CRITICAL THINKING, SCIENCE, AND PSEUDOSCIENCE

WHY WE CAN’T TRUST OUR BRAINS

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For my son, Lucian. I hope that the world you grow up in contains at least a few more critical thinkers in it because of our work.

—CWL

To my father, Jacques Rossouw—a model of scientific integrity and a lifelong inspiration for careful and critical thinking. Thank you.

—JR
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Ask an actor, “How do you connect with an audience?” and you’re likely to hear that he or she will aim at an audience on four levels. An actor can appeal to the intellect, to emotions, to instinct, or, shall we say genteelly, to animal urges. In other words, brains, hearts, guts, and genitals.

Guess which will be the first choice?

Right. The farther down the body you go, the easier, quicker, and more effective is the connection to an audience. You can see this in magazine advertising or on Internet social media. “Click-bait” focuses heavily on guts and genitals—and all those cute cat and puppy videos are an appeal to the heart. You don’t see a lot of click bait appealing to brains. Twitter and YouTube are not the first places you turn to for logical, intellectual discourse.

So why did the authors of this book focus at the top of the list, rather than somewhere lower down?

Because even though the downward end of the scale of brains, hearts, guts, and genitals works in acting, YouTube posts, advertising, and other forms of communication, it’s not necessarily how you want to live your life. As the starring actor in your own life’s drama, you are going to be much better off if you focus on the top of that scale for most of the decisions in your life.

It’s not going out on a limb to say that you really should start at the top when it’s a big decision. If you know how to use your brain to think critically about the world around you, most of the time you’re going to come out ahead. Arguably, relying on the topmost anatomical features (head and heart) will get you farther than guts and genitals.

I’m not proposing that you give up heart, guts, and genitals; you’re not likely to comply, and really, it’s not necessary anyhow. If you’re walking to class or work, say, and you put in your earbuds to listen to some music, you’re not likely to need to employ a lot of the critical thinking skills so usefully outlined in this book: you’re going to choose your selections depending on how you feel. Are you feeling really mellow? Are you feeling too mellow, and need to get your brain firing before you get there? Okay, crank up something with a great beat, or whatever works for you to get your heart rate up. We make decisions all the time that don’t involve a lot of logic or empirical evidence.
But let’s say you get a phone call from a lawyer in a far-off foreign country who has really bad news about a friend or relative of yours who has just been arrested on a trumped-up drug charge and needs $100 to bribe his way out of jail. You need to buy some prepaid debit cards, and read the serial numbers to the lawyer so he can get the money to rescue your friend. Whatever you do, the lawyer warns, don’t tell anyone, even other friends, because the situation is so perilous, and the bribe could fall through if the authorities get wind of it. And do it right away because even a few hours in the jails of this country are a nightmare for your poor friend.

Here’s where you need a little critical thinking. Of course your first reaction will be to want to help a loved one. Hearts are good things, but don’t rely on them for analysis. For circumstances like this, you need to use your brain, not your heart. Every year, scammers obtain hundreds of thousands of (untraceable) dollars from well-meaning people who believe they are doing the right thing for a loved one. It’s important to have the tools to think critically about such circumstances and to evaluate such claims.

Going with your gut also has its shortcomings. When you “just know” something, you might need to stop and think whether your belief comes from a reliable source or is the product of stereotypes, inadequate or mistaken information, or even superstition. It’s especially worrisome when people in decision-making positions cede thinking to their instincts. President George W. Bush famously “looked [Russian President Vladimir Putin] in the eye” and “found him trustworthy”; we would hope that successful international diplomacy would rely on a more systematic procedure for assessing the trustworthiness of decision makers.

Heads, hearts, guts … we’ve now made our way to the last rung of the ladder: genitals.

Is it pretty obvious why you shouldn’t make major decisions based on your sexual impulses? I thought so.

But lest you think that I’m advocating a really boring life, where every decision is the product of critical thinking and rationality, à la Mr. Spock of Star Trek, let me reassure you. I’m not. Life is a balance, and life would be pretty dull if we didn’t have love, and wonder, and excitement, and awe, and delight, and lots of other things that don’t have to be the product of logic and reason.

There’s a famous etching by Francisco Goya portraying the artist slumped at his desk in exhausted sleep, while above him fly scary-looking bats and owls—symbols of evil in Goya’s eighteenth-century Spain. The title is “The Sleep of Reason Produces Monsters,” and it has become something of a slogan for scientific skeptics and other rationalists who worry about what happens when we don’t use our brains.
Yet it’s useful to look at the full epigraph to the etching, which reads, in translation, “Imagination abandoned by reason produces impossible monsters: united with her, she is the mother of the arts and the source of their wonders.”

To be “wonderful”—full of wonder—the arts require not only imagination, but also reason, says Goya. I’d like to think of this as a metaphor. Hearts, guts, and genitals need to be guided by reason, lest they result in bad decisions—Goya’s “monsters.” We may fall prey to scammers who cost us—whether money, time, emotions, or something else we hold dear. Even sincere people may mislead us into believing things that are not true, or not believing things that are true, and bad decisions and consequent suffering can take place. Without critical thinking, we may be led to accept false ideas about health, finances, personal relationships, or other issues that can injure us or our loved ones.

No one can, or should, abandon brains, or heart, or guts, or genitals. We need all of these to be complete human beings. But Goya’s point is to not let your reason sleep! Only with reason—engaged, not relegated to the sidelines, not sleeping—can we ensure that our other human qualities won’t lead us astray.

Enjoy all the parts of your body! And read this book to learn how to be sure that reason isn’t sleeping; brains are at the top, after all!

