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Critical Thinking: Your Survival Kit

OUTLINE
1) Critical Thinking Defined: <i>Critical thinking is the process of (1) evaluating a claim about objective reality and identifying support, and (2) considering alternative hypotheses.</i> <ol style="list-style-type: none"> a) Stating a Claim, Identifying Types of Support <ol style="list-style-type: none"> i) Appropriate sources ii) Logic and clear language iii) Science b) Alternative Hypotheses: Going Beyond Immediate Personal Experience and Intuition <ol style="list-style-type: none"> i) Oddities in nature and the world of statistics ii) Perceptual error or trickery iii) Memory error iv) Placebo effect v) Sensory phenomena, hallucinations, and psychiatric conditions
2) Bats, Balls, and Mind-Reading: Intuitive vs. Reflective Cognitive Thinking Styles
3) The Time and Place for Critical Thinking
4) Finding a Safe Practice Arena
5) The Four Challenges of the Open-Minded Critical Thinker <ol style="list-style-type: none"> a) Have the Courage to Pause and Reflect b) Question Fearlessly and Honestly c) Recognize that There May Be More to the World than Meets the Eye d) Admit You Might Be Totally Mistaken

Life can be a Pandora's box of problems and mysteries. This includes all things great and small. Everyday challenges like starting college, dating, and finding work. Threats to society, like war, poverty, disease, and environmental disaster. Yes, even frantic internet exposés of mind-controlling psychics, flesh-eating vampires, and invasions from other universes. In a world full of troubles, every student needs one important survival kit – a toolbox of powerful critical thinking skills.

Consider Alex, a college student who faces a rather complicated dating dilemma. The first few dates went well. What to do next? Please study this carefully:

I think I'm ready for sex. I'm dating Jesse, who is fun to be with. But I doubt Jesse has any interest in romance. I'm not quite sure what I want.

I want to take Jesse to an art museum this weekend. There are two exhibits. I've seen both. Which has the more beautiful art?

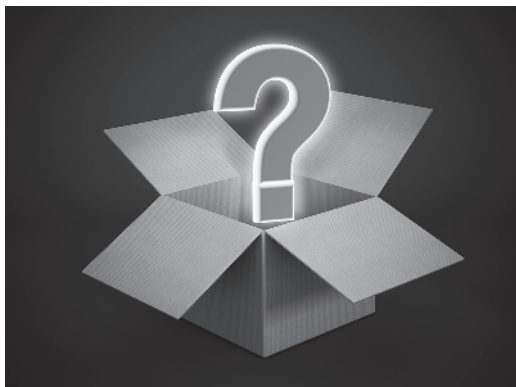


Figure 1.1 What's in your Pandora's Box?
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I'm getting closer to both Jesse and Riley. I've gone out with both. It almost feels like I'm dating two people. Is that OK? Should I drop one and date the other? And what about Jamie, someone interesting I just met?

What does God want me to do? How can I tell the difference between God's will and my wishes?

Julian, my roommate wants me to take a drink he obtained from a store that specializes in alternative medicine. Citing personal experience, Julian says it works and will help me make choices more decisively. Should I try it?

All these questions! Last night I had a dream that I dropped out of school and took a hike on a long mountain path to clear my head. Out of nowhere, a sage on a vintage Harley rumbled to a dramatic stop in front of me. I was struck by what this person was wearing – a glowing ruby eye earring, delicate flowered silk scarf, and steel-studded leather arm band. As the dust settled, my Biker Sage whispered: "Think clearly!" blew me a kiss, and roared away. Should I take this premonition seriously?

Critical Thinking Defined

Fortunately, Alex is taking a course in critical thinking and hopes he can find some answers. He begins with some popular definitions. For example, his very first Google hit (out of 53,100,000 results) is a very popular definition:

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.

(Scriven & Paul, 2014)

Such definitions are abstract and global and can be applied to a wide range of life's challenges. Think "clearly." Conceptualize "consistently." Evaluate "fairly." You could use these with just about any issue, whether it be one of romance, beauty, creativity, morality, God, science, the deeper mysteries of life, or even sex.

However, the majority of texts on critical thinking take a more focused approach. Put very simply, critical thinking boils down to two very simple questions:

What are the facts? How do we know they're true?

