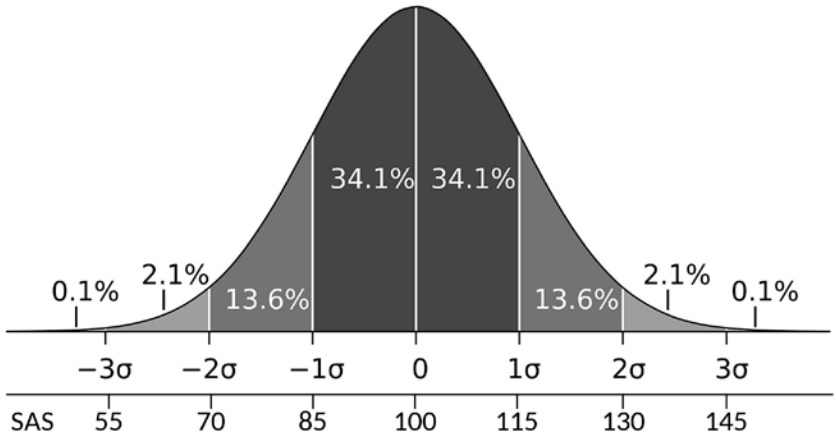

Figure 0.1. Normalized distribution of IQ on the Wechsler Adult Intelligence Scale (WAIS) with a mean of 100 and a standard deviation 15. It is commonly assumed by many today that, like a person's height and weight, their intelligence can be measured to discover how smart they are stacked up against other people. When charted as a normal distribution, approximately 68 percent of adults are believed to fall within one standard distribution above and below the mean. Dmcq, CC BY-SA 3.0, via Wikimedia Commons.

Introduction

What Is Intelligence?

There is little agreement today on what the word *intelligence* means. Yet this word is widely believed to be about something real, mostly biological, and important. Looked at closely, however, it turns out this word belongs more in the realm of traditional folklore than modern science.

Nobody can say for sure what intelligence means. What this word implies seems clear enough when used in the arena of military or industrial intelligence: it means collecting and analyzing information. But how the basic question "What is this?" otherwise gets answered often makes it sound as if intelligence is far more than simply having a sizable number of facts and figures. Judging by popular wisdom and protracted debates on social media, this familiar word evidently refers to nothing less than our inherited biological ability as human beings to be not only wise but wonderfully successful at whatever we set our sights on doing.

Moreover, intelligence is evidently something—whatever it is—that can be scientifically measured, weighed, and even cut up, or subdivided, into different types or categories of more specialized things, whatever they are, much like the different types of muscles in your body (Bornstein 2020: 125, 126; Davis et al. 2011; Gottfredson 1997). From this popular perspective, intelligence is also something you can have a lot of, and luckily find yourself being labeled a genius (Simonton 2021); or sadly, something you do not have nearly enough of, and so find yourself being seen by others, at least behind your back, as silly, stupid, or plainly idiotic.

Even in the latter case, however, it is commonly said that by merely being human, we are all unquestionably the most intelligent, the most wise, the most rational of all the world's life forms, past and present. Is this true? Is there something about human intelligence that makes all of us the most remarkable, the most intelligent creatures on Earth—and possibly even in the Universe?

When answering questions of this sort, it is often taken for granted that the right answers are likely to be straightforward and categorical. Yes, intelligence is something that can be measured, weighed, and subdivided. Yes, we are the most rational creatures on Earth. Yes, there is something unusual, something special about human intelligence making all of us as a species remarkably brainy and insightful—fully equipped, in other words, to rule the world and be the masters of our own fate. No wonder, therefore, the Swedish naturalist Carl Linnaeus in 1758 gave us our modern scientific name *Homo sapiens*, Latin for "wise man" (Agamben 2001: 23)

Are we really this special? Or is this wishful thinking on our part? If they could speak, would chimpanzees and bonobos, our closest biological relatives, agree with us?

Reasons for Doubt

All of the authors of this book are anthropologists and historians. We all have done research in different parts of the world. We all have an abiding interest in documenting what it means to be human. We decided to write this book together because we know firsthand what people will tell you it takes to be smart and capable as a human being cannot be boiled down to the singular (or even multiple) "something" that many in Europe and North America—academically trained, or not—will claim can legitimately be labeled (sometimes scornfully) as "intelligence." Yet more bewildering, even people in Europe and North America do not agree on what this word in the English language means.

The *Cambridge Dictionary* defines *intelligence* as "the ability to learn, understand, and make judgments or have opinions that are based on reason." This same dictionary defines *reason* as knowing "the cause of an event or situation or something that provides an excuse or explanation." How useful these seemingly uncomplicated definitions are will be considered more fully in Chapter 1. In the same chapter, we survey how human intelligence has been seen throughout much of the Global North down through history and in philosophy, psychology, and the popular press.

Defining intelligence as the ability to learn, understand, and explain events and situations does not necessarily imply that we are able to do so skillfully and well. After all, it may be easy enough to judge how successfully someone is able to get something done (say, quickly adding numbers), but how do you judge what they think about something?

Therefore, also discussed in Chapter 1 is the popular claim that how smart you are can be measured (and judged) by how well you can find patterns hidden in numbers, picture puzzles, word lists, and the like. Ex-

Is It Really Saltimbocca?