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Critical Thinking, Science, and Pseudoscience: Why We Can’t Trust Our Brains offers an introduction to various issues that relate to our ability to navigate the world of information effectively and efficiently. The first obvious issue that arises when trying to make sense out of all the noise we’re subjected to is how arguments and evidence work—summarized here as the skill of critical thinking. But it’s not enough to know how to think well in theory, because in practice—as you no doubt know all too well—we often don’t have the time or ability to be as careful with our reasoning as we might like to be. We’re bombarded with conflicting information, and in an effort to save time and make decisions easier, we’ve all developed various strategies for coping with information overload. Yet these strategies can sometimes lead us astray, so it’s important to talk about how humans actually think—not just how we should think—and to also explore the various ways in which we might be led to confusion not only by our own brains, but also by the misleading or inaccurate information we’re sometimes exposed to.

This book is unique in two important ways: The first is the broad cross-disciplinary approach that it brings to the topic of critical thinking, and the second is that we take care, even when discussing ideas that we regard as deeply flawed, to not belittle or ridicule those who hold such views. Being a consistently critical thinker is not easy for anyone, and is not aided by mockery or misunderstanding. But more to the point, the authors recognize that we are all prone to errors of similar sorts, and think that dialogue and understanding, rather than caricature and hectoring, are more productive tools for minimizing those errors.

On the first aspect, the cross-disciplinary approach: Although the book takes a primarily psychological and philosophical look at a diverse range of topics, we also incorporate the perspectives of biology, physics, medicine, history, and so on. As an example, when discussing alien abductions, we discuss not only the historical perspective on why we have the image of aliens being thin, gray-skinned, big-eyed humanoids, but also the problems with eyewitness testimony and memory. When discussing cryptids (“hidden” creatures such as the Loch Ness Monster or Bigfoot), we discuss not only the problems in terms of plausibility and evidence, but also the problems with the existence of such creatures from a biological perspective,
such as food supplies and lack of physical evidence. This emphasis on examining phenomena and claims from multiple perspectives is intended to help the reader consider different levels of (rational) explanation that lead to the same conclusion—in this case, that pseudoscience is bunk—while also offering intellectual resources that can be generalized for reaching that same conclusion for topic areas the book does not address.

In terms of organization and approach, the second unique aspect of this book is expressed in a Michael Shermer quote inspired by Baruch Spinoza: “I have made a ceaseless effort not to ridicule, not to bewail, not to scorn human actions, but to understand them” (Shermer, 2002, p. 41). As such, the book will not just focus on “debunking” various pseudoscientific topics, but also will help the reader understand why people believe in such things. We begin by discussing the need for critical thinking (Chapter 1), centering around the question of “What’s the harm?” and showing exactly how not thinking critically can cause minor and major damage to both individuals and society. We then operationally define science (Chapter 2), and show how it is similar to and different from other types of knowledge and understanding. Chapter 3 describes pseudoscience, illustrates some of the common mistakes made in pseudoscientific thinking, and lays some of the groundwork for discussions of particular examples of pseudoscience in later chapters. We then move to a discussion of the key principles of critical thinking in Chapter 4, before spending the next two chapters examining why it is so difficult to be a critical thinker. These discussions are framed in terms of the questions “Why can’t we trust our brains?” (Chapter 5) and “Why can’t we trust our world?” (Chapter 6). In Chapter 5, we focus on how the human brain does not process information in a rational, logical fashion and instead is rife with natural biases. In Chapter 6, we expose many of the social factors that come into play that prevent one from gaining an unbiased, critical perspective on information.

After laying the foundations of how we would ideally think about things, but then showing how our brains and world complicate that ideal, we introduce specific pseudoscience topics as illustrative examples of this tension, applying the principles of critical thinking to examine the veracity of various claims. Chapter 7 discusses alien visitation and abduction. Chapter 8 tackles the subject of psychic powers and those who claim to have them. Chapter 9 deals with some of the strange creatures some people claim to see, or believe that they might have seen—Bigfoot, the Loch Ness monster, and so on.

Chapters 10 through 12 combine as an extensive look at alternative medicine. Chapter 10 lays the groundwork in discussing what alternative medicine is and when medical treatments should or should not be considered trustworthy. The next two chapters examine two areas where
alternative medicine is prevalent—physical health (chiropractic treatment, acupuncture, etc.) and mental health (e.g., facilitated communication for autism and sensory integration therapy). All of this is done through the lens of critical thinking, and includes discussion about why people believe in alternative treatments, using the principles described in Chapters 5 and 6.

Chapter 13 takes a look at some of the more popular conspiracy theories, including the Illuminati and the New World Order, “false flag” operations, suppression of technology, and apocalyptic predictions. Our penultimate chapter (Chapter 14) then takes a look at how religion and culture impact science and vice versa, using the narrative of the “culture wars” surrounding topics such as heliocentrism, the theory of evolution via natural selection, climate change, and so on. We then conclude, in Chapter 15, with a restatement of the importance of critical thinking in one’s day-to-day life, and provide resources for encouraging critical thinking in our readers’ communities.

Although this book will be of great interest to those specifically studying critical thinking—for example, those taking a course on it or studying for a qualification with a primary or secondary focus on critical thinking—the authors are of the firm view that everyone can benefit from becoming a better critical thinker, whether you have to take a course in it or not! So, if you’re the sort of person who reads and enjoys popular science books and articles, such as those by the likes of Ben Goldacre, Richard Dawkins, Michael Shermer, Carl Sagan, and Neil DeGrasse Tyson, we think there is a good chance you will enjoy this book also.

While we have referenced key claims, the book is not intended as an academic monograph, and we wouldn’t want it to read as such. We hope it will introduce an interested member of the public or an undergraduate student to key issues in how to reason critically and scientifically, and to help this individual to communicate those ideas to others. We hope you enjoy reading it as much as we’ve enjoyed writing it for you.