To elaborate:

Critical thinking is the process of (1) evaluating a claim about objective reality and identifying support, and (2) considering alternative hypotheses.

This needs a little unpacking. Let's examine each part of our definition.

Stating a Claim, Identifying Types of Support

First, critical thinking involves stating and testing reality claims against three types of support:

- *Appropriate sources such as other people, groups, or institutions (Chapter 4);*
- *Correct use of the tools of logic and clear language (Chapter 5, Chapter 6); and*
- *Science (Chapter 7).*

Alternative Hypotheses: Going Beyond Immediate Personal Experience and Intuition

Appropriate sources, logic and clear language, and scientific observation prompt us to be open to the possibility that there may be more than meets the eye, more to reality than what is apparent. They may suggest five alternative hypotheses. A mistaken conclusion that a paranormal claim is factual may be the result of:

- *Oddities in nature and the world of statistics (Chapter 8);*
- *Perceptual error or trickery (Chapter 9);*
- *Memory error (Chapter 10);*
- *Placebo effect (Chapter 11);*
- *Sensory phenomena, hallucinations, and psychiatric conditions (Chapter 12).*

This definition provides an outline of our text.

Critical thinking is reality checking. Thinking that masquerades as critical thinking, pretends to identify support, and fails to openly question personal experience and intuition is *pseudoscientific thinking*. A different way of looking at this is to consider the objectives. Is your goal to discover the facts (critical thinking) or protect your preconceived notions (pseudoscientific thinking)? Is your goal to put aside political, social, religious, or personal objectives in pursuit of the truth (critical thinking)? Or is it to "keep controversy alive" by sowing needless doubt and confusion in order to pursue another political, social, religious, or personal agenda (Oreskes & Conway, 2010)?

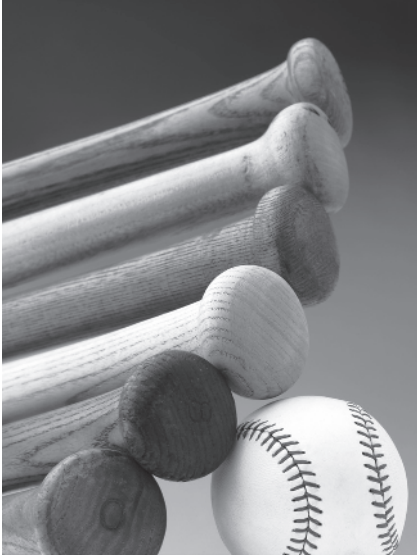


Figure 1.2 Bats and ball. Reproduced with kind permission of Gettyimages.

Bats, Balls, and Mind-Reading: Intuitive vs. Reflective Cognitive Thinking Styles

Stepping back, our definition is based on an important idea: the critical thinker takes pause and recognizes there may be more than *immediate personal experience and intuition*. First impressions and hunches, no how matter how vivid, may be misleading. One important area of cognitive research illustrates this idea. Consider these curious studies on the price of bats and balls.

An **intuitive thinking style** involves automatically going with one's first instinct. A **reflective thinking style** involves questioning such first instincts and considering other possibilities (Frederick, 2005; Stanovich & West, 1998). An intuitive thinker accepts what immediately seems to be true. A reflective thinker takes pause, questions first instincts, and considers other possibilities. As such, reflective thinking allows for counterintuitive conclusions. Importantly, a reflective thinker can suppress an intuitive and spontaneous wrong answer in pursuit of a less obvious answer that may be correct.

The Cognitive Reflection Test (CRT; Frederick, 2005) is a remarkably powerful and brief test that measures reflective and intuitive cognitive thinking styles. It consists of only three questions. Try this frequently cited example: "A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost?"

Is your answer \$0.10? This is the intuitive answer, but it is incorrect. Reflective thinkers tend to suppress this automatic and intuitive answer because they are suspicious of the first thing that comes to mind. As a result, they are more likely to come up with the right answer, \$0.05. (Ball = \$0.05. Bat = \$1.05. Bat + Ball total cost = \$1.10. The bat costs \$1.00 more than the ball; $1.05 - 0.05 = 1.00$. Put differently, if the ball costs \$0.10,

and the bat costs a full \$1.00 *more* than that, then the bat *alone* would have to cost \$1.10. So the cost in total would have to be \$1.10 + \$0.10 or \$1.20, not \$1.10.)

