CHAPTER 1

An Introduction to Critical Thinking: Maybe It Will Change Your Life

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Many people would sooner die than think.
In fact, they do.

(Bertrand Russell, quoted in Macmillan, 1989)

Introduction

We define critical thinking in several different ways that converge on the same basic idea. It is a combination of skills, attitude, and knowledge. To think critically about any topic, one needs a deep knowledge of the topic and the propensity to apply the appropriate thinking skills. These skills can be taught (and learned) in ways that transfer to different topics, but it is not easy or automatic. Instructors need to teach for transfer deliberately. Personality traits such as concern for truth, being analytic, and being open to new ideas are some of the traits of critical thinkers. Creativity was defined as creating something that is unusual and useful. It is a special case of critical thinking. The rules for scientific reasoning, avoiding bias, resisting persuasion, and so on are universal, thus we conclude that although culture is always important, the skills for critical thinking are the same everywhere.

We interrupt your reading for this important news flash. The date is 350 BCE and the philosopher Aristotle just announced, "The shape of the heaven is of necessity spherical, for that is the shape most appropriate to its substance and also by nature primary" (Stocks, n.d., Book II Part 4, line 1). Did you miss the news? It has been over two thousand years since the shape of the earth has been known to be roughly spherical. Columbus knew this when "he sailed the ocean blue in 1492." Apparently, some

people just don't keep up with the news. The number of people who believe that the earth is flat has been growing, with sharp increases every time a rapper (i.e., B.o.B) tweets that the earth is flat or an athlete (i.e., NBA player Kyle Irving) podcasts this news (*The Economist*, 2017). Surprised to learn this? What about all of the evidence that contradicts the idea that the earth is flat, like photographs of it from space or the simple fact that no one we have ever heard of fell off the earth? Flat Earthers, as they are called, believe that the photos from space were fake, produced by some evil government (or other force) to control the world.

In the United States almost 10 percent of adolescents are not immunized for measles (National Center for Health Statistics, 2015, Table 67). Although we do not know the exact percentage, we have reason to believe that a large proportion are or have parents who are "vaccine deniers" – people who believe that vaccines, such as the one for measles, can cause autism or some other serious health problem. In 2015, there was a multistate outbreak of measles and preliminary data from 2018 show a three-fold increase over the year before (Centers for Disease Control, 2019). Many people hold on to the belief linking vaccines to autism, despite the overwhelming evidence that vaccines do not cause autism, including a meta-analysis involving more than 1.2 million children (Autism Speaks, 2014). People who are not vaccinated not only harm themselves, but also put people at risk who are unable to be vaccinated because of weak immune systems or for other reasons (e.g., newborns).

We have always needed a citizenry that can think critically, but it seems that we need it now more than ever before. Mindless voters are a threat to democracy (rule by the people). Voters need to know how to think about complex issues such as politics, AIDS, and climate change, to name only a few such issues. The advent of the Internet makes information instantaneously available. But in addition to valuable information from reliable sources, much of the information reflects untested opinions, misleading attempts to persuade the reader to believe something, blatant lies, and sometimes, dangerous hate speech. The need for critical thinking is clear, but what does it mean to say that someone can think critically?

Critical Thinking: A Definition

Researchers generally agree that critical thinking involves rational, purposeful, and goal-directed thinking. Although there is some disagreement about the boundaries for critical thinking, definitions usually include scientific reasoning, evaluating claims, recognizing attempts at persuasion,

and generating options. Mayer and Goodchild (1990) defined critical thinking more narrowly as understanding and analyzing arguments. We favor a broader definition. For example, Bensley (2009; this volume, Chapter 4) agrees with the points made by Yancher, Slife, and Warne (2008) calling for an inclusive definition with analytic reasoning, dispositions, and discovery as critical components. Critical thinking requires understanding information at a deep and meaningful level and overcoming fallacies and biases (the skills part of critical thinking). Not surprisingly, we are partial to the definition offered by Halpern (2014). Critical thinking is more than good thinking or reflecting on your thinking:

> **Critical thinking** is the use of those cognitive skills or strategies that increase the probability of a desirable outcome . . . the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions, when the thinker is using skills that are thoughtful and effective for the particular context and task. (p. 8)

But critical thinking is more than a set of skills; it also includes the propensity to use those skills. The dispositions for critical thinking include the willingness to engage in and persist at a complex task, demonstrate flexible and open-minded thinking, and the readiness to abandon non-productive strategies and self-correct when needed. Almost 60 years ago (1960), Bertrand Russell defined critical thinking this way: "Critical thinking . . . seems to involve attitude, plus knowledge of facts, plus some thinking skills" (cited in d'Angelo, 1971, p. 6): His equation for critical thinking is thus:

attitude + knowledge + thinking skills = critical thinking

Each of these components is necessary for critical thinking. It would do no good if someone could think critically but were too lazy to use those skills when needed. Similarly, no one can think critically about any topic without sufficient knowledge. To think critically about the European Union, for example, one would need to know about the history of Europe and the various alliances and concerns of every country. And finally, one has to know the "how" of critical thinking – what we are calling thinking skills.

