

Decoding Deception

DECODING DECEPTION

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INTRODUCTION

KAINAN JARRETTE AND DIANA DALY

WHERE WE ARE

The current media landscape is rocky terrain at best. Traditional media outlets continue to be replaced by online social platforms and their networks of producers. The increasing capabilities of artificial intelligence (AI) make creating misinformation as simple as typing a prompt, and that misinformation is spread at lightning speed through social media. Meanwhile, institutional trust has been eroded to its [lowest point](#)¹ in nearly 70 years, and facts matter so little that “post-truth” is the moniker of the era. People are primed for being deceived, and deception has never been easier.



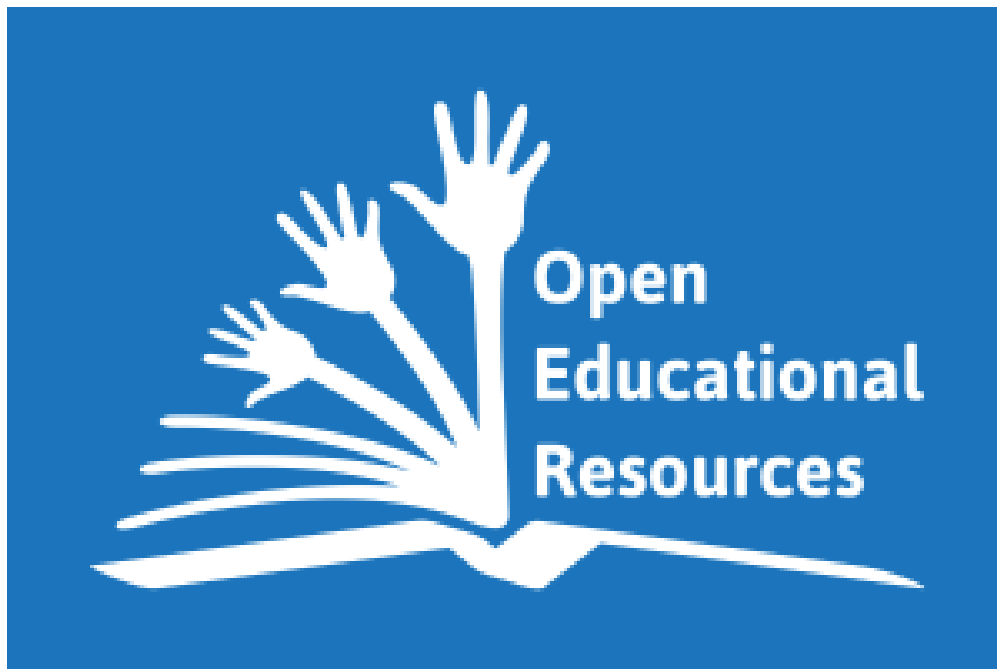
When we say **deception**, we mean when content obscures its origin, distorts meaning, or misrepresents reality, often to exploit cognitive biases or provoke emotional responses. Fortunately, that deception can be decoded by understanding its flaws through the lens of critical thinking. That’s what this book aims to teach you how to do.

ABOUT THIS BOOK

Donor Acknowledgment

Decoding Deception was made possible by a generous, anonymous donor whose commitment to helping fight psychological manipulation was deeply personal. As a teenager the donor learned their family members who had remained in Europe had all perished in the Holocaust. This motivated him to study the speeches and propaganda techniques used by the Nazis and other authoritarian leaders, and gave the donor and his spouse a clear and sobering understanding of how psychological manipulation and disinformation can lead to real-world violence. They recognized the patterns, the rhetoric, and the consequences—not in theory, but in family history. The donor was motivated not only by the rise of deceptive media tactics but by how easily those around them could be persuaded by lies. Their support allowed us to create a resource that is experimental, creative, and focused on helping people recognize and resist the many forms of manipulative communication we all encounter.

This Book is an Open Educational Resource.