Those who think intuitively are more likely to apply an emotionally appealing and immediately tempting paranormal explanation to an apparently paranormal event. In contrast, reflective thinkers are more likely to use critical thinking and take pause and look for a more complete explanation. While exploring a supposedly haunted house at night you may see a shadowy figure in a corner. Your shivering gut tells you it is a ghost. Or you may put aside your intuition and reflect that there might be other explanations, such as drifting cobwebs, window shades blowing in the wind, or simply scurrying mice.

The effects of intuitive and reflective cognitive thinking styles have been demonstrated in research. Bouvet and Bonnefon (2014) had students participate in what was described as an experiment in “telepathic transfer of information from one person to another.” But the experiment was rigged to make it appear that extrasensory perception (ESP) was involved. Each student was paired with a “reader,” someone who could presumably read minds. A student was given a stack of ESP Zener cards, each with a different symbol (star, plus sign, circle, wavy lines, square). He or she would then view one card completely hidden from the reader. The reader would attempt to use mind-reading to identify the viewer’s card. Remarkably, the reader could do this successfully.

Actually the experiment was a trick. Unknown to the student, the reader was a plant working for the experimenter. During each session, the experimenter would secretly signal to the plant what card was being viewed.

Those who scored as intuitive (on the CRT) were more likely to say that ESP explained the odd results. This was true even if they did not particularly believe in ESP before the experiment. Reflective thinkers were more likely to explain the results as a statistical fluke. Both did find the results weird, suggesting that the reflective thinkers indeed could tell the results appeared to be paranormal.

In another experiment, Bouvet and Bonnefon gave students astrological horoscopes described as individualized personal descriptions. In fact, all were identical. Furthermore, all were actually fake horoscopes filled with meaningless generalities that could apply to nearly anyone (e.g., “You have a tendency to be critical of yourself.”). Intuitive thinkers on the CRT were more likely to accept the “horoscopes” as personally accurate.

Yes, how people think (or fail to think) about bats and balls can tell us something important about open-minded critical thinking and the paranormal.

The Time and Place for Critical Thinking

There may be a time and place for intuitive and reflective thinking. Some situations may be so complex that reflective analysis is not practical, and an immediate intuitive action is required. Perhaps at times intuition enables us to process a large amount of information unconsciously and quickly. Intuition may be highly desirable in considering questions not particularly amenable to critical analysis, for example, questions of love, beauty, morality, and God. On the other hand, intuitive thinkers may be at greater risk

for fraudulent and deceptive manipulation, not only from unscrupulous psychics but for any type of persuasion that relies on a quick, unreflective response.

Concerning Alex's readiness for sex, one could consider claims about the objective risks of disease. However, objective reality checking may not apply to passions of the heart. Which museum has more beautiful art? A critical thinker might count the number of positive online reviews. But then beauty is in the eye of the beholder. What is the moral course of action? What is the will of God? A reality check may identify precise rules in a favored holy book or moral guide. Or one might rely on intuition or prayer. Some problems call for objective reality checking, others do not.

Finding a Safe Practice Arena

If you want to become a master of critical thinking, you must do more than memorize a set of rules. A handy pocket list will be of little use in the battlefield of life. You need to practice. Where is the best place to practice? Where does a football player practice tackling a 250-pound receiver barreling at locomotive speed? Where does the rookie police officer practice nabbing a screaming terrorist wearing a suicide vest? Where does the surgeon practice slicing into one's chest to replace a heart valve? For future champions of critical thinking, what is the most appropriate practice arena? You want an arena that gives you a good workout, but one where there will be no bloody noses or broken bones.

One solution is to select a very limited subject area, for example repairing car mufflers, rearing children, writing college papers. Such targeted approaches work well for their restricted domains, but have limited generalizability. Skills for repairing a noisy car muffler may not always work for soothing a crying infant.

There are several arenas that work for most reality-testing skills, for example, science, politics, religion, journalism, and advertising. However, each has its drawbacks. Critical thinking applied to science can require specialized technical knowledge. Critical thinking applied to politics and religion can arouse distracting ideological passions. Journalistic critical thinking can be as dated as today's headline. Critical thinking applied to advertising can descend into the trivial.