We are not always rational thinkers. There are limitations to our thinking – these limitations are called "**bounded rationality**" (Simon, 1991). No one ever has complete knowledge of the consequences of their decisions because those consequences occur in the future. We can never generate a complete list of alternative solutions when making decisions or solving problems. For complex topics, there is too much information to consider at one time. Thus, we are **satisficers** – we make good enough decisions for the situation and move on

(Schwartz et al., 2002). Not every decision needs critical thinking, or it would not just be ice cream that is frozen at stores selling huge varieties of flavors – the ice cream-eater would be "frozen" in indecision too!

Critical Thinking Is of Paramount Importance in the World of Work

Hart Research Associates (2018) conducted surveys of 501 business executives and 500 hiring managers. One of their key findings was: "The skill and knowledge areas of greatest importance to both business executives and hiring managers include oral communication, critical thinking, ethical judgments, working effectively in teams, working independently, self-motivation, written communication, and real-world applications of skills and knowledge" (p. 11). Hart Research Associates have repeated this survey every year for decades, and critical thinking has always remained a key skill that employers value in their employees.

Teaching for Critical Thinking

Universities teach writing in the belief that good writing skills will transfer to all sorts of writing assignments, both in and out of school. Similarly, they teach mathematics with the expectation that the skills learned will be applied when students confront math problems in their everyday lives; the same applies for oral communication, and so on. There is nothing about critical thinking to suggest that it cannot be learned; but it is not easy, automatic, or necessarily people's first choice of a mode of thinking when they are confronted with problems about which they hold strong beliefs regarding solutions. We want critical thinking skills to **transfer** across domains of knowledge. Like writing and math skills, sometimes critical thinking skills transfer and sometimes they do not. To get the skills to transfer, they need to be taught for transfer, with multiple examples from different domains of knowledge. The skills also need to be learned and practiced over time. Additional references and evidence in support of this claim can be found in Butler and Halpern (this volume, Chapter 7).

Not all critical thinking is the same. If you are preparing for a career in the law, then the skills of reasoning with analogies and analyzing arguments will be particularly important. If you are preparing for a career in research, then scientific reasoning will be of primary importance. But regardless of what area you are preparing to enter, many skills are useful across domains of knowledge. As you will see in the coming chapters, the

authors vary in the extent to which they believe that critical thinking skills can be learned so that they transfer to novel areas. It is clear, however, that developing one's critical thinking skills is not a necessary, or perhaps even a usual, by-product of education.

Critical Thinking and Other Psychological Constructs – Intelligence, Personality, Creativity

As you will see in several chapters in this book, someone can be highly intelligent – obtain a high IQ score and accumulate prestigious awards – yet not think critically. One area where the rules for thinking are very different is religion. With religion, we are not asked to examine empirical evidence – it is taken on faith. Sometimes when intelligent people fail to use critical thinking it is because of a belief system that they take "on faith" – such as believing in fairies or psychic surgery (surgery performed without cutting the body – somehow done by concentration or some other manner by individuals who present themselves as psychic surgeons). These are not religions, but they have some aspects that are similar to religion for believers in them.

Do critical thinkers have some personality aspects in common? The answer seems to be yes, but it is challenging to say exactly what they are. In general, people who think critically score high on openness to experience – one of the Big Five dimensions of personality. They also may be high in "concern for truth" (Ku & Ho, 2010). In an examination of critical thinking dispositions in health-care professionals in Taiwan, three personality factors emerged: (1) Systematicity and Analyticity; (2) Inquisitiveness and Conversance; and (3) Maturity and Skepticism (Yuan et al., 2014). You may be wondering if a study done in Taiwan can be generalized to Western countries. If so, you are already on your way to becoming a critical thinker. Certainly, these three personality attributes have **face validity**, which means that they look right. As you can probably infer, different researchers use different assessments to come up with personality traits that can predict or correlate with critical thinking. Giancarlo, Blohm, and Urdan (2004) investigated the relationship between personality traits and critical thinking with a large sample of secondary school students in the US. They found four traits: 1) learning orientation; 2) creative problem solving; 3) mental focus; and 4) cognitive integrity. Even though different studies have used different instruments and have come up with different sets of personality traits, it seems fair to conclude that there are personality types that are better at critical thinking. Although there is no definitive list, they all

suggest a person who is careful and analytic, serious about learning, open to different points of view rather than dogmatic, and who has a healthy dose of skepticism. Do these traits describe you?