Qualified instructors can e-mail textbook@springerpub.com to receive an Instructor’s Manual and a chapter-based PowerPoint deck that will aid in engaging and inspiring your students to become better critical thinkers.

REFERENCE

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CHAPTER 1

WHY DO WE NEED CRITICAL THINKING?

Being able to change our minds about something—to realize that we hold a false belief, and to then correct it—is an invaluable human capability. False beliefs can confuse debates, lead us to poorer choices than we might otherwise make, and, in general, limit our opportunities to make the most of our circumstances. Yet, it’s a capability that we can sometimes take for granted, so much so that we forget that it can be exercised and strengthened—or that we can become worse at it over time, if we allow faulty assumptions or poor reasoning to become entrenched in our minds. Even if we can recall recent cases in which we’ve changed our minds about something—maybe the extent to which you favor one political candidate over another, the performance of your sports team, or where you should invest your money—those easy-to-remember cases might obscure an underlying, and perhaps pervasive, tendency not to interrogate our beliefs as often as we should.

Later in this book, you will read about confirmation bias (in short, our habit of noticing evidence that confirms something we already believe, and not noticing evidence that complicates the picture or disproves our belief), and this very common bias affects our ability to recognize when we’re not thinking as well as we could or should—irrespective of what we are thinking about (Trout, 2002). So it’s not only the case that we might be unduly complacent about particular beliefs, but also (more worrisomely) that we might become unduly complacent about our thinking patterns in general, or about the ways in which information in the world and its presentation could contribute to making that task difficult for us.

The capacity to change our minds, or to approach issues in a way that gives us the best chance of reaching the most justified conclusion, is one that needs nurturing and exercising. If we neglect it, we become worse at doing it—and unfortunately, we’re very good at hiding our failures to ourselves. This, in short, is why we need both critical thinking and to exercise our critical-thinking skills: we can benefit from learning how to think things through, or reminding ourselves of the ways in which we let ourselves down in our sincere efforts to do so. It’s true that the Internet, and social media in particular, can overwhelm (or at least complicate) our best intentions and
efforts. And, contrary to the promise that the Internet holds for robust and informative debate, communication studies indicate that social media, at least, could contribute to a “spiral of silence,” in which we mostly end up sharing views only when we think that our audience is likely to agree with us already (Hampton et al., 2014). Later chapters explore the role of social media and the Internet in complicating our thinking and our conversations, but for now, let’s focus on a fuller explanation of why we should continue to strive to be better thinkers.

**KNOWLEDGE AND EMPOWERMENT**

Consider these two statements:

- It’s relatively easy to fool someone who doesn’t understand the topic under discussion (assuming that you do understand it, or can plausibly pretend to).
- It’s unlikely that the average person will have enough specific knowledge to be equipped to judge the truth of many scientific claims.

One implication of these two statements is that each of us can easily find ourselves in one of two positions: that of explaining something you know about to someone who is less of a specialist in that area than you are, or when it’s you who is in the position of relative ignorance, having something explained to you. In these sorts of circumstances, the person with the knowledge is given our trust, as they could quite easily tell us things they know to be untrue—and we would be unable to separate truth from untruth in many of these cases. An immediate lesson here would be that it’s vitally important to choose your authorities carefully, in order to maximize your chances of being told the truth. A later chapter (Chapter 6, “Why Can’t We Trust Our World?”) explores some of the reasons why this isn’t always an easy task.

The second of the two statements raises a significant difficulty for someone who wants to be a responsible epistemic agent (epistemology is the philosophical field that addresses questions of knowledge—how and why we believe in propositions, and how best we should do so). As the boundaries of knowledge have expanded, theoretical fields have become increasingly specialized (Malone, Laubacher, & Johns, 2011). Instead of being an economist, you can now study to be a game-theorist; instead of a psychologist, a neuropsychologist; and the generalist in a field will find himself or herself increasingly ill-equipped to join into various conversations. Each of us has limited time and capacity for learning, so whatever we don’t specialize in becomes something about which we are, to some extent at least, in a position of vulnerability to false beliefs with regard to that field of knowledge,
thus needing to trust someone identified as an authority in that area. This need not entail anything sinister—we don’t mean to argue that people are determined to deceive us (although sometimes they are), but more that we simply might not know the difference if they were.

The key insight here is that knowledge cannot be separated from power—having knowledge confers power, and lacking knowledge removes it and creates vulnerability. Furthermore, those with power (whether it be financial, moral, or political) can abuse it, sometimes endorsing knowledge and sometimes suppressing knowledge for their own reasons (Martin, 1999), such as personal gain. For those of us without such power, a clear implication is to be wary of believing something just because the person telling us to believe wears a scientist’s coat, a priest’s robe, or a presidential seal. There need to be good reasons for believing a claim, irrespective of who offers the claim. In logical terms, believing something because of who said it rather than what is being said is the fallacy of appeal to improper authority.

The good news is that even if one knows little or nothing about a particular field, there are still ways of determining whether a point of view is likely to be sensible or worth taking seriously, and talking about those ways is a fundamental motivation for our having written this book. We will never be able to avoid relying on people we believe to be authorities, but we can certainly learn how to choose our authorities responsibly—to become “authorities on authority,” in a manner of speaking. But in doing so, one of the things we have to consider is that hyperspecialization and the deluge of information available to us might require that we shift our focus away from being certain that something is true. We’ll seldom be in a position for such a strong judgment, and might instead want to adopt a less demanding standard, asking instead whether an idea or argument seems better justified than its competitors.