Metaphorically speaking, intelligence is like the Italian dish "saltimbocca." If you google the term or consult a cookbook, you will find a variety of definitions, and if you order the dish in Italian restaurants around the world, it turns out, amazingly, that there is not one single common ingredient in the dishes served as "saltimbocca." Still, there are experts who claim they know and other experts who admit they do not know for certain, but they believe nevertheless there must be a definition (and they may still be working on one).

De Boeck, Gore, Gonzalez, and Martin. 2020.
"An Alternative View on the Measurement of Intelligence and Its History."

Saltimbocca alla Romana. Alec Vuijlsteke, CC BY 2.0, via Wikimedia Commons

perts in psychology, behavioral economics, and other academic fields often caution, however, that all of us use mental shortcuts when faced with everyday problems we somehow need to solve, perhaps quickly, perhaps not. There is even a technical word for these hasty and potentially flawed strategies that cannot be guaranteed to give us true and correct solutions for dealing with the realities of life. They are labeled as *heuristic strategies*, or just *heuristics* (Gigerenzer 2020; Gigerenzer and Gaissmaier 2011; Kahneman 2011; Weinberger and Stoycheva 2020).

All human thought, however, is basically impressionistic and prone to error. Therefore, the real issue is what can be done to keep the magnitude of human error reasonably in check.

How Intelligent Is This?

Instead of simply taking it for granted that intelligence can be defined as the ability to learn, understand, and make judgments or have opinions based on reason, it is important to acknowledge that there is considerable evidence, both historical and in today's news, attesting to the seemingly countless ways we all can stumble intellectually and end up not being nearly as clever as we may want to believe we are. There are many good reasons to doubt how smart we are as a species, however promising the label Linnaeus gave us. Here are five examples.

1. Astronomy

John Terrell's high school Physics teacher favored saying that "the obvious is seldom seen." Another way of saying much the same thing is to say "it's easy to take things for granted." Furthermore, familiarity may not necessarily breed contempt, but it can lead us to overlook the wisdom in the old saying that appearances can be deceiving. Rather than spurring us to take a closer look, we may not even see the value of doing so.

Consider, for example, a famous case from the history of astronomy. Recognition that we are not living strategically located at the center of the Universe is often credited to Nicholas Copernicus in the sixteenth century. In fact, however, as the astronomer Owen Gingerich wrote years ago, there were even those in ancient Greece who had already gone against appearances in favor of the seemingly counterfactual truth of a sun-centered (heliocentric) model of our solar system (Gingerich 1973). Furthermore, he made it clear that Copernicus had known their arguments, and had said so in his famous book *De revolutionibus orbium coelestium* (*On the Revolutions of the Heavenly Spheres*), first published shortly before his death in 1543.

It is often also added that the model of our solar system proposed by Copernicus as an alternative to conventional wisdom was far from accurate or convincing (Gingerich 2004). It was the seventeenth century astronomer Johannes Kepler who finally suspected that the orbits of the planets are not circular but instead elliptical. This realization led him to propose his now famous three laws of planetary motion. Yet, it was still not until Isaac Newton advanced his theory of universal gravitation in *Principia Mathematica* (1687) that the heliocentric view began to win out over the seemingly obvious older earth-centered (geocentric) model of the universe (Figure 0.3).

2. Salem Witch Trials

Despite the popular claim that we are superior to all other creatures on Earth, we have an obvious intellectual handicap. Try as we might, we cannot read minds. The only way we are able to tell what others are thinking and why—and not just others who are human, but others such as family pets, lions, tigers, and bears—is to watch and listen to what they do, say, or in some way vocalize (Terrell and Terrell 2020). Because of this genuine disability, it can be hard, if not always impossible, to figure out why others do, or did, what they are doing, or have done.

The case of the famous Salem witch trials of 1692–1693 is no exception. What happened then in and around Salem, Massachusetts, seems well documented historically, at least the basic details. Between February 29 1692 and May 1693, an astonishing number of people were accused

Figure 0.2. Claudius Ptolemy, a Greek mathematician, astronomer, and geographer who lived in Alexandria in the 2nd century A.D. His mathematical arguments were so influential that the ancient Earth-centered view of the universe is known today as the Ptolemaic system. Picture from a sixteenth century book frontispiece. Theodor de Bry, Public domain, via Wikimedia Commons.

