Skills to Develop

- Define intelligence
- Explain the triarchic theory of intelligence
- Identify the difference between intelligence theories
- Explain emotional intelligence

A four-and-a-half-year-old boy sits at the kitchen table with his father, who is reading a new story aloud to him. He turns the page to continue reading, but before he can begin, the boy says, “Wait, Daddy!” He points to the words on the new page and reads aloud, “Go, Pig! Go!” The father stops and looks at his son. “Can you read that?” he asks. “Yes, Daddy!” And he points to the words and reads again, “Go, Pig! Go!”

This father was not actively teaching his son to read, even though the child constantly asked questions about letters, words, and symbols that they saw everywhere: in the car, in the store, on the television. The dad wondered about what else his son might understand and decided to try an experiment. Grabbing a sheet of blank paper, he wrote several simple words in a list: mom, dad, dog, bird, bed, truck, car, tree. He put the list down in front of the boy and asked him to read the words. “Mom, dad, dog, bird, bed, truck, car, tree,” he read, slowing down to carefully pronounce *bird* and *truck*. Then, “Did I do it, Daddy?” “You sure did! That is very good.” The father gave his little boy a warm hug and continued reading the story about the pig, all the while wondering if his son’s abilities were an indication of exceptional intelligence or simply a normal pattern of linguistic development. Like the father in this example, psychologists have wondered what constitutes intelligence and how it can be measured.
Classifying Intelligence

What exactly is intelligence? The way that researchers have defined the concept of intelligence has been modified many times since the birth of psychology. British psychologist Charles Spearman believed intelligence consisted of one general factor, called $g$, which could be measured and compared among individuals. Spearman focused on the commonalities among various intellectual abilities and demphasized what made each unique. Long before modern psychology developed, however, ancient philosophers, such as Aristotle, held a similar view (Cianciolo & Sternberg, 2004).

Others psychologists believe that instead of a single factor, intelligence is a collection of distinct abilities. In the 1940s, Raymond Cattell proposed a theory of intelligence that divided general intelligence into two components: crystallized intelligence and fluid intelligence (Cattell, 1963). **Crystallized intelligence** is characterized as acquired knowledge and the ability to retrieve it. When you learn, remember, and recall information, you are using crystallized intelligence. You use crystallized intelligence all the time in your coursework by demonstrating that you have mastered the information covered in the course. **Fluid intelligence** encompasses the ability to see complex relationships and solve problems. Navigating your way home after being detoured onto an unfamiliar route because of road construction would draw upon your fluid intelligence. Fluid intelligence helps you tackle complex, abstract challenges in your daily life, whereas crystallized intelligence helps you overcome concrete, straightforward problems (Cattell, 1963).

Other theorists and psychologists believe that intelligence should be defined in more practical terms. For example, what types of behaviors help you get ahead in life? Which skills promote success? Think about this for a moment. Being able to recite all 44 presidents of the United States in order is an excellent party trick, but will knowing this make you a better person?

Robert Sternberg developed another theory of intelligence, which he titled the **triarchic theory of intelligence** because it sees intelligence as comprised of three parts (Sternberg, 1988): practical, creative, and analytical intelligence.

**Figure (PageIndex{1})**: Sternberg’s theory identifies three types of intelligence: practical, creative, and analytical.

**Practical intelligence**, as proposed by Sternberg, is sometimes compared to “street smarts.” Being practical means you find solutions that work in your everyday life by applying knowledge based on your experiences. This type of intelligence appears to be separate from traditional understanding of IQ; individuals who score high in practical intelligence may or may not have comparable scores in creative and analytical intelligence (Sternberg, 1988).
This story about the 2007 Virginia Tech shootings illustrates both high and low practical intelligences. During the incident, one student left her class to go get a soda in an adjacent building. She planned to return to class, but when she returned to her building after getting her soda, she saw that the door she used to leave was now chained shut from the inside. Instead of thinking about why there was a chain around the door handles, she went to her class’s window and crawled back into the room. She thus potentially exposed herself to the gunman. Thankfully, she was not shot. On the other hand, a pair of students was walking on campus when they heard gunshots nearby. One friend said, “Let’s go check it out and see what is going on.” The other student said, “No way, we need to run away from the gunshots.” They did just that. As a result, both avoided harm. The student who crawled through the window demonstrated some creative intelligence but did not use common sense. She would have low practical intelligence. The student who encouraged his friend to run away from the sound of gunshots would have much higher practical intelligence.