**JUSTIFICATION**

Any opinion worth holding—if you care about the truth, that is—must have some justification, which can be broadly understood as support or foundation for an opinion. The extent to which justification is present can be easy to agree on in fields that involve recognizable and measurable data (e.g., an engineer’s claim that the bridge will not collapse), but often attracts disagreement in contexts such as moral argumentation, where “facts” seem thin on the ground.

It might be a mistake to think that we can’t apply the same principles across these domains of knowledge, though. Claims made in domains such as morality or aesthetics are also capable of being less or more justified (Tramel, n.d.), just as claims in science are—even if we can’t reach the same
level of confidence regarding their truth.\footnote{Some readers who are familiar with moral philosophy will disagree strongly with this, but I would plead their indulgence given that this book’s primary topic is not moral philosophy, but critical thinking and psychology. For the purposes of this chapter, a coherenist approach to morality is assumed.} What I mean is, although there may be fewer facts underpinning a moral judgement compared to one in science, a view that disregards what facts there are would still be inferior to one that takes those facts into account. We are, in other words, still responsible (if we want to hold responsible opinions) for digesting the information that there is as objectively as possible, and for evaluating the consequences of our views as clearly as we can.

The belief that we can hold more or less justified views regarding subjects like morality meets with plenty of opposition. Perhaps as a way to avoid these arguments entirely, you’ll find that people often end up “agreeing to disagree,” saying things like “everybody is entitled to an opinion.” But in what sense is it true to say that “everybody is entitled to his or her opinion?” Or, to put it a different way, that “everyone has the right to an opinion?”

One possible way of interpreting these claims is that everyone, legally, is entitled to or has the right to hold whatever opinions he has. But that is surely not what we mean as, first, we’d have no way of knowing what opinions people held until they told us, and second, we’d only start caring once those opinions had some effect on real-world welfare.

To clarify what we mean, consider the occasions when certain phrases are used. We typically say: “Well, you’re entitled to your opinion” when an opinion has been expressed and we already disagree with the expressed opinion. We then indicate that disagreement through expressing that other people have the right to disagree. If we agreed with the other person’s opinion, we would just say so. Now, one way of framing this issue would be to point out that this conversation shortchanges our own opinions to an extent—instead of saying: “You’re wrong. This is what you should believe,” we find a way of saying something similar, but in a way that is less likely to cause offense. But for our own opinion to be worth holding, surely we should be willing to defend it more strongly than that. If we are that unpersuaded or committed to our own opinions, we should arguably not be saying “You have the right to your opinion,” but rather “Oh, I hadn’t thought about it that way—I’ll reconsider my opinion in light of what you’ve said.” Because if we’re not willing to revisit our opinions in the light of new evidence, what are we doing holding those opinions in the first place?

Alternately, this “right to an opinion” response could be read as being dishonest, in that we might be saying something like: “You’re just wrong about what you believe. And although I am right on this issue, I can’t be bothered to argue about it.” We say this can be dishonest because although you clearly don’t respect the other person’s view, you suggest that you do by saying that she has a right to her opinion. Even worse, this response could
Also be read as being demeaning toward the person you are speaking to, as you might be saying that she is simply too unreasonable to see sense on the issue in question. In all these permutations, we’d instead hope that we have strong justification for our own views, in that we have reasoned through the issue and settled on a well-considered position, rather than, for example, having believed something for so long (maybe because you heard it from a parent or a priest) that you are already completely committed to its truth, and argue to justify it rather than to assess its worth (Haidt, 2001).

Taking this a step further: Once we realize that what we mean by everybody “being entitled to his opinions” is so meaningless or unhelpful, why do we keep saying it? The immediate answer would be that it’s a pleasantry—something we say to keep conversation going while avoiding a fight. But if everybody knows that we don’t mean it in any meaningful sense, isn’t its value as a tool for social harmony decreased? If we all cared about holding well-justified opinions, we might instead say something like: “No, not everybody is equally entitled to an opinion. I’ve thought about my opinion for a long time, and can offer you reasons for my opinion being a better one than yours. So, in this case, when discussing this issue, I’m very happy to say that I am more entitled to holding an opinion than you are, or at the least that my opinion is the superior one.”

**RELATIVISM**

So why don’t we ever say this, or something similar? Partially, this is because it’s become very unfashionable in the modern world to say that you know better than someone else. This is in some ways attributable to the global conversations we can now have thanks to the Internet, and also to the hyperspecialization discussed earlier. As we have become exposed to more and more different people, cultures, and religions, we have good reason to become less certain that our ways and our beliefs just happen to be the correct ones. Although this is a good thing in moderation, as it does encourage open-mindedness, the end of the line for that sort of reasoning is to say that no one is entitled to say that he knows the truth or has the best answer. In other words, it’s a line of reasoning that ends in relativism, where “truth” is perceived as being relative to you and your particular situation—your history, your culture and upbringing, your influences. But there is no need to take this relativistic line, and there are, in fact, good reasons for not doing so (Boghossian, 2006).

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2 There are numerous examples of this in the English language, where what is said is actually the opposite of what is meant. One of our personal favorites is the phrase (often used in the American South): “Well, bless her heart!” On the surface it seems nice and lovely, but in reality is almost exclusively used to avoid saying someone’s moronic.
There is no need to endorse this line of thought, because even though it may be difficult to agree on the truth of the matter, this does not mean that one opinion cannot be inferior to another, or that there are some opinions that just should not be taken seriously. And the most obvious good reasons for not taking the relativistic line are that treating claims relativistically removes part of our opportunity to correct our own errors through learning from others, and to discover when we are being complacent about our beliefs or reasoning. Relativism also takes away our opportunities to inspire other people to be responsible about what they believe. But why would something like personal belief in something matter, and why should we care about what others believe?