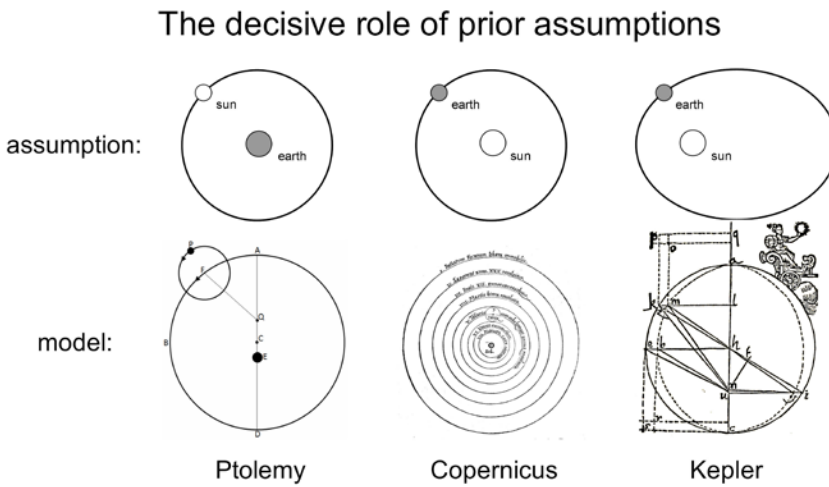

Figure 0.3. The decisive role of prior assumptions. What we take for granted can play a decisive role, for example, in how we see our place in the Universe. Bottom row, left: Muhammad, CC BY-SA 3.0, via Wikimedia Commons; middle: Public domain, Wikimedia Commons; right: Arthur Berry (1862-1929), Public domain, Wikimedia Commons. © John Edward Terrell

of witchcraft, and twenty were executed. The uproar began when two girls, one nine years old and the other eleven, started having "fits." A local doctor asserted that an evil hand was at work, not natural causes. Then, another young girl began to act similarly. When questioned by local magistrates, these girls blamed three women: a homeless beggar, a Caribbean slave, and an elderly and impoverished woman. Two of the women insisted they were innocent. The Caribbean woman, however, apparently confessed to having been recruited by the Devil. All three women were sent to jail.

Thereafter, others were also accused of evil deeds, mostly by a core group of girls and young women, although others, too, stepped forward to relate strange and mysterious events, some going back decades. On June 10, the first of those accused was found guilty and hanged as a witch on what was later known as Gallows Hill. Five more people were hanged in July, five in August, and eight in September. By the middle of May the following year when the crisis ended, nineteen people having been accused of signing the Devil's Book—thereby becoming "a detestable Witch"—had been hanged, one old man had been crushed to death with heavy stones, others had died in jail, and over two-hundred people had been accused of practicing the Devil's magic.

Ironically, although in previous witchcraft trials back in Europe confessing to doing the Devil's evil work had usually led to execution, this time around confession became a way to escape the gallows. Needless to say, this led to many confessions. Those, however, who defiantly proclaimed their innocence were more than likely found guilty, and some were hanged.

What was the nature of the incriminating evidence against so many? In the words of one recent commentator:

> Two particularly strong themes emerge from the trial documents and the observer and commentator accounts: spectral evidence and confessions. Much of the evidence presented, especially by the core group, relied on spectral affliction: the afflicted claimed to be tormented by the accused in spectral form. Naturally, this evidence could not be independently verified, but the court nevertheless accepted its legitimacy. (Grund 2020: 74)

What are we to make of what took place long ago at Salem in the Province of Massachusetts Bay (which was to become one of the first thirteen states in the United States of America)? Several probable explanations have been advanced over the years as to why what happened then occurred. These include everything from family feuds and local politics to mass hysteria. Regardless of the cause or causes and personal motives of

those involved, what stands out is that accusations of witchcraft and being in league with the Devil were taken seriously enough that dire consequences could most decidedly result.

The biologist and Nobel Laureate François Jacob titled his popular book on science and evolution *The Possible and The Actual* (1982). If you read this short and insightful book, you soon learn that the word "possible" in its title refers to how the human mind tries to decide what can or cannot be true in the real world. From this perspective, what remains unclear is whether people in Salem in 1692 genuinely believed in the potency of witchcraft and the Devil's magic to threaten the public order, or alternatively, were simply willing to invoke the alleged efficacy of both to advance their own private and political ends. Yet even if we could still ask them, how would we know for sure they were telling us the truth?

3. Conspiracy Theories

Not being able to read minds is not the only obvious intellectual handicap we all have as human beings. Try as we might, we also cannot be an eyewitness to all events and decisions affecting our lives and shaping our success as clever creatures.

Political events in recent years in the United States have made the phrase "conspiracy theory" a part of everyday life for many of us. The evident willingness on the part of some to believe rumors and accept hearsay evidence undoubtedly contributed to the mob attack on the United States Capitol Building in Washington, D.C., on January 6, 2021, although exactly why this shocking event happened will probably be one of history's enduring questions.

There is no need here to detail or resolve this recent chapter in the conduct of political life in the United States. The point to be made instead is this one: we may be smart in many ways, but telling the difference between what is real and what is only plausible is harder for all of us to do as observant and skillful beings than conventional wisdom and common sense may lead us to believe. To repeat: we cannot read minds, and we cannot witness firsthand all that we might need to know to always be able to tell fact from fiction, truth from falsehood, honest claims and downright lies.

4. How Not to Catch a Cold

Possibly the most widespread medical belief on earth is the idea that cold winds can make you sick. The common expression "catch a cold" immortalizes this idea, which is still believed by millions of people. Even those

who know about rhinoviruses and the like often argue that the viruses are always around, and a cold wind can definitely make them attack—especially if you go outside with wet hair, or without your coat.