Consistent with the authors' commitment to having knowledge be accessible wherever possible, *Decoding Deception* is an **Open Educational Resource**, or **OER**. As [defined](#)² by David Wiley, the concept of an OER can be broken into “5 R’s”:

1. **Retain** – *The right to make, own, and control copies of the content (e.g., download, duplicate, store, and manage)*
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This open license means that anyone with internet access can read, view, and interact with the *Decoding Deception* material at <https://opentextbooks.library.arizona.edu/decodingdeception/>. Further, anyone (including course instructors and educators) can adopt and adapt any of the *Decoding Deception* material for free, as long as they attribute the content to the original authors.

Share Your Experience!

We're always looking for feedback on this book, including how it's being used, what's working, and what isn't. We encourage all readers to take the survey below to share their experience with the book!



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How This Book is Structured

As of the [current version](#), this book is divided into two main parts:

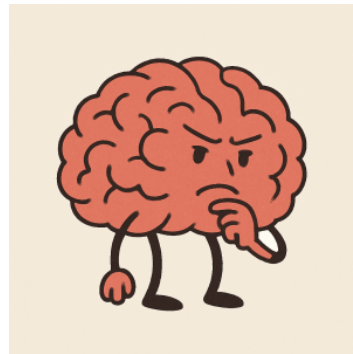
Critical Thinking



Critical thinking skills are arguably one of the best tools for resisting the influence of misinformation.

This section introduces (or refreshes) readers on what critical thinking is, why it's important, and how to use it, through chapters on [Epistemology](#), [Cognitive Bias](#), [Logic and Intuition](#), [Media Literacy](#), and [AI Literacy](#).

Logical Fallacies



The persuasiveness of misinformation often relies in part on the use of logical fallacies.

This section introduces and defines the concept of logical fallacies, and explores common fallacies: [Red Herrings](#), [Straw Man Arguments](#), [Ad Hominem Attacks](#), [False Equivalences](#), [Slippery Slope Arguments](#), [False](#)

[Dilemmas](#), [Appeals to Authority](#), and [Hasty Generalizations](#).

Readers will learn what errors in reasoning the fallacies contain, how to spot them (in others and themselves), and how to protect against them.

Gamification of Useful Information



For readers or instructors who want a quicker and more interactive jump into logical fallacies, we also have our [Liar's Landscape](#) game that covers the first four fallacies mentioned above!

How This Book Uses H5P Content

Most chapters of this book contain H5P content which is meant to help readers better retain and reflect on what they've learned. This content can also be used by instructors to gauge student progress or as included assignments as part of a course.

Quizzes and Knowledge Checks

These are sets of close-ended questions, usually meant to test specific knowledge. Types of questions include:

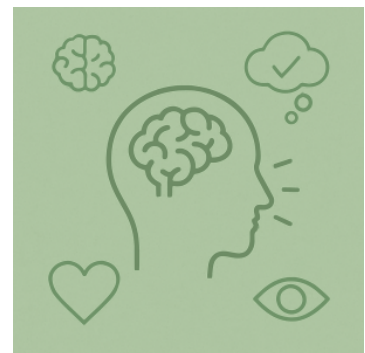
- True or False
- Multiple Choice
- Drag and Drop
- Fill in the Blank



Short Essay and Documentation

These are open-ended questions, usually meant to make readers reflect on the concepts and how they may apply to their own lives.

These all use the H5P content “Documentation Tool,” which allows readers to export their answers as a PDF (which can then be sent or uploaded to a course, instructor, etc).



How this Book Tracks Changes

Any future changes to this book will be tracked in a [Version Update History](#). That page explains in more detail our revision philosophy, but essentially:

- We **won't** be *removing* parts, chapters, H5P content, or glossary terms.
- We **will** (potentially) be *adding or expanding* parts, chapters, H5P content, and glossary terms.

Announcements

We also have an [Announcements](#) page at the beginning of this book where you can stay up to date about updates, research opportunities, new resources, and more!

A Note on The Images Used in this Book

Unless where otherwise noted, all the images in this book were created by ChatGPT in collaboration with the authors. All images are being put up under a Creative Commons Zero ([CC0](#)) license, meaning they are public domain and so can be used and adapted by anyone for free.