IF ACTIONS MATTER, BELIEFS DO TOO

It is vitally important to care about what we believe. For all the emphasis that is placed on action, we can forget that action is (usually) motivated by thought: We desire, we need, we plan, and then we act. If we don’t think about what we believe, the chances of arriving at optimal actions are impacted. Our self-interest motivates us toward thinking clearly about what’s best for us personally, and selecting the actions that are best suited to achieving the outcomes we desire. In other words, what we believe does matter; as does what other people believe, because those beliefs typically translate into real-world actions. Although we can tell people that they are entitled to their beliefs, we should remember that this is mostly a political claim, in the sense that we are affirming human equality and committing to respecting others through not prejudging their opinions to be worthless. We are not, and never were, saying something about how all opinions are literally equal in worth, even after we’ve been exposed to their respective merits.

Consider an example: Fred and Bob both claim that the president of the United States is going to lead the world into a nuclear war. Fred says he believes this because he has read statements from U.S. military officials that indicate America is stocking up on missiles, because of psychological reports he has read about the character of the president, and so forth. Bob says he believes this because last night, when he was asleep, a wise gray squirrel appeared to him in a vision and told him that the president would start a nuclear war.

When thinking about that example, it would be easy to get sidetracked by your current knowledge or beliefs about an existing president and his or her character, as well as your beliefs about the current state of international politics. Note, however, that being sidetracked by these factors would be a mistake. The thing that makes Fred worth talking to (and that makes Bob worth ignoring, at least in terms of the truth of his statement) is that we can understand the methodology behind the forming of his opinion. Fred has
1. WHY DO WE NEED CRITICAL THINKING? • 7

taken evidence, thought about that evidence, and come to a conclusion. He may have done so badly, or somewhat irresponsibly, but he is still speaking in a language we understand—the same language we use when taking claims seriously in science, whether it be economics and psychology (social sciences) or biology and physics (physical sciences).

We know that there would be a point in debating with Fred: We can dispute his evidence (the psychological reports, for example) or his reasoning (the way in which he uses the evidence to reach a conclusion). Debating with Bob would merely involve telling him that the gray squirrel (if it exists) has no good reason to believe in the likelihood of certain events, and that Bob has no good reason to believe what the squirrel says. (From what we know of Bob, he won’t much care about these technical details.) So, in the end, it doesn’t matter one bit whether Bob and Fred are right or wrong—they could both be right, or both wrong, but although we can learn something from talking to Fred (and he from us), it would most likely be an inefficient use of our time to talk to Bob (at least assuming our impetus is our care for the truth, rather than our wish for entertainment).

OPINIONS, BELIEFS, AND KNOWLEDGE

We are constantly forced to make choices. Fortunately, many of these choices have no serious negative consequences for us, given that they are typically directed at our best interests. Our decisions can and do affect others also, of course—not only directly with regard to their welfare, but also in shaping their perceptions and responses to us. We’d like others to treat us well, and we’d like to make the best decisions for ourselves (and others), which means that it is crucial to be as well informed as possible when making decisions. This means not only having as many of the facts at your disposal as possible, but also to treat those facts responsibly, rather than conveniently ignoring those facts that you are uncomfortable with, or would prefer not to believe.

But what is it to be informed? One way of answering this question is to say that you’ve achieved a sort of synchronization between the contents of your head and the world outside—that you (largely) believe those things that are true and disbelieve those things that are false. Unfortunately, we sometimes get this order wrong. We sometimes respond to the world as if it should correspond to our beliefs, rather than treat our beliefs as if they need to correspond to the world. This reluctance to change our minds in light of evidence has been described as so pervasive as to suggest that we’re living in an “age of willful ignorance” (McIntyre, 2015). However, you don’t need to be that pessimistic to nevertheless agree that we are too often reluctant to change our minds in light of evidence that our beliefs are false. We prefer to think that the information we are getting is false, rather than thinking that
something we believe may be false, and that is why the world doesn’t act the way we think it should. This habit is an example of confirmation bias—the tendency to easily view evidence as confirming preexisting beliefs and to be reluctant to understand evidence as disproving beliefs we currently hold.

Why would we be so lazy or complacent in choosing what to believe? Often the answer seems to relate to the fact that it often doesn’t much matter what you believe in practical terms—other people are usually willing to continue to talk to you or do business with you, whether or not you believe something different from them. Another part of the answer may be that many of our beliefs are never exposed or tested. We are not given an opportunity to engage with or question them, because they simply never come up, or if they do, they come to the surface in contexts in which it’s easy to not bother challenging them. But whether or not it’s easy to understand why we often simply carry on believing the things that we currently believe, the more important issue is whether we should be so lazy or complacent in choosing what to believe.

One way of approaching this more important issue is to consider how we feel about different sorts of beliefs. Take, for example, an engineer. It is surely the case that we care about many of her beliefs. If she believes that her design for a particular bridge is sound—in other words that it can support your car as you travel 65 feet above another highway—we have some quite serious reasons for being concerned that her beliefs do in fact map onto the world and its physical laws accurately. If your employer believes that you are lazy and incompetent, we likewise care about the accuracy of that belief. For some reason, though, we don’t seem to care in the same sort of way about other beliefs, particularly beliefs relating to morality, politics, aesthetics, and metaphysics. They matter, in that we may choose to interact with people who happen to share the same sorts of beliefs that we do in these areas (e.g., supporters of a particular football team might prefer to frequent a bar where other supporters of that team congregate), but for the most part, these disputes don’t seem to affect many of the day-to-day events of our lives, and they also aren’t interrogated as strongly regarding their correspondence with the real world. Everyone is entitled to his or her opinions, right?