The origins of this popular idea may lie in the basic fact that hypothermia (when your body loses heat faster than you produce it) and hyperthermia (when your body becomes dangerously overheated) can definitely be deadly without needing the assistance of a virus. However, the most that can be said is that although being cold and wet do not cause colds, both colder temperatures and drier air may independently or jointly contribute to the risk of human rhinovirus (HRV) infections, either by altering the survival and spread of viruses in the environment, or by affecting our susceptibility to infection (Ikäheimo et al. 2016).

A related Chinese belief holds that too much internal heat causes dryness and sores in the mouth and throat, plus weakness, skin problems, and susceptibility to disease. The cure is to eat cooling foods—green vegetables and herbs. These symptoms are classically those of the disease called scurvy (below, Conclusion), for which the cure of vitamin-rich foods is perfect. Although the ancient Chinese would not have known about Vitamin C, they saw that this change in diet was beneficial. This was not so, however, when they tried to treat scurvy with dried herbs, or use green vegetables to treat infectious diseases having scurvy-like symptoms (Anderson 1980, 1984, 2007, 2014).

5. Racism, Foreign Colonialism, and African Science

Many Europeans have long seen skin color as a sign of intelligence. The lighter you are in your appearance, the smarter, more progressive, and technologically more advanced you are, and vice versa. As the bioanthropologist Nina Jablonski has remarked: "Skin color was the keystone trait to which other physical, behavioral, and culture characteristics were linked" (Jablonski 2021: 437). While there have been many examples, Immanuel Kant's notorious remark about a black carpenter sums up such thinking even if Kant himself may not have wanted to be taken seriously: "but in short, this fellow was quite black from head to foot, a clear proof that what he said was stupid" (White 2013: 542).

By late medieval times in Europe, blackness was associated with evil or something inherently defective, undesirable, or mysterious while whiteness was taken as a sign of goodness, desirability, and honesty. Being dark-skinned easily invoked distrust and suspicions of cannibalism, devilishness, and inferiority. Like the phoenix bird, these attitudes have an enduring shelf-life even in our own times. The psychiatrist, political philosopher, and Marxist Frantz Fanon aptly captured in his writings the

prejudiced thinking and practice that empties the black body of all forms of humanity and sees blackness as a curse that blacks should desire to escape from (Fanon 2008).

Nowadays, such attitudes are still called racist, but it is not clear which gave birth to the other: racism or the fallacious equation linking black skin color with stupidity. Fanon has used an anecdote about when a white child pointed at him and declared "Look, a Negro!" to examine what lies behind this loaded racial slur. Borrowing Jean-Paul Sartre's "white gaze argument" (Stoneman 2023), he says racism brands black people in a way white people do not face, and stereotypes blacks as bad, mean, and ugly animals or cannibals (Fanon 2008).

In 2007, James D. Watson, the Chicago-born, 1953 DNA structure co-discoverer, and 1962 Nobel Prize for Medicine winner, told a British journalist that the prospect of Africa was inherently gloomy because "all our social policies are based on the fact that their intelligence is the same as ours—whereas all the testing says not really." Though he hoped that everyone is equal, "people who have to deal with black employees find this is not true." When asked how long it might take for the genes leading to differences in human intelligence to be identified, his answer: "15 years. However, he wonders if even 10 years will pass" (Hunt-Grubbe 2007).

Like Watson's notorious remarks, debate about black vs. white intelligence often focuses on biology and genetics, not on science and technology. When it comes to the latter, however, both words can have many meanings and interpretations. Seeing both only from a European point of view ignores the reality that people around the world may not only do things differently, but also have other purposes and goals in mind.

In Western nations, science is often performed in well-documented and controlled environments that are called *laboratories*. Historically, this has not always been the case, and the European "scientific method" is a relatively recent phenomenon (Mavhunga 2017). Furthermore, the documentation created as part of the "scientific method" ensures the reproducibility of results in accord with the "laws of science" as understood in Western epistemology.

It is not surprising, therefore, that when European travelers increasingly found themselves encountering Africans after 1492, they expected to find people doing things not only the way they were being done in Europe, but also making things the way they were making them there. Instead, although not widely known today, they found people in Africa were using what came across to these foreign travelers and traders as decidedly unfamiliar and strangely ritualized methods of transforming iron ore into useful metal. People there were also following recipes that apparently had not been written out to be passed down from one generation to the next.

In Western eyes, there seemed to be only two ways to explain such seemingly odd behavior. Africans were either not really doing science at all, but rather something akin to magic or voodoo. Or what they were doing so strangely was a degenerated version of what they had learned from an ancient and superior race that had long ago vanished from the face of the Earth (Bandama 2013). Either way, Europeans were associating African practices with skin color and seeing Africans as lesser beings than themselves.

The ironic fact is that as we now learn more and more about the history of science and technology, it is becoming clearer that Africa has been home, for instance, to remarkable technological diversity in metallurgical skills both in terms of methods and finished products. The unique downdraught iron furnace technology of the Mandara people of Cameroon (David et al. 1989) is an easily overlooked example. Like other bloomery technology (traditional smelting involving the melting of impurities leaving a sponge iron bloom), this is a solid-state reduction technology, but it uses an exceptionally long blowpipe (*tuyere*) inserted vertically deep into the furnace to serve the dual purpose of facilitating both slag formation as the ore melts and feeding oxygen to the furnace for combustion (Killick 2015).

