Memory is a very cool topic, because if you think about it, our memories are in fact what make us who we are. We all have a genetic predisposition to act in particular ways, but it appears that at least half of our psychological make-up is influenced by environmental factors. If we had no forms of memory, we would have no way of recording those environmental differences that influence who we are. Everyone likes food, but your experience with eating Mexican when you had the flu has changed your tastes such that you no longer like the smell or even the idea of taco seasoning. That is a result of memory. Your experience with tequila is the reason that you feel nauseous at the thought, whereas others can still have a margarita without cringing.

Our memory is the process by which information is retained for later use. The basic process by which information is processed follows this format: information is acquired and *encoded*, which leads to *storage* in the brain, which leads to the possibility of later *retrieval* (though as you know at test time, it is not a guarantee), and the possibility of eventually forgetting the information.

What we are able to remember has a lot to do with how much *attention* we are paying at a given moment. How many of you listen to music while you study? Or like to have the television on in the background? You are actually dividing your attention and as a result, you can detrimentally impact your memory (which can be problematic come test time). The depth at which we *process* the information can also impact our ability to remember it later. One of the best ways to *elaborate* on new information we learn is by connecting it to information about ourselves. So, when you read about the types of memory, try to create your own examples that will help you to discriminate between each type.

**The Storage Facilities**

If we characterize paying *attention* and *encoding* as placing an order, then where and how are your products (e.g., memories) stored? According to your textbook, there are three types of memory storage facilities: *sensory*, *short-term*, and *long-term* memory. Sensory memory is an immediate, automatic recording of environmental information (remember sensation from Unit III?). With a little bit of *attention*, sensory memories can be transferred into our short-term memory. You might have heard someone say, “I have short-term memory problems” referring to an experience where they cannot seem to recall things that happened to them in the recent past. You will learn more about forgetting in Chapter 6, but really, short-term memory is like a storage bin (and without rehearsal, you can probably only keep information in it for about thirty seconds). Thankfully, researchers have helped us to learn lots of great tricks—like *maintenance rehearsal* and *chunking*—so that we can remember things longer. In reality, our biggest, best storage facility is our long-term memory. Its capacity is enormous and allows us, in ideal circumstances, to remember decades upon decades of information. Long-term memory is where we store information about where we celebrated our seventh birthday (this is called *episodic memory*) and where the seven wonders of the world are located (this is called *semantic memory*).
Where Did I Put My Car Keys?

If we were paying attention, and if the information was successfully transferred to our long-term memory, we should be able to retrieve it, right? It turns out that there are a lot of “ifs” and a lot can interfere with our ability to retrieve our memories. Part of this has to do with our overestimation of how much we were paying attention in the first place (Is it possible that you were trying to get ready for bed, worrying about the next day, and shutting off the lights around your house when you sat your keys down?). Part of your inability to successfully retrieve (literally and psychologically) your keys might have to do with interference. Maybe you had been in the habit of leaving your keys on your night stand but have recently changed habits and are leaving them on your dresser. Your old habit might be interfering with your ability to remember the new location.

Limitations of Remembering

Research has helped us to better understand why we forget, but it has also shed light on what we remember. Contrary to the belief that our memory is an exact snapshot of our experiences, it turns out that our memories are often distorted. Overall, as humans, we like to be consistent. If we have an idea in our minds of how something should have been experienced, we can sometimes misremember according to our beliefs instead of what happened. Our memories can also be influenced by other people. An eyewitness to a car accident might be influenced by the wording the law enforcement officer used when taking his or her statement. A child testifying in court might be influenced by a desire to please the adults who will be influenced by his or her testimony. It is important that we not forget the limitations of remembering.

The Best and the Worst

We humans are a funny species. As a civilization, we have invented the wheel, landed space ships on the moon, and cracked the genetic code. When you stop to think about it, our list of triumphs is long and very impressive. At the same time, we wreak havoc on the environment, mistreat our partners in marriage, and throw away hard-earned money away in games of chance. What is it about the way we humans think that leads us to be both rational and irrational? How do we solve difficult problems and then evaluate the solutions, and what kinds of errors are we prone to make along the way?

It turns out that we use a variety of strategies when trying to solve problems—whether on the scale of reversing a global recession or finding a shorter route to work. Most of us love a good algorithm. If you can tell me a step-by-step process that will always get me to the right answer, I will take it. The problem is (as you have anticipated), there is not really a good algorithm with which to find world peace and prosperity. The next strategy most of us try is called a heuristic. Sure, we have rules of thumb for simple things (e.g., “I” before “E” except after “C”) but we also have these rules for human interactions (e.g., people who work hard get ahead in life). Again, as you have anticipated, these do not always work out in real life. Nevertheless, we humans keep coming up with creative solutions to many of the problems we come up against.

What Do We Mean By Smart?

When you hear someone described as “smart”, what comes to mind for you? Do you think, oh, they probably got good grades in school, or they probably have no common sense, or possibly, they probably make a lot of money at their job? How we think about intelligence and how we might be able to measure it has been the subject of psychologists’ research almost since the founding of the field. What you might have commonly heard referred to as IQ actually came about as a result of the development of many different renditions of assessing what people know and how they know it. What about people who do not necessarily score high on a standardized intelligence test, but have remarkable abilities in the areas of music or athletics? Can theories of multiple intelligences help recognize the amazing capacities of these individuals? How do we understand individuals who represent the extremes of intelligence? Should we be cautious in our application of intelligence testing?
And How Do We Communicate All of This?

How much of our concepts of learning, memory, and intelligence rely on language and the ability to communicate? If you can remember your name, but could not use words or symbols to share it with someone else, how would we know you knew it? What about things you say—not to others—but just in your own mind—do these thoughts involve language?

According to your textbook, all human languages have five basic rule systems that guide them. From helping us to understand the simplest, meaningful sounds to giving us rules to know how to speak to our friends versus our supervisors, these rule systems guide the infinite generativity of human language. In addition, we know that children progress in their language development at about the same rate—even if they are hearing impaired. Does this mean that language is innately biological, or are there environmental, even cultural, factors that influence our language development?

As you can see, there is much to consider in the breadth of cognitive processes that we humans engage in. From getting you to eat your broccoli and clean your room, to helping you solve world crises, to helping you understand and remember the words on this page—does your mind just get more and more fascinating with each unit? I hope so!

Suggested Reading

Click here to access a PowerPoint presentation of the Chapter 5 material. Click here to access a PDF version of this presentation.

Click here to access a PowerPoint presentation of the Chapter 6 material. Click here to access a PDF version of this presentation.

Click here to access a PowerPoint presentation of the Chapter 7 material. Click here to access a PDF version of this presentation.

Learning Activities (Non-Graded)

Textbook Chapter 5 Self-Quizzes:
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Textbook Chapter 6 Self-Quizzes:
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Textbook Chapter 7 Self-Quizzes:
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View the Swarm Intelligence portion of this video (begin at 31:16):

Non-graded Learning Activities are provided to aid students in their course of study. You do not have to submit them. If you have questions, contact your instructor for further guidance and information.