Read more about our use of AI for this book [here](#).

REFERENCES

¹ Pew Research Center. (2024, June 24). *Public trust in government: 1958-2024*. <https://www.pewresearch.org/politics/2024/06/24/public-trust-in-government-1958-2024/>

² Wiley, D. (n.d.). *Defining the “open” in open content and open educational resources*. OpenContent.org. <https://opencontent.org/definition>

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ANNOUNCEMENTS

Check here for the latest announcements about *Decoding Deception*, including version updates, research opportunities, and more!



ANNOUNCEMENTS – 08/19/25

All images in the book (including H5P content) have been updated with alternate text descriptions.

ANNOUNCEMENTS – 08/18/25

Image alt text descriptions were found missing due to an internal issue, and they are being added at this time. Those intending to adapt or export this resource are advised to wait until the next announcement verifying all images have been described.

ANNOUNCEMENTS – 08/13/25

The textbook *Decoding Deception* will be officially released on 08/14/25!

After that, we will occasionally update this textbook, announcing changes here whenever possible. Truth changes over time, as do licenses and cultures.

If you prefer a resource that will not change, you can [clone](#) or [download](#) this one, or find other free resources in the Open Textbook Library.

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INTRODUCTION TO CRITICAL THINKING

KAINAN JARRETTE AND DIANA DALY

WHAT IS CRITICAL THINKING?

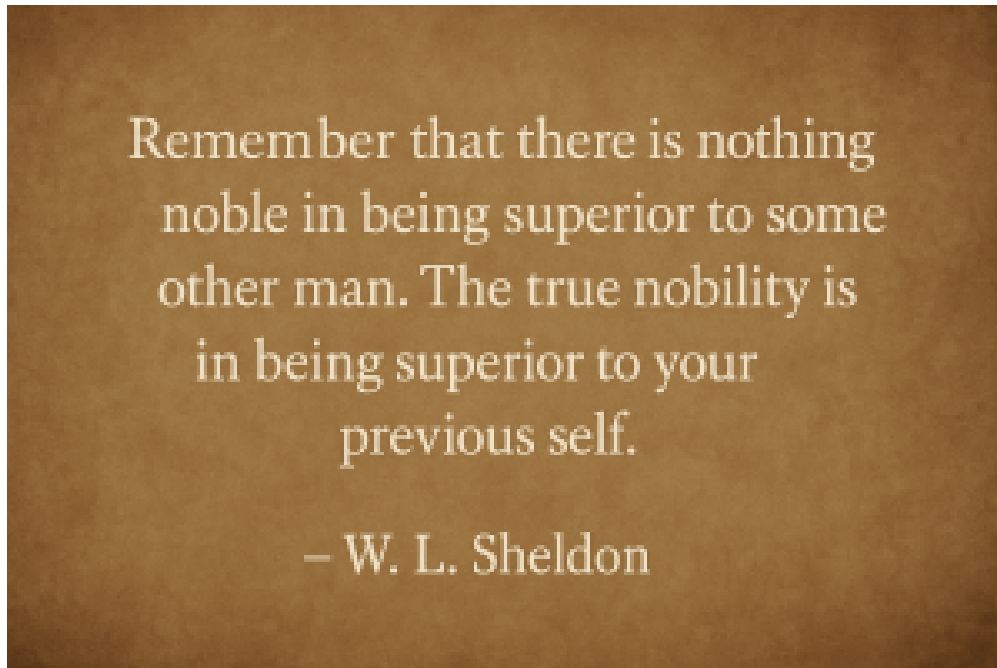
Critical thinking is the practice of carefully analyzing information, beliefs, and arguments in order to make well-reasoned decisions, form justified beliefs, and avoid being misled. It involves asking thoughtful questions, recognizing fallacies or biases, and being open to revising your views when evidence demands it.