The African diversity in metallurgical processes and products speaks to the little-known fact that Africans knew how to produce metals thousands of years before European colonialism. In fact, some parts of West and Central Africa had probably developed the world's first iron technology (Chirikure 2015). This happened without the apprenticeship stage which characterized the gradual Eurasian transition from simpler copper metallurgy to complex iron technology. Even during the later years of contact, many Eurasian explorers considered African metals to be much better in quality than metals in their places of origin.

The history of metallurgy in Africa and the innovations made there all involved stages now associated also with modern science (observation, question, experimentation, analysis, conclusions, and repeatability). Unlike in Europe, however, where keeping written records was standard and usual, in Africa, how to turn ore into useful metal was knowledge shared and passed down from one generation to another in non-written ways such as songs, practical observations, and accompanying rituals. And yet Western colonial officials derided African non-written achievements as backward and barbaric. Although this was done under the guise of civilizing "barbaric Africa," here is another example of how factual ignorance can trump historical truth. And thereby lead to feelings of racial superiority on the part of some that are actually the product of ignorance.

Figure 0.4. The down-draught iron smelting furnace near Kasungu, Malawi. The stack is made of baked clay taken from termite mounds and is sufficiently high to permit the furnace to attain smelting temperature by natural draft rather than with an air blast provided by pumping bellows. Source: David J. Killick, used with permission.

Rethinking Intelligence

These five examples, drawn both from history and what is happening today, support what social scientists and others have long been saying. People around the world often use remarkably different ways to explain things, events, and why people do what they do (Alcoff 2007; Mignolo 2007). Moreover, the notion that some people are inherently far superior to the usual run of the rest of us at learning, understanding, and making judgments or having opinions based on reason may sound right, but this definition of intelligence ignores an old and famously difficult question, as well as plentiful evidence to the contrary.

QUESTION: What is Truth?

According to one religious website on the internet: "truth is simply telling it like it is; it is the way things really are, and any other viewpoint is wrong. A foundational principle of philosophy is being able to discern

between truth and error, or as Thomas Aquinas observed, 'it is the task of the philosopher to make distinctions'" ("What is truth" 2023).

Even if most philosophers as a rule might be willing to say yes, they are seeking after the Truth, this claim about their calling is questionable. Philosophers are famous, after all, for arguing, often vehemently, about whether they or anyone else has ever found it. Therefore, claiming somebody is more intelligent than other people because they are better equipped biologically to know the truth when they come across it (e.g., H. J. Eysenck *in* Sternberg 1984: 290–91) sounds more like wishful thinking than a credible way to certify somebody as a genius.

EVIDENCE

Both individually and when we get together with others of our kind, we are all perfectly capable of believing, often quite strongly so, the most incredible things. Current research on what is perhaps all too easily called "artificial intelligence" (AI) generally takes it for granted that intelligence is about being able to successfully find the right answers to mathematical, verbal, and spatial puzzles (Biever 2023). But what does it mean to fail such tests of intelligence? What are the consequences? Why is Truth not only famous for being elusive, but also easy to overlook or take for granted? Why is it apparently so easy to ignore what would seem obvious, and instead believe with passionate conviction delusions, deliberate fictions, and downright lies?

Therefore, if intelligence is a measure of how successfully we can find "the cause of an event or situation or something that provides an excuse or explanation," then the latter half of this definition of the word reason makes sense—although equally good words to use would be rationalize and rationalization. Yet, as shown by the five examples just given, the notion that some of us are smart enough to see the truth that the rest of us are too stupid to grasp does not square with the history and current condition of our species. If this were not so, there would be no need to write this book.

In the following chapters, therefore, we survey briefly some of what has been said about human intelligence from historical, philosophical, psychological, and political points of view (Chapter 1). Then, four different ways of thinking about what it means to behave intelligently are summarized and compared (Chapter 2). Following this closer look at these popular theories, we describe (Chapter 3) a way to understand how all of us think about things and our own hopes and wants taking into account how inventive and creative—both intentionally. and sometimes quite unknowingly—all of us can be as we make our way through life. In the final chapter (Conclusion), we summarize what has been discussed, and offer several suggestions about how to make the most of the real talents all of us possess as bona fide human beings.

To not keep you in the dark, however, here are six of our observations about what has been called intelligence that we will be exploring with you in the following chapters.

Our Conclusions

The common thread running through many definitions of what the word intelligence means is the assumption that however this word is defined, it refers to something which is mostly biological that determines how *effectively* we are able to deal with the world around us (Nickerson 2020: 225). There are good reasons to challenge this conventional idea. It is more useful to think of intelligence as how *aware* we are of what is happening—and may happen down the road—outside the confines of our skulls.

1. Your Brain Is Not a Camera

It is estimated that the human brain contains ~86 billion neurons. This may sound like a lot, but given all that a brain does to keep us alive and well, and given the metabolic cost of using your brain, it is hardly surprising our memories—whatever these are taken to be as physical traces of our experiences as we live and breathe—are generally only as detailed as they need to be to see us through life from day to day (Girard, Jiang, and van Rossum 2023; Kristjánsson and Egeth 2019; Seger and Millar 2010). Moreover, it is not clear how often our memories, however impressionistic or richly inscribed they may be, are (or need to be) updated. There is more than a little truth, therefore, in the saying "if it looks like a duck, swims like a duck, and quacks like a duck, then it probably is a duck," even if what you are dealing with isn't a duck at all. These observations have profound implications for how accurate and trustworthy our understandings of the world are likely to be.