Critical Thinking and Creativity

You may be wondering about the relationship between creative thinking and critical thinking. What does it even mean to say something is creative? Virtually all definitions of creativity involve two components (Halpern, 2014). To be creative, whether it is a dance, a mathematical discovery, or anything else, an idea or product must be (1) unusual; and (2) appropriate for the situation (or meaningful). Thus, the product of creative thinking must be novel and of high quality. To consider its relationship to creative thinking, let's go back to the definition for critical thinking, which includes using a set of skills that increase the probability of a desirable outcome. Here is an example: Suppose that you have to make a difficult decision – let's say how to design a university curriculum that would prepare students for life after graduation. Of course, the first creative act is to find problems that few others have identified and then go about finding solutions. You might start with different majors or interesting multidisciplinary courses for general education. But to be creative, you would come up with more novel possibilities, such as doing away with college and having students solve several problems in the real world for credit, or setting up a series of "internships" where students learn from professionals. You can probably come up with ideas better than these. If you were applying the general skills used in decision making, you would begin by generating a series of options and then continue by systematically assessing each one. When these options are novel and appropriate for the decision, then the resulting idea or ideas are creative. Thus, under this definition, creative thinking is one aspect of critical thinking.

Is critical thinking different in different cultures? Again, to answer this question, you would go back to the definition and see if it is applicable in places that are very different from the ones with which you are familiar. The nature of the desirable outcome will likely differ from one culture to another. In some parts of the world, clean water is scarce. With critical and creative thinking, possible solutions to the problem of obtaining clean water may emerge. Thus, there is nothing particularly culture-bound with this definition of critical thinking. Consider the common skills of not confusing correlation with cause, or being misled by labels used for different concepts, or attacking a person who makes a claim instead of the claim itself.

We understand the importance of culture in shaping how people think, feel, and act, and recognize that different thinking skills may be preferred in different cultures. But the skills are applicable around the world.

Goals for Readers of This Book

We believe that critical thinking is essential for the future of our planet. We won't tell you what to think about issues like global climate change, immigration, or trade treaties, but we will tell you how by posing questions such as: What is the evidence? How solid is the reasoning? Are there alternative explanations for the statements that you read? Who stands to gain from a particular conclusion? And so on. In the following chapters you will learn about common biases and how to overcome them, how to identify reliable information, how people often fall prey to various methods of persuasion, how the experimental process can foster critical thinking, and more. In particular, you will learn about the reflections of diverse leaders in the field on a number of issues, such as:

1. What exactly is critical thinking?
2. Why do psychologists believe that critical thinking is so important?
3. To what extent is critical thinking an ability or skill and to what extent is it an attitude?
4. What do we know about how critical thinking develops?
5. To what extent is critical thinking domain-general and to what extent is it domain-specific?
6. How is critical thinking related to major constructs in psychology, such as intelligence, creativity, wisdom, personality?
7. How can we test for critical thinking?
8. How can we teach for critical thinking?
9. Is critical thinking the same across cultures and across time? If it is not the same, how does it differ?
10. Is critical thinking the same in different disciplines, or is it a single label that encompasses multiple things across disciplines?

We hope that you enjoy your journey into the world of critical thinking, and that you will become a better critical thinker by reading this book.

Questions

1. How would you define critical thinking? Is your definition similar to those presented in this chapter?

2. Give three reasons why someone might not think critically about a topic such as immigration or climate change.
3. What would you have to do to get thinking skills to transfer from one domain to another?
4. As you will see, the authors in this book differ in the extent to which they believe that critical thinking is a general skill that people can use across domains of knowledge. What do you think and why?
5. Think of someone whom you admire for their ability to think critically. Does that person have the personality traits that emerged from research? What other personality traits does this person have?
6. We categorized creativity as one type of critical thinking. Not everyone agrees with this definition. What do you think and why?

Key Terms

Bounded rationality The idea that all of our thinking is limited because we never have complete knowledge.

Critical thinking The use of skills or strategies that increase the probability of a desirable outcome. It includes thinking skills, the disposition to apply these skills, and a deep knowledge of the content area.

Face validity The idea that a measure looks correct.

Satisficing Making decisions by accepting an alternative that is satisfactory or "good enough" instead of seeking the best possible alternative.

Transfer In this context, it is the use of critical thinking skills that are learned in one domain of knowledge (e.g., economics) in another domain of knowledge (e.g., psychology).

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