Analytical intelligence is closely aligned with academic problem solving and computations. Sternberg says that analytical intelligence is demonstrated by an ability to analyze, evaluate, judge, compare, and contrast. When reading a classic novel for literature class, for example, it is usually necessary to compare the motives of the main characters of the book or analyze the historical context of the story. In a science course such as anatomy, you must study the processes by which the body uses various minerals in different human systems. In developing an understanding of this topic, you are using analytical intelligence. When solving a challenging math problem, you would apply analytical intelligence to analyze different aspects of the problem and then solve it section by section.

Creative intelligence is marked by inventing or imagining a solution to a problem or situation. Creativity in this realm can include finding a novel solution to an unexpected problem or producing a beautiful work of art or a well-developed short story. Imagine for a moment that you are camping in the woods with some friends and realize that you’ve forgotten your camp coffee pot. The person in your group who figures out a way to successfully brew coffee for everyone would be credited as having higher creative intelligence.

Multiple Intelligences Theory was developed by Howard Gardner, a Harvard psychologist and former student of Erik Erikson. Gardner’s theory, which has been refined for more than \((30)\) years, is a more recent development among theories of intelligence. In Gardner’s theory, each person possesses at least eight intelligences. Among these eight intelligences, a person typically excels in some and falters in others (Gardner, 1983). The Table below describes each type of intelligence.

<table>
<thead>
<tr>
<th>Intelligence Type</th>
<th>Characteristics</th>
<th>Representative Career</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linguistic intelligence</td>
<td>Perceives different functions of language, different sounds and meanings of words,</td>
<td>Journalist, novelist, poet,</td>
</tr>
<tr>
<td></td>
<td>may easily learn multiple languages</td>
<td>teacher</td>
</tr>
<tr>
<td>Logical-mathematical</td>
<td>Capable of seeing numerical patterns, strong ability to use reason and logic</td>
<td>Scientist, mathematician</td>
</tr>
<tr>
<td>intelligence</td>
<td></td>
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<tr>
<td>Musical intelligence</td>
<td>Understands and appreciates rhythm, pitch, and tone; may play multiple</td>
<td>Composer, performer</td>
</tr>
<tr>
<td></td>
<td>instruments or perform as a vocalist</td>
<td></td>
</tr>
<tr>
<td>Intelligence Type</td>
<td>Characteristics</td>
<td>Representative Career</td>
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<tr>
<td>Bodily kinesthetic intelligence</td>
<td>High ability to control the movements of the body and use the body to perform various physical tasks</td>
<td>Dancer, athlete, athletic coach, yoga instructor</td>
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<tr>
<td>Spatial intelligence</td>
<td>Ability to perceive the relationship between objects and how they move in space</td>
<td>Choreographer, sculptor, architect, aviator, sailor</td>
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<tr>
<td>Interpersonal intelligence</td>
<td>Ability to understand and be sensitive to the various emotional states of others</td>
<td>Counselor, social worker, salesperson</td>
</tr>
<tr>
<td>Intrapersonal intelligence</td>
<td>Ability to access personal feelings and motivations, and use them to direct behavior and reach personal goals</td>
<td>Key component of personal success over time</td>
</tr>
<tr>
<td>Naturalist intelligence</td>
<td>High capacity to appreciate the natural world and interact with the species within it</td>
<td>Biologist, ecologist, environmentalist</td>
</tr>
</tbody>
</table>

Gardner’s theory is relatively new and needs additional research to better establish empirical support. At the same time, his ideas challenge the traditional idea of intelligence to include a wider variety of abilities, although it has been suggested that Gardner simply relabeled what other theorists called “cognitive styles” as “intelligences” (Morgan, 1996). Furthermore, developing traditional measures of Gardner’s intelligences is extremely difficult (Furnham, 2009; Gardner & Moran, 2006; Klein, 1997).