2. Your Brain is Not a Computer

The popularity nowadays of computers, cell phones, and the like encourages us to believe the brain is a kind of organically constructed computer (Cobb 2020; Cosmides and Tooby 1997). As Robert Epstein has observed: "Our shoddy thinking about the brain has deep historical roots, but the invention of computers in the 1940s got us especially confused. For more than half a century now, psychologists, linguists, neuroscientists and other experts on human behavior have been asserting that the human brain works like a computer." His frustration with those who think this way about thinking is obvious. Yes, human babies are born with certain ready-

made reactions to particular sorts of stimuli that are important for their survival.

> But here is what we are *not* born with: *information*, *data*, *rules*, *software*, *knowledge*, *lexicons*, *representations*, *algorithms*, *programs*, *models*, *memories*, *images*, *processors*, *subroutines*, *encoders*, *decoders*, *symbols*, or *buffers*—design elements that allow digital computers to behave somewhat intelligently. Not only are we not *born* with such things, we also don't *develop* them—ever. (Epstein 2016)

Needless to say, not everyone agrees with him (as many of the online comments added to his essay demonstrate). The point we want to make here, however, is that despite the popularity of saying our brains are like computers, it is fundamentally misleading to say, as so many nowadays do (Friston 2008, 2016; Friston et al. 2017), that our brains are constantly trying to *predict* what will happen next, and we are constantly *computing the probability* of this or that happening. Far better words to use are *expect* and having *expectations* derived simply from your prior experiences.

The saying "experience is the best teacher" has been around at least since the time of Julius Caesar and other famous Romans of long ago. We are confident someone suffering from PTSD (Post-traumatic stress disorder) might strongly disagree. Even so, our point is this one. The experiences we have in life lead us to have useful expectations about what may happen next. These foreshadowings of what may happen are not statistical, and they do not literally require us to do computations of any sort. Instead, we are skilled at finding *patterns* in the things and events "out there" in what many would call the "real world."

3. Intelligence is Not About Success

What we know about the world around us is mostly just "good enough" for us to get by from day to day. No wonder, therefore, that it can be hard work to memorize something as complex as Beethoven's *Moonlight Sonata in C-sharp minor*. No wonder, too, witnesses during jury trials may not necessarily get their facts right, and may instead testify to something they believe happened because in hindsight this is what they honestly think must have happened.

Robert Sternberg, who has written often about how important it is to capitalize on our strengths and compensate for, or correct, our weaknesses, has argued repeatedly that even if there is no agreement on what the word means, "intelligence involves formulating, striving for, and achieving, to the extent possible, a meaningful and coherent set of goals" (Sternberg 2020b: 680; also Sternberg 1999: 438). On the plus side of this

way of thinking about intelligence, he is one of many who have pointed out that successful intelligence involves a wider range of human abilities than those assessed by tests of intellectual or academic skills. Yet what is both fascinating and obvious about associating intelligence with success is that being a failure in life does not have to mean you are intellectually stupid. As Keith Stanovich and his colleagues have pointed out, "smart people do foolish things all the time" (Stanovich, Toplak, and West 2020: 1106).

On the other hand, although Stanovich and his colleagues have said that being rational is different from being intelligent, they define rationality in ways that would seem to contradict this claim. "For our beliefs to be rational they must correspond to the way the world is—they must be true (epistemic rationality). For our actions to be rational, they must be the best means toward our goals—they must be the best things to do (instrumental rationality)" (2020: 1109).

Therefore, even if intelligence and rationality are somehow different, we find it hard not to see them as just two sides of the same coin. In this book, we argue instead that the challenge of being human is not how successful or seemingly rational you are, but how willing and able you are to be aware of what is happening around you.

4. Your Brain Is a Pattern Recognition Device

A useful way to think about what it means to say "I think" is to describe what is happening inside your skull begins as *pattern recognition* (Kahneman and Klein 2009; Pi et al. 2008). As Herbert Simon (see Chapter 2) wrote decades ago about the skillfulness of a grandmaster at the game of chess:

> The information associated with familiar patterns may include knowledge about what to do when the pattern is encountered. Thus the experienced chess player who recognizes the feature called an *open file* thinks immediately of the open file possibility of moving a rook to that file. The move may or may not be the best one, but it is one that should be considered whenever an open file is present. The expert recognizes not only the situation in which he finds himself, but also what action might be appropriate for dealing with it. (Simon 1996: 86)

In the above excerpt, Simon wrote about the phenomenon, the kind of thinking, commonly called intuition, and how he felt it could be readily explained: "most intuitive leaps are acts of recognition." Nobody needs to be as skillful at a game called chess to know firsthand that doing something "by intuition" is what all of us often do. The spooky part, of course, is this means you often don't have to realize what you are doing to get

it done. This is, of course, a godsend when you are on a bicycle without training wheels.