There are some mental tools that make up the building blocks of critical thinking, which we'll cover in the following chapters:

1. [Epistemology](#) – *How do we know what we know?*
2. [Cognitive Bias](#) – *How does the brain trick itself?*
3. [Logic and Intuition](#) – *How do we reason clearly and know when analysis is more useful than our gut?*
4. [Media Literacy](#) – *How do we apply all of the above to prevent being manipulated by media in our daily lives?*
5. [AI Literacy](#) – *How can critical thinking be applied to the presence and use of AI?*



What Critical Thinking Is Not



From "What to Believe: An Ethical Creed," Ethical Addresses (Apr 1897)

Critical thinking is meant as a tool, not as an identity. Humility and curiosity are vital to critical thinking, which means:

- Critical thinking **is not** just being "smart."
- Critical thinking **is not** being contrarian.
- Critical thinking **is not** just aimlessly criticizing things.
- Critical thinking **is not** an excuse to be cynical, snarky, or dismissive.
- Critical thinking **is not** a guarantee of always being right.
- Critical thinking **is not** just saying "I'm a critical thinker."

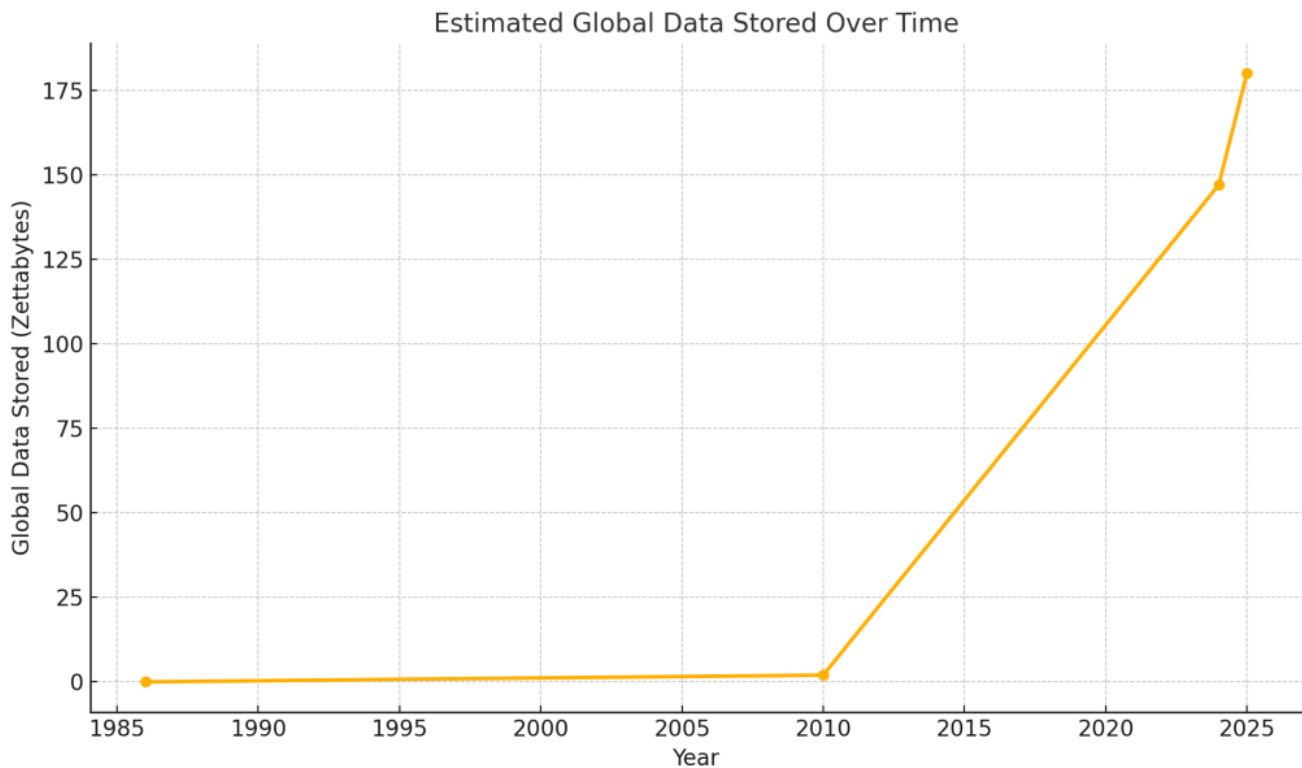
As we'll cover more in upcoming chapters, there's a growing weaponization of many of these terms and ideas. But these tools are not about "winning" or "being better" than anyone. Bullying **is not** compatible with good critical thinking.