So what is the difference between these different sorts of beliefs? Some may think that the answer was contained in the observation that much of the time, aesthetic beliefs (e.g., your belief in your team having the most dynamic players in the league) simply don’t affect our lives in the way that the construction of a bridge does. But is this true? Isn’t the difference between these two sorts of beliefs more that we tend to treat the engineer’s beliefs as facts and your beliefs about football as opinions? And then, surely, some opinions are actually true in the same sort of way as the engineer’s beliefs are, and other opinions are simply false or indeterminate—so not
only can we make distinctions regarding the quality of opinions, but this also suggests that some opinions are surely far closer to being “fact” than others.

The point here is that we tend to use words like “belief,” “opinion,” “fact,” “true,” and “knowledge” in very casual ways (McBrayer, 2015), which allow for you to be talking about something different to me when we both use words like “opinion.” One of the points made earlier is that we minimize our chances of making mistakes if we fill our heads with pieces of information that are actually true, whether those pieces of information are called beliefs, opinions, or facts. Even if you end up disagreeing on any given taxonomy of those words, a concern for justification should be central to your understanding of all of them. The reason for this is that all of our beliefs are connected to other beliefs, and most of them are (sometimes in very roundabout ways) connected to some very foundational beliefs that we hold, beliefs about very essential or basic things. For example, take your belief that your name is “Bill.” Your belief that your name actually is Bill (or whatever your name is) depends on various other beliefs, such as that your “parents” are actually your parents; that if they are your parents, that they are trustworthy; and so on.

The point in questioning your belief in something as basic as your name is to make it clear that not only are beliefs interconnected, but also that a mistake in the foundation of your belief network can corrupt any beliefs that depend on that initial belief. If this is true, it means that we should care about all of our beliefs—or more specifically, about whether they are true or not. And by “true,” we can’t mean something like “true for me, but maybe not true for you,” because that’s not what the word “true” means. When we say something is true for me, but maybe not for you, we are not actually talking about “truth” as commonly understood, but rather saying that I believe it, and perhaps you don’t.

These issues wouldn’t matter if our beliefs made no difference to the ways in which we interact with the world. But history offers us countless examples of ways in which beliefs—particularly about things with little or no empirical evidence to support them—can have serious and sometimes catastrophic effects on the world. For example, consider the belief, held by many even today, that one particular race or gender is superior to another. Or consider the belief that the measles, mumps, and rubella (MMR) vaccine causes autism: even though it’s based only on poor and discredited science, along with some misguided celebrity endorsement, it can—and has—caused deaths from a disease we thought was already defeated in the United States (measles).

Yet, despite the effects they can lead to in the world, we don’t treat beliefs symmetrically (in that some are interrogated more critically than others), and we also offer beliefs exemptions from standards we’d hold “facts”
to—you can believe whatever you like, so long as you don’t perform actions that harm other people on the basis of those beliefs. The broader point being made here is that if we are willing to offer some beliefs exemptions from corresponding to evidence, should we not extend the same charity to all beliefs that can’t be proven to correspond to the world? And, if not, how do we choose which are exempted and which are not? A principled way to distinguish between those two categories is important, because one person’s demand that she be entitled to believe in a pseudoscience is otherwise difficult to distinguish from the racist’s demand that he be regarded as superior to you. Either these cases can both be assessed on their internal logic, or they need to both be assessed with reference to some external standard (possibilities here include both correspondence to the external world and capacity to result in benefit or harm).

The general point is that a very simple principle—consistency—demands that we treat things that are similar in a similar fashion (Ryan, 1996). The challenge of argument here is that we’d either need to show that these examples are not similar or, if that fails, to accept that they need to be treated symmetrically. If you don’t subscribe to either of these beliefs (in a particular pseudoscience or in scientific racism), it’s no doubt far easier to see their similarity in both being unjustified by external evidence (rather than their own internal logic). They are also similar in that pseudoscientific beliefs can affect other people as negatively as racist beliefs. And if we are then to accept that these beliefs are similar in these sorts of ways, consistency demands that we treat them similarly by either respecting all relevantly similar beliefs that don’t correspond to evidence (or where evidence is difficult to find), or that we are skeptical about all of these sorts of beliefs.

Being skeptical of such beliefs does not necessarily mean believing that they are false. It simply means not being dogmatic about them being true, and being open to the possibility that they are false. Of all such beliefs, it may well be that some (or even many) of them are in fact true, but the problem remains that we cannot prove them to be so. This means that if you are going to believe them, you commit yourself to a certain amount of risk, especially if you are going to perform actions motivated by these beliefs. Again, though, it needs to be made clear that if one is prepared to believe things on the basis of little or no evidence, one increases one’s chances of believing things that are false. This is hardly a good strategy for being informed, and thus increasing your chances of making optimal decisions.

Back to our engineer: a key feature of her claim, and one that makes it “knowledge,” is that it is true—or that it is so likely to be true that we may as well call it true (certainty being too demanding a standard). What prevents my (JR) claim that the death penalty is unjust from being knowledge is that I cannot demonstrate it to be true to the same extent. Of course I can argue for that belief, and I may well be able to persuade you that it is a good belief.
to hold, but I will not be able to prove it to be true beyond any reasonable doubt. So it remains in the realm of opinion, rather than fact, although it’s certainly the sort of opinion that is worth taking more seriously than the opinion that, for example, men are (literally) from Mars and women are (literally) from Venus. Opinions can vary in quality, and can be treated with the relative respect that quality earns. In this case, my opinion would be supported by evidence, good reasoning, and the like—I can argue for it, and offer you reasons why it’s a good belief to hold. So a large part of our answer as to which opinions to take seriously has to do with how responsive the opinions in question are to evidence, in other words, how well justified they are.