There is one arena that has emerged as ideal, and indeed is the preferred choice for textbooks. Surprisingly, this is the world of ghosts, astrology, psychics, miracles, alien abductions, and magical cures. This is the world of the paranormal, the world of claims beyond science.

Think about it. Nearly everyone has at least one paranormal belief. And nearly everyone can identify a paranormal belief they reject as nonsense. Justifying either position requires sharp critical thinking skills. Paranormal claims have been around for millennia and permeate nearly every culture. You can find paranormal claims in science, politics, religion, journalism, and advertising – indeed just about every human endeavor. And frankly, the world of the paranormal is interesting. Applying and practicing our critical thinking skills can transform what might be a tedious exercise into something fun. And in this arena there should be few lasting bruises after our bouts of vigorous practice. In the following chapters, we will enter this arena with our saber and shield of critical thinking. In this book's final section, you can try your skills on more challenging claims. And I invite you to explore an extended sample of extraordinary claims in my companion text, *The Paranormal Sampler* (Smith, in press, createspace.com).

The Four Challenges of the Open-Minded Critical Thinker

This book tries to make sense out of the strange and unexplained. We go beyond the ordinary, what we think is real. We will map the vast heavens of mysterious claims and explore reality-checking tools for determining which are true or false. My mission is not to convert you into a True Believer or True Skeptic. Instead, I invite you to take on the Four Challenges of the Open-Minded Critical Thinker.

CHALLENGE 1: Have the courage to pause and reflect.

CHALLENGE 2: Question fearlessly and honestly.

CHALLENGE 3: Recognize that there may be more to the world than meets the eye, that things may be different than you wish.

And perhaps most important:

CHALLENGE 4: Admit you might be totally mistaken. A true critical thinker can make this admission. In contrast, a True Believer cannot.

I invite you to apply these challenges to all life's mysteries, bright and beautiful, great and small.

Study Questions

1.1 *Definitions (Define, differentiate, and provide an example for each of the following)*

- A. Critical thinking
- B. Intuitive vs. reflective cognitive thinking style
- C. Practice arena
- D. Challenges of the Open-Minded Critical Thinker

1.2 *Simple Thought Questions*

- A. What do you think is an area or topic that needs the application of critical thinking? Why? What are the possible consequences of uncritical thinking in this area or topic? What are some of the benefits of an intuitive thinking style?
- B. Is it possible to be a “closed-minded critical thinker”? What would it be like to engage in a discussion with such a person (perhaps about “the existence of ghosts”)?

1.3 *Essay Questions*

- A. Think of a question or choice in your life that cannot be satisfyingly answered through critical thinking? Why is that the case? What might be the costs of applying critical thinking? How might critical thinking help?
- B. “How people think – or fail to think – about the prices of bats and balls is reflected in their thinking, and ultimately their convictions, about the meta-physical order of the universe” (Shenhav, Rand, & Greene, 2011). Evaluate this observation using the concepts of this chapter.
- C. “Perhaps one can be a reflective thinker and accept a paranormal claim reflectively” (Tassi, 2012). What do you think?

1.4 *Internet Search*

- A. Search “critical thinking” and find a definition that appears to differ from that of your text. What are the advantages and disadvantages of the term you discovered and the definition offered by your text?
- B. Search for definitions of “skepticism.” How is skepticism similar to and different from our definition of critical thinking?

1.5 *Conversation with a Classmate*

Most study guides include essay questions. Essay questions can be very valuable tools for teaching how to create and present an argument in textbook English. However, in real life our critical thinking skills are challenged, not by formal essays, but by what people say, text, and write in unexpected ordinary places – on the streets, by the water cooler, in the coffee house, over breakfast, and so on. Here one does not write essays.

I believe it is important to practice applying critical thinking in situations that resemble real life. Throughout this text we will attempt this through an exercise called “Conversation with a Classmate.”



Figure 1.3 A Klingon. Reproduced with kind permission of Fotolia.

In these exercises we begin with an email from a hypothetical classmate. He or she makes a challenging assertion. You reply with an email in which you explore and possibly question the assertion using textbook concepts. It is important that you write in the first person (“*Hi Student X. Thanks for writing. I disagree with your claim that vampires stole the cupcakes in the cafeteria, although I think I understand where you are coming from ...*”).