WHY CRITICAL THINKING MATTERS



We live in an era of information abundance. Not only has it never been easier to access or share information, but the rate and speed with which that happens is unprecedented in human history. Look at the following progression:

- From 1986 through 2007 it's estimated that about [295 exabytes](#)¹ (or roughly 295 *billion* gigabytes) of data were stored globally.
- By 2010 that had increased to over two zettabytes of global data (that's two *thousand* exabytes, or two *trillion* gigabytes).
- In 2024 that had increased to 147 zettabytes (so 147 *trillion* gigabytes).
- By the end of 2025 it's projected to be over [180 zettabytes](#)² and climbing.



The exponential growth of global digital data

Unfortunately, this information abundance also means there's an abundance of **misinformation**. Misinformation is false, inaccurate, or misleading information and it's *everywhere*.

Misinformation, Disinformation, and the Name Game

In other classes, books, and articles you read, you may see both the term “misinformation” and also the term “disinformation.” Many times it feels like they’re used interchangeably, but technically there’s a distinction: intent.

Misinformation is false, misleading, or inaccurate information... but not necessarily with an intention to deceive.

Disinformation is false, misleading, or inaccurate information... but with a specific intent to deceive.

The problem is that it's often very hard to actually know somebody's intent. In fact, the same piece of information (meaning its content) can be considered both misinformation or disinformation simply depending on who shared or created it for what reason.

Given all that, this book will generally be sticking to the term “misinformation” for sake of ease.

Misinformation is dangerous because it can affect not only our general view of the world, but the

very way in which we [think](#)³. Since thinking is always (on some level) the precursor to action, that means misinformation interferes with things like:

- What and how we consume
- How we vote
- How we interact with others
- How we empathize

Which are all activities that are both fundamental for a well-functioning society and fundamental for being a good citizen, communicator, friend, parent, and so on. The tools of critical thinking provide you with a much better defense against misinformation and all the negative consequences it can bring.

VOCABULARY

critical thinking

the practice of carefully analyzing information, beliefs, and arguments in order to make well-reasoned decisions, form justified beliefs, and avoid being misled

misinformation

false, inaccurate, or misleading information

REFERENCES

¹ Hilbert, M., & López, P. (2011). The world's technological capacity to store, communicate, and compute information. *Science*, 332(6025), 60–65. <https://doi.org/10.1126/science.1200970>

² Backlinko. (2023, October 24). *How much data is generated per day in 2024?* Exploding Topics. <https://explodingtopics.com/blog/data-generated-per-day>

³ Loftus, E. (n.d.). *Misinformation effect*. EBSCO Research Starters. <https://www.ebsco.com/research-starters/social-sciences-and-humanities/misinformation-effect>

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EPISTEMOLOGY

KAINAN JARRETTE AND DIANA DALY

WHAT IS EPISTEMOLOGY?

Start Here!



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<https://opentextbooks.library.arizona.edu/decodingdeception/?p=58#h5p-8>

Simply put, **epistemology** is the study of how we know what we know. On a deeper level, epistemology looks to help identify the difference between a **belief** and **knowledge**.

Belief vs Opinion

In the context of this book, the term “belief” is not interchangeable with the term “opinion.” An opinion is a feeling about something **subjective**. This could be your feelings about a movie or your feelings about if something is moral. The important point is that these things aren’t **falsifiable** — no amount of investigation of the world can tell you if an opinion is factually right or wrong, because those terms simply don’t apply. For instance, if I think strawberries taste bad and you think they taste good, neither of us is factually wrong (unless one of us was knowingly lying about our preference).