So far we have considered four elements of what one could call our mental furniture: opinions, beliefs, knowledge, and justification. Let’s now try to define these more carefully in an attempt to understand them in relation to each other.

**Opinions and Beliefs**

There are certain properties we would like our opinions to have—we would like them to be true rather than false, and we would also like for them to be based on good reasons rather than bad reasons. Opinions are also propositions or statements that we believe to be true—if I say “the death penalty is unjust,” or “adulterers will go to hell” I am expressing an opinion and at the same time expressing a belief. After all, something cannot be your opinion if you do not believe it to be true. So for our purposes, a belief can be treated as meaning the same thing as an opinion; some of our opinions (or beliefs) could be true and others could be false, and we could also hold varying degrees of commitment to our own beliefs (being more convinced of some than of others).

A belief based on superstition, for example, is based on poor reasons unless that superstition happens to be true. Even if that is the case, the belief is still based on poor reasoning, in that even though the superstition ends up being grounded in fact, you’re still reasoning poorly if you appeal to the superstition itself rather than those facts. Believing something based on poor or no reasons could also be said to be irrational, which often boils down to simply claiming more than is suggested by the evidence available. And, if you form opinions in an irrational fashion, you increase your chances of having false opinions—you’re in effect buying lottery tickets rather than weighing the evidence. As discussed earlier, given that our beliefs and opinions affect not only how we form subsequent beliefs, but also how we act, we do need to care about holding true beliefs rather than false ones. For those who like definitions, let’s summarize in saying that a belief consists in having a clear disposition toward the truth value of a statement.
Knowledge

Some of our beliefs are, in fact, true and others are false, regardless of our views on the matter. We (in everyday life) tend to regard a belief as true when it is consistently demonstrated to be true (e.g., the law of gravity: I believe this to be true because things I drop consistently fall to the ground), and are more cautious of believing claims to be true when it is difficult to demonstrate their truth. But, regardless of our particular justification for regarding a claim as knowledge, it would be distinctly odd to allow for claims that are false to count as knowledge. We might (mistakenly) think they are true, and regard them as knowledge, but we’d simply be wrong about this.

As with many of these concepts and debates, we should be careful to separate how we talk about the concepts from how they are most usefully understood—“knowledge” is most usefully reserved for things that are factual and known, rather than strongly held beliefs that are possibly false. It is maybe simplest (for everyday purposes) to say that a proposition counts as knowledge if (a) you believe it for good reasons, and (b) it is actually true. The philosophical literature on the topic and the complexities raised therein are far beyond the scope of this text, as you can verify by reading an elegant and oft-cited paper by Gettier (1963), interrogating a similar conception of knowledge as “justified true belief.”

Following Gettier, it is important to note that for something to count as knowledge, you must believe it for good reasons. If, for example, I have a dream in which the gray squirrel says to me that I will win the lottery, and then I do win the lottery, it was never the case that I knew that I would win the lottery. I believed it, and perhaps even strongly believed it if I place great faith in the gray squirrel, but I never knew it—not if by “know” we mean something more serious such as, “I know that tomorrow is Friday” (if today is Thursday, of course!). So even though we may often use the words “I knew it” in casual conversation, we are using the words “know” or “knowledge” in a casual fashion, and “know” means something quite different when we say “I know that water boils at 100 degrees Celsius” (at sea level and so forth). Again, the difference between these two sorts of claims is that my belief that I would win the lottery was poorly justified, whereas my belief that the following day would be Friday was strongly justified.

The second element of knowledge previously mentioned is truth—for something to count as knowledge you need to have justified belief in something that is also true. Here, we can simply say that a statement is true if it actually corresponds with the way the world is. Note that corresponding with the way you think the world is, or the way that you would like the world to be, does not make something you merely believe count as knowledge. So we need to be careful to avoid subjectivity here, and remember that if a proposition corresponded with the way the world actually was, it would
probably be the case that most everyone agreed with it (the laws of gravity are again a good example), rather than that it was something nobody else but you believed to be true. What makes a proposition true is that the world actually looks or acts like that—no matter who happens to believe what.

This raises a serious philosophical issue though: It is certainly possible that we don’t have access to certain facts about the world that we would need to really know when a belief is true or when it is false, and thus, when it can be regarded as knowledge. To return to the example of religious beliefs, even if we can’t prove that the world actually corresponds to those beliefs, it might still be the case that those beliefs are true. Or to take another example, it might possibly (in a logical sense) be the case that it actually is unlucky to walk under a ladder. Perhaps there is some law of nature that dictates this unlikely principle, even though we would struggle to find evidence for it.

Regardless of those complications, if there is no evidence for a belief, it is irrational to believe it—even though it might actually be true. Likewise, we can make mistakes of the other sort—we can believe something because it seems to be justified by the evidence, but then we eventually learn that the belief in question was false. If you were living before a time when we had boats that could travel long distances, and we had no telescopes or photographs from space, all the evidence you had access to might have led you to believe that the Earth was flat, even though that belief turns out to be false. By contrast, to believe that the Earth is flat today, given the evidence available, would be an unjustified and irrational belief.

Justification of Beliefs

Justification relates to the evidence we have for holding a belief. Here, it is important to note that different sorts of evidence may be required or appropriate to different sorts of belief. If you are trying to persuade me that the unemployment rate is likely to decrease by 10% over the next 3 years, the evidence you use is likely to be very different from the sort of evidence you use to persuade me that there is life on other planets. Regardless of this, either or both of these beliefs can be well justified (or either or both can be poorly justified). A second complication is that although there may be information that helps us determine whether a belief is well or poorly justified, we may sometimes not have access to (or not understand) that information.