It is also useful to think about the physical traces of our life experiences filed away in the neurons of that large mass of tissue on top of our shoulders—in this book, we will be referring to these stored experiences as memory traces—in two alternative ways. These traces may be 2- and 3-dimensional spatial mappings of people, places, and the like (we will be calling these traces *situational mappings*). They can also be time traces (*sequential mappings*).

An example of the first kind of memory tracing is learning—and hopefully being able to recall—the right password or pin number that will get you into your computer, cell phone, or online bank account. Another is being able to remember where you left the book you were reading before you started cooking dinner. Examples of the second sort would be what you know might happen if you forget your wedding anniversary, and why you expect a goodnight kiss from your life's partner lying next to you in bed. How well we can remember the details of either sort of neurological mapping will depend on how detailed are the memory traces used, and how altered these traces have become when we have been thinking about them in the past (Cosandi 2016: 54–61).

5. Paying Attention Is Harder than We Think

Not only is the human brain not a camera, it does not work like one. The camera in your cell phone can take richly detailed snapshots of what it is "seeing" in such rapid succession that what it is "capturing" may be turned into videos you can post on social media and replayed whenever you want to do so. In contrast, the retina inside each of your eyeballs has not been designed by evolution (or by God) to accomplish such recording feats. Far from being a biologically constructed photosensitive plate uniformly covered with tiny light sensitive cells, each of which can measure the amount of light falling on it, our retinas are designed to help us pay attention to what is changing in the world around us (Binda and Morrone 2018; Chica et al. 2013). Why? So we can decide—mostly without even having to think about it—whether we need to do something to respond to what we are sensing. The goal, therefore, is not an accurate true-to-life picture or video. Instead, what is sought is a useful one capturing only the details in what we are aware of that our prior experiences have taught us can be ones worth paying attention to, perhaps sometimes even for life-or-death reasons.

David Eagleman, who has written often about neuroscience, has described what the brain is up to when it is attending to the world in this way: "brains reach out and actively *extract* the type of information they

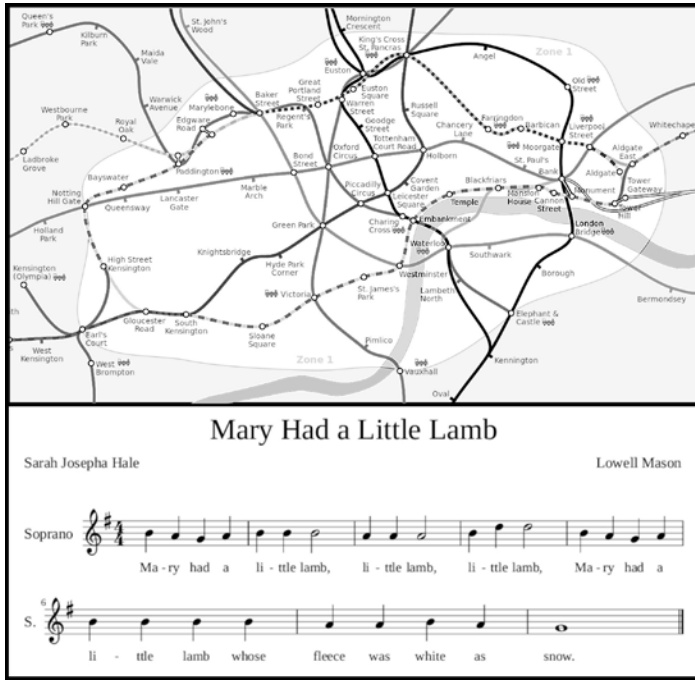

Figure 0.5. (top) Subway map—an example of *situational mapping*. London Underground geographic map, CC 3.0, via Wikimedia Commons. (bottom) Music notation—an example of *sequential mapping*—for "Mary Had a Little Lamb" based on a poem by Sarah Josepha Hale, 1823. Sarah Josepha Hale & Lowell Mason, Public domain, via Wikimedia Commons.

need. The brain does not need to see everything at once . . . it does not need to store everything internally; it only needs to know where to go to find the information." There are surely times when this may be so, but as a general rule, we think this is an overstatement.

After making this claim, Eagleman adds: "As your eyes interrogate the world, they are like agents on a mission, optimizing their strategy for the data" (Eagleman 2011: 30). Moreover, he says, we are all basically unaware that our eyes are thus engaged in such an active, intentional, and secretly deliberate quest for understanding. Again, we think this way of seeing what a brain is normally doing goes too far. Saying, as he does, that vision is active, not passive, overlooks that much of what we take in about the world and then may go on to do is likely to be more habitual than intentional.

Consequently, the downside of having two biologically constructed "environmental sensors" like our eyes located on the sides of your nose is

that anything coming across as boring may not be seen as memorable, and may not even be noticed (Liversedge and Findlay 2000). The expressions "been there, done that" and "same old, same old" often apply even if they don't come across as appropriate scientific jargon. What Eagleman has said in a more recent book suggests he has now changed his mind about how actively the brain deliberately needs to weigh whether it needs to go out of its way to find out what is happening around it (Eagleman 2020: 163–73).