In contrast, a belief relates to something **objective**. These are statements or ideas that *are* falsifiable, meaning you can investigate the world to help identify how true or false they are. For instance, if I think strawberries grow on trees and you think strawberries grow on vines from the ground, one of us is factually wrong (it's me!). We can figure out who's wrong by simply investigating how strawberries grow in the world, and consistently seeing that they grow on vines from the ground and never on trees.

The easiest way to begin to identify if something is a belief or knowledge is to ask:

**WHY DO YOU
BELIEVE
THAT?**

Let's say you ask someone if crime is getting better or worse in their city, and they answer "I believe it's getting better." You then ask that person *why* they believe that.

A *belief response* would sound like: "Because just look around, you can see it's getting better."

A *knowledge response* would sound like: "Because the most recent crime statistics released by local law enforcement agencies shows there has been a drop in the rate of most crime over the past year."

Which of the two responses sounds most convincing to you?

REALITY, EVIDENCE, AND REASONING

On its own, belief is something a person holds to be true without necessarily having rational justification for it. Knowledge, in contrast, is a *justified* belief. By "justified" we mean that the belief has the following traits:

01. It corresponds with reality.

In other words, the belief accurately reflects or represents the way things actually are.

An obvious example would be: if you believe it's raining outside, but it's actually bright and sunny out, your belief does *not* correspond with reality.

But this can also take more pernicious forms, such as holding a belief that the Earth is flat or that the moon landing was a hoax. It's not simply that these things are controversial, it's that they're *demonstrably* false – if you travel 35,000 feet above the Earth's surface, you'll see the curvature; there are thousands of photos, videos, testimonials, and living astronauts of the time who can attest to the reality of the moon landing. Which leads nicely into the next trait...

02. It has strong evidence and reasoning behind it.

Technically speaking, **evidence** is just information offered to support or refute a belief. *Strong* evidence is evidence that:

- Can be observed
- Can be measured
- Can be independently verified
- Cannot be accounted for by other explanations



What We Mean When We Say “Observed.”



When we say strong evidence “can be observed,” we don’t mean only *personally* observed.

Reliable observations can come from others. This is especially true when those observations are numerous, consistent, and independently documented. For example, it’s unlikely anyone reading this book is old enough to have *personally* witnessed historical events like the Holocaust, but we consider them strongly supported by evidence because of the combination of many trustworthy sources: survivor testimony, photographs, documents, physical sites, and film footage, all of which can be independently verified and cross-checked.