This raises two issues. First is that our beliefs can only be justified to the extent of the information available to us. Second, that if we are to claim that something is true, it is our responsibility to accumulate enough evidence related to that belief to entitle us to claim that the proposition in question is true. If you have not bothered to do the homework, you are certainly still entitled to claim something as an opinion or belief, but you are by no means entitled to claim that it is true, or that anyone else should believe it also.
The more important lesson here is perhaps for us to realize that before we regard something as true, and especially before we form other beliefs (or are motivated to action) on the basis of a claim, that we do the necessary homework in justifying our belief in that claim. Here confirmation bias, discussed earlier, is again relevant. We tend to treat our existing beliefs as already justified, forgetting that the mere fact that we believe them does not in itself count as justification. We need to think about why we believe what we do—if we have good reasons, which are likely to be accepted by other rational people, we are justified in believing something. If we don’t have such reasons, we should acknowledge that our belief is unjustified, and not insist that other people take that belief seriously.

WHAT’S THE POINT OF CRITICAL THINKING?

Some people may want to argue that it’s not important to think about thinking, or to pay attention to issues such as the differences between beliefs and knowledge, and the role justification plays in distinguishing them. One could be tempted to think, for example, that this sort of reflection doesn’t get any of the world’s work done, and is instead a leisure activity for those who have nothing better to do. Fortunately, there are three easy answers to this sort of skepticism, which we’ll adapt from Blackburn’s *Think* (1999).

The High-Ground Answer

There are many things we do in life that don’t directly serve some pragmatic purpose. We might listen to music, watch films, or play sports—and in these cases, it’s exceedingly rare to find someone asking what the point is. There are different sorts of possible “points,” and it’s not necessary for everything to relate to the global economy for it to be relevant to human life. Our lives consist of various elements, and one could argue that the activity of thinking, and of trying to understand human nature, is interesting and rewarding for its own sake. Blackburn also suggests an analogy comparing mental exercise with physical exercise: just as physical exercise makes the body fitter and stronger, causing us to feel better, so mental exercise can cause us to feel better by making the mind more stronger and more flexible.

The Middle-Ground Answer

What we think—the contents of our heads—is a key contributing factor for determining what we do. As discussed previously, our beliefs with regard to political or religious questions can have serious and sometimes catastrophic implications in terms of our lives and the lives of others. It’s undeniable that we care about how people act—and given this concern, it follows that we
need to care about how people think. This is especially true for ourselves, seeing as we have a direct investment in making decisions that are in our own best interest.

**The Low-Ground Answer**

The low-ground answer takes the sentiment of the middle-ground answer, but asks you to reflect on the fact that people can be persuaded to do quite nasty things to each other, often as a result of being encouraged not to think, but just to believe. Plus, there are so many more other people in the world than there are “you’s” in the world—so you (and I) would far prefer that they pay attention to reason and evidence. Critical thinking is our best antidote to the sleep of reason, and is therefore clearly worth cultivating.

**CONCLUSIONS**

With the definitions given in this chapter, and especially if you agree that it’s difficult and often impossible to possess absolute certainty with regard to any claim, this discussion points to justification as being the most important element in terms of our being able to say that we “know” something. “Truth” becomes less relevant—not because it’s unimportant, but because it’s more difficult for us to establish whether something actually is true or not than whether we have compelling reasons to regard it as true.

As soon as justification takes center stage, it becomes easier to recognize the similarities among different forms of knowledge, and how it is possible for the engineer to say “I know this bridge can support x tons of mass” and at the same time for you to say “I know my name is Bill,” or even “I know that the death penalty is immoral.” In each of these cases, there is information available that entitles one to claim knowledge, so long as she has responsibly gathered sufficient evidence and, as objectively as possible, considered whether that evidence, presented in a cogent argument, adds up to a justified claim.

Of course, it may well be that for some issues (tricky moral questions like human cloning, or the existential threat of artificial intelligence) the evidence is too difficult to find or understand. But that does not mean we can’t arrive at better and worse justified claims in these areas—it just means that we have to work far harder to derive them. We should also not forget that just because we cannot bring ourselves to consider something “knowledge” right now does not mean that it will not eventually be regarded as knowledge. Technology advances, we discover new data, and our arguments improve. In the past, we were unable to prove that there was no material reason to discriminate unfairly based on race and gender, and now we can.
Examples such as this should remind us that we are learning things all the
time, and that we should remember that there is still much to learn. Even if we
can’t know (in other words, demonstrate it to be a justified belief) now that,
for example, it is possible for humans to live on other planets, we are never-
theless in the process of gathering information that may make it possible for
us to know this 100 years from now. That continual search for knowledge—
and the revision of false beliefs in light of new evidence—is the essence of
science and the scientific method, which we’ll discuss in the next chapter.

QUESTIONS FOR REFLECTION

1. Are false beliefs always best avoided or eliminated, or can you think of exceptions
to this principle?
2. Are there any principled grounds by which false beliefs should be exempted from
the general ideal that we should aspire to only hold true beliefs?
3. Do you think that humans in the 21st century are more susceptible to holding
false beliefs than they were in the past? If so, how do you think we might best
respond to modern challenges related to conflicting information and information
overload?
4. Consider different sorts of belief: for example, belief in a personal god (or gods)
versus belief that smoking contributes to cancer. Are these beliefs justifiable
(or not) in the same sorts of ways, or are they different kinds of belief, with differ-
ent standards of assessment?
5. Is there anything that you regard as being certain knowledge—in other words,
something about which you allow no possibility that you are wrong? If so, how
do you justify this certainty?

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