Gardner’s inter- and intrapersonal intelligences are often combined into a single type: emotional intelligence. **Emotional intelligence** encompasses the ability to understand the emotions of yourself and others, show empathy, understand social relationships and cues, and regulate your own emotions and respond in culturally appropriate ways (Parker, Saklofske, & Stough, 2009). People with high emotional intelligence typically have well-developed social skills. Some researchers, including Daniel Goleman, the author of *Emotional Intelligence: Why It Can Matter More than IQ*, argue that emotional intelligence is a better predictor of success than traditional intelligence (Goleman, 1995). However, emotional intelligence has been widely debated, with researchers pointing out inconsistencies in how it is defined and described, as well as questioning results of studies on a subject that is difficulty to measure and study emperically (Locke, 2005; Mayer, Salovey, & Caruso, 2004).

Intelligence can also have different meanings and values in different cultures. If you live on a small island, where most people get their food by fishing from boats, it would be important to know how to fish and how to repair a boat. If you were an exceptional angler, your peers would probably consider you intelligent. If you were also skilled at repairing boats, your intelligence might be known across the whole island. Think about your own family’s culture. What values are important for Latino families? Italian families? In Irish families, hospitality and telling an entertaining story are marks of the culture. If you are a skilled storyteller, other members of Irish culture are likely to consider you intelligent.

Some cultures place a high value on working together as a collective. In these cultures, the importance of the group supersedes the importance of individual achievement. When you visit such a culture, how well you relate to the values of that culture exemplifies your cultural intelligence, sometimes referred to as cultural competence.
Creativity

Creativity is the ability to generate, create, or discover new ideas, solutions, and possibilities. Very creative people often have intense knowledge about something, work on it for years, look at novel solutions, seek out the advice and help of other experts, and take risks. Although creativity is often associated with the arts, it is actually a vital form of intelligence that drives people in many disciplines to discover something new. Creativity can be found in every area of life, from the way you decorate your residence to a new way of understanding how a cell works.

Creativity is often assessed as a function of one’s ability to engage in divergent thinking. Divergent thinking can be described as thinking “outside the box;” it allows an individual to arrive at unique, multiple solutions to a given problem. In contrast, convergent thinking describes the ability to provide a correct or well-established answer or solution to a problem (Cropley, 2006; Gilford, 1967).

EVERYDAY CONNECTION: Creativity

Dr. Tom Steitz, the Sterling Professor of Biochemistry and Biophysics at Yale University, has spent his career looking at the structure and specific aspects of RNA molecules and how their interactions cold help produce antibiotics and ward off diseases. As a result of his lifetime of work, he won the Nobel Prize in Chemistry in 2009. He wrote, “Looking back over the development and progress of my career in science, I am reminded how vitally important good mentorship is in the early stages of one’s career development and constant face-to-face conversations, debate and discussions with colleagues at all stages of research. Outstanding discoveries, insights and developments do not happen in a vacuum” (Steitz, 2010, para. 39). Based on Steitz’s comment, it becomes clear that someone’s creativity, although an individual strength, benefits from interactions with others. Think of a time when your creativity was sparked by a conversation with a friend or classmate. How did that person influence you and what problem did you solve using creativity?

Summary

Intelligence is a complex characteristic of cognition. Many theories have been developed to explain what intelligence is and how it works. Sternberg generated his triarchic theory of intelligence, whereas Gardner posits that intelligence is comprised of many factors. Still others focus on the importance of emotional intelligence. Finally, creativity seems to be a facet of intelligence, but it is extremely difficult to measure objectively.

Glossary

analytical intelligence
aligned with academic problem solving and computations

convergent thinking
providing correct or established answers to problems

creative intelligence
ability to produce new products, ideas, or inventing a new, novel solution to a problem

creativity
ability to generate, create, or discover new ideas, solutions, and possibilities
crystallized intelligence
characterized by acquired knowledge and the ability to retrieve it

cultural intelligence
ability with which people can understand and relate to those in another culture

divergent thinking
ability to think “outside the box” to arrive at novel solutions to a problem

emotional intelligence
ability to understand emotions and motivations in yourself and others

fluid intelligence
ability to see complex relationships and solve problems

Multiple Intelligences Theory
Gardner’s theory that each person possesses at least eight types of intelligence

practical intelligence
aka “street smarts”

triarchic theory of intelligence
Sternberg’s theory of intelligence; three facets of intelligence: practical, creative, and analytical

Contributors

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