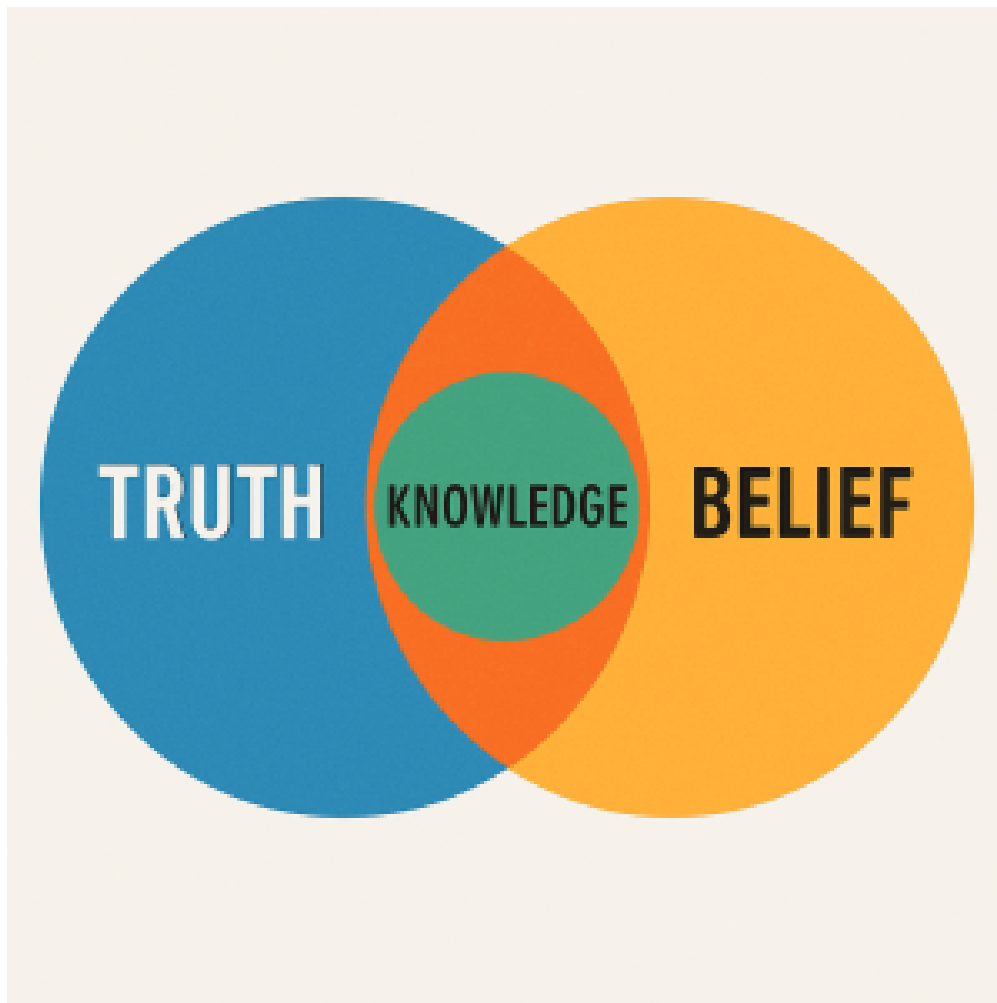
For example: Let’s say you want to investigate the belief of “after it rains, the ground is wet.” Strong evidence would be:

- *Observing* the ground was indeed wet after a storm (and having your neighbors observe the same)
- *Measuring* the amount of water on the ground before and after it rains
- Having somebody else *verify* your findings
- Ruling out other possible *alternative explanations* (such as a neighbor’s sprinkler system going off)

Reasoning is the process by which we analyze and evaluate evidence and arguments. Good reasoning typically involves applying logic, as well as searching for potential flaws, such as biases and logical fallacies.

If a belief is based on *good reasoning* of *strong evidence* and seems to *correspond to reality*, we call that belief *justified* because it has a much higher probability of *being true*.

Essentially, knowledge is where truth and belief intersect.



Let's Check!



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So, if you determine an idea is a belief and not knowledge, is it still valuable? Yes! We learn a lot about the world by understanding what people believe and why. Beliefs are the catalysts of major events, and they drive much of human behavior, both individually and collectively. Beliefs can also be respected without being shared by all who consider them.

That said, not all beliefs are equally reliable when it comes to making decisions, especially when

those decisions affect others. While beliefs matter, they aren't a substitute for evidence-based knowledge when the stakes are high. Valuing beliefs doesn't mean treating them all as equally true.

THE BURDEN OF PROOF

Another important concept when it comes to knowledge and knowledge acquisition is the **burden of proof**. This is the idea that it's the responsibility of the person *making* a claim to provide evidence for it, not the other way around.

To understand why the burden shifts in this direction, let's use an example:

Let's pretend I come up to you and say, "Dragons are real! I know they're real!"

Your logical next step might be to ask something like, "why do you believe that? What evidence do you have that dragons are real?" This would be you asserting (correctly) that the burden of proof should be on me. I'm the one claiming dragons exist, so I should be the one to back that claim up with evidence.

But pretend that my response to you is then, "I just do! It's on *you* to prove me wrong."

Outside of this just generally being an annoying way for me to respond, how would you possibly go about proving me wrong? Would you take your entire life to scour every inch of the globe so that you could confidently say "I've looked everywhere and I can't find one"? And even if you did, what would prevent me from then claiming "well, dragons are invisible, so of course you can't see them"? That pattern could just continue on forever.