However, when creating this exercise I quickly discovered a problem. To make the exercise realistic, I wanted to use actual names (rather than “Student X,” “A hypothetical person,” or, God forbid, “John Smith.”) But my editors noted that if I picked a real name I ran the risk of insulting someone who actually had that name, or perhaps some ethnic or national group. Here’s my solution.

Klingons are a species of humanoid warriors in the famous science fiction series *Star Trek*. They are noted for their snarly personalities, rigid foreheads, spines, eight-chambered hearts, and multiple stomachs (all of which help them survive their frequent forceful encounters). The Klingon language is different from any human language. There is a Klingon dictionary (Okrand, 1992) and even a Klingon-English translator on the Bing search engine (which may prove useful for students exploring question 1.3C or the loving dedication on p. v). You can find a version of Shakespeare’s *Hamlet* in the “original” Klingon (Nicholas & Strader, 2000), and translations of books of the Bible. “To be or not to be” in the original is “*taH pack taHbe.*” (Note how Shakespeare was able to retain the alliteration and cadences of the original.) But we digress.

So, to avoid the possibility of insult, from this point on our examples will use Klingon rather than Human names.

Here is the complete list of students in our class of Klingons. These are actual Klingon names selected from a list of thousands available online (<http://fantasynamgenerators.com/star-trek-klingon-names.php#.VVyg4FnBzGc>):

Gest Bimrat	Klong Pansato
Pelkewi Birc	Sasso Pondlil
Burf (the dog)	Dohla Qornang
Elana Emrem	Krorf Rrirdon
Eturd Ernoch	Obom Rrononn
Baltig Ev	Undun Sustradh
Durtid Ev	Jadoz Tassi
Yahi Firshack	Groshi Tharesbh
Otam Fistram	Bolkrom Thol
Ewith Gampazh	Jang Trenzaz
Urara Grolkolt	Dreth Ukrol
Yovon Haj	Lurinn Urni
Nemulo Hev	Drorf Vompaj
Ebek Hogur	Gil Vrunjol
Torkul Kadha	Borgh Wommruck
Yoho Krarang	Odros Xatzhog
Klurf K’tudij	Ovosi Zendloth
Tuss Lactaz	Chipolt Zolt
Ubaw Likirk	Jeska Zolt-Zonjag
Vinn Mennan	Ugrox Zonjag
Busti Mochirr	

And now for our first email example, from one Chipolt Zolt.

TO: You
 SUBJECT: Religion and doubt for Klingons
 FROM: Chipolt Zolt

I think of myself as an intelligent critical thinker. For example, my culture teaches me that there are multiple gods; some have killed each other off. I believe it is honorable to question such claims, and I do so without fear. Indeed, only through such questioning does ones faith grow stronger.

Reply

TO: Chipholt Zolt
 SUBJECT: Religion and doubt for Klingons
 FROM: [Your name]

Hi Chipholt! It was good to read your thoughtful email. I always enjoy rowdy and civil discussions with my otherworldly classmates. Getting to your point: Religion is a very personal topic, and I think there are some religious ideas that aren't meant to be logically tested. I've read some of the accounts of battles of your gods, and some of them teach what it means to be courageous. But something you say confuses me. You see doubt as something very honorable. I get it. But doesn't that mean that you have to accept wherever your doubt takes you? What if in your open-minded search you conclude that Klingon gods never fought each other. But you say doubt is good because it strengthens belief. In this case doubt might lead you to change your belief. Aren't these paths contradictory?

Here's an example for you.

TO: You
 SUBJECT: I saw it with my own eyes
 FROM: Elana Emrem

Before we begin, I have to tell you about this incredible experience I had last week! My dear granny passed away last month. It was very sad. One night last week I went to her empty house to get some of my belongings. She had put them in her basement. As I walked down the stairs alone, the lights went out for about a minute. I heard a giggle that sounded like granny. She always liked to play jokes. I saw a misty figure next to her favorite chair. It looked like her, although very fuzzy. I felt a rush of cold air and the lights went on. At that instant I saw a blur moving from her chair to the window. It was her. I was terrified and walked to the chair. Sure enough, there were footprints in the dusty floor, right where I saw granny. I called for my sis, and she agreed that they were footprints. I saw granny's ghost. I know what I saw. Something was really there.

What is your civil reply?

TO: Elana
 SUBJECT: I saw it with my own eyes
 FROM: [Your name]