6. We Are All More Delusional Than We Believe

If the word *delusional* is taken to mean believing things that are not true, then the challenge of being human is not just seeing things and events for what they are rather than what we believe them to be. It is also easy to be delusional by wrongly assuming what we are experiencing in the here and now is the same as what we have encountered before. There are many familiar expressions for being delusional in this way: "seen one, seen them all," "jumping to conclusions," "been there, done that," and even "can't see the forest for the trees" on the belief you already know what is important and what isn't.

Studying perceptual awareness has long been a major focus in psychology, neuroscience, and nowadays artificial intelligence (AI), too. Despite what common sense tells us, we are never directly in touch with the world around us, but only through our recollections—our memory traces, however recent or longstanding—of what our senses have been picking up, and what our minds have done with these recollections (Seth 2021; Seth and Bayne 2022). As David Eagleman has written, conscious awareness of our surroundings occurs when sensory inputs violate learned expectations. When this hasn't happened, awareness "is not needed because the brain is doing its job well" (Eagleman 2011: 50).

Consequently, deliberately paying attention to what is happening around us can be harder than we think. To paraphrase a well-known saying, if it ain't broke, don't fix it. Like it or not, instead of paying attention to what we are seeing, it is notoriously easy to jump to conclusions that seem to make sense but aren't picking up on what is really "out there" (Figure 0.6).

The reverse—being truly aware of what is happening—can also have its limitations. As we will discuss in Chapter 3, how we deal with the world is a dynamic interplay between *awareness*, *recognition*, and *imagination*. The downside of this constant trialogue, however, can include not "seeing" something happening right before our eyes because we are so preoccupied with attending to something else, lost in our own thoughts, and the like.

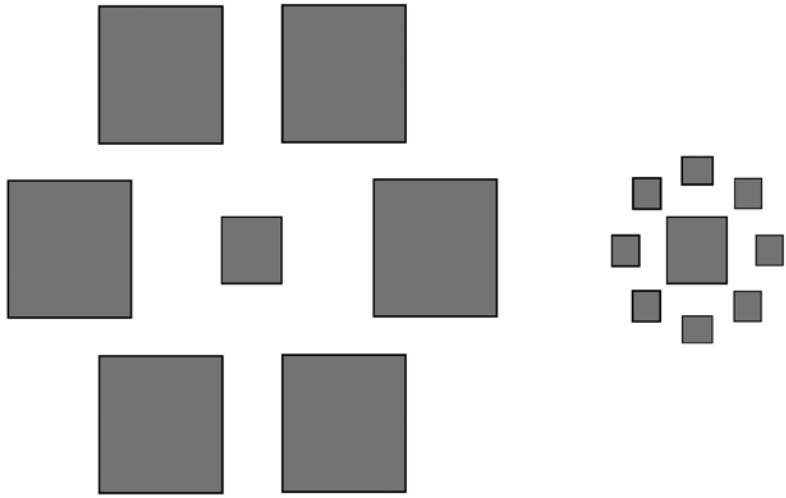

Figure 0.6. Can you tell whether the central square on the right is bigger than the one on the left? Hint: appearances can be deceiving. © John Edward Terrell

Why? Because the human brain can only do so much at any one time. Therefore, what it takes to make us "open our eyes" to what is really going may be something we have only limited control over, and something we should not simply take for granted.

Another way of saying what we have just said is that all of us experience the world filtered through our memories of what we have experienced previously. As we have already said and will discuss again in Chapter 3, our memories of things and events are just our impressions of the world around us of greater or lesser richness. Moreover, to add to our potential woes, our previous impressions—our memory traces—perhaps more likely than not—may have been reworked, perhaps even "corrupted" into reformed memories, fantasies, and hallucinations by what our minds have been doing with them since they were originally formed (Lisman and Sternberg 2013). How delusional they have become may depend on how far they depart from what got them memorized in the first place.

Intelligence Redefined

As human beings, we may see ourselves as remarkably intelligent creatures. All human thought, however, is prone to error. Consequently, what can we do to keep human error reasonably in check? As we have already

said, the common thread of many conventional definitions of intelligence is the claim that what is critical is how effectively people deal with the world around them. A more realistic way, however, of pinning down what this word means is the observation that we have three different ways of engaging with what is going on outside the confines of our own skulls: *mechanical awareness*, *functional awareness*, and *relational awareness*.

In the following chapters, we will spell out why this understanding of what the word intelligence means not only works better than what this word is often taken to mean, but is also a more useful way to think about what makes us who we are. Knowing this can also make it harder for us to be hacked—to use a word popular nowadays when so many of us are taking to the internet and social media to find things out and communicate with one another. Knowing our intellectual weaknesses as well as our strengths can make it harder for others to manipulate us and control our lives.

Table 0.1. Intelligence redefined as 3 levels of awareness. © John Edward Terrell.

INTELLIGENCE LEVEL	A	B	C
mechanical awareness	experience	recognition	imagination
functional awareness	observe	assume	decide
relational awareness	survey	theory	model

Key Points

1. Although there is little agreement today on what it means to be intelligent, this word is widely believed to be about something real, mostly biological, and important.
2. The common thread running through many definitions of what this word means is the assumption that, however defined, it refers to how effectively we can deal with the world around us.
3. There are good reasons to challenge this conventional belief. It is more useful to think of intelligence as how aware we are of what is happening outside the confines of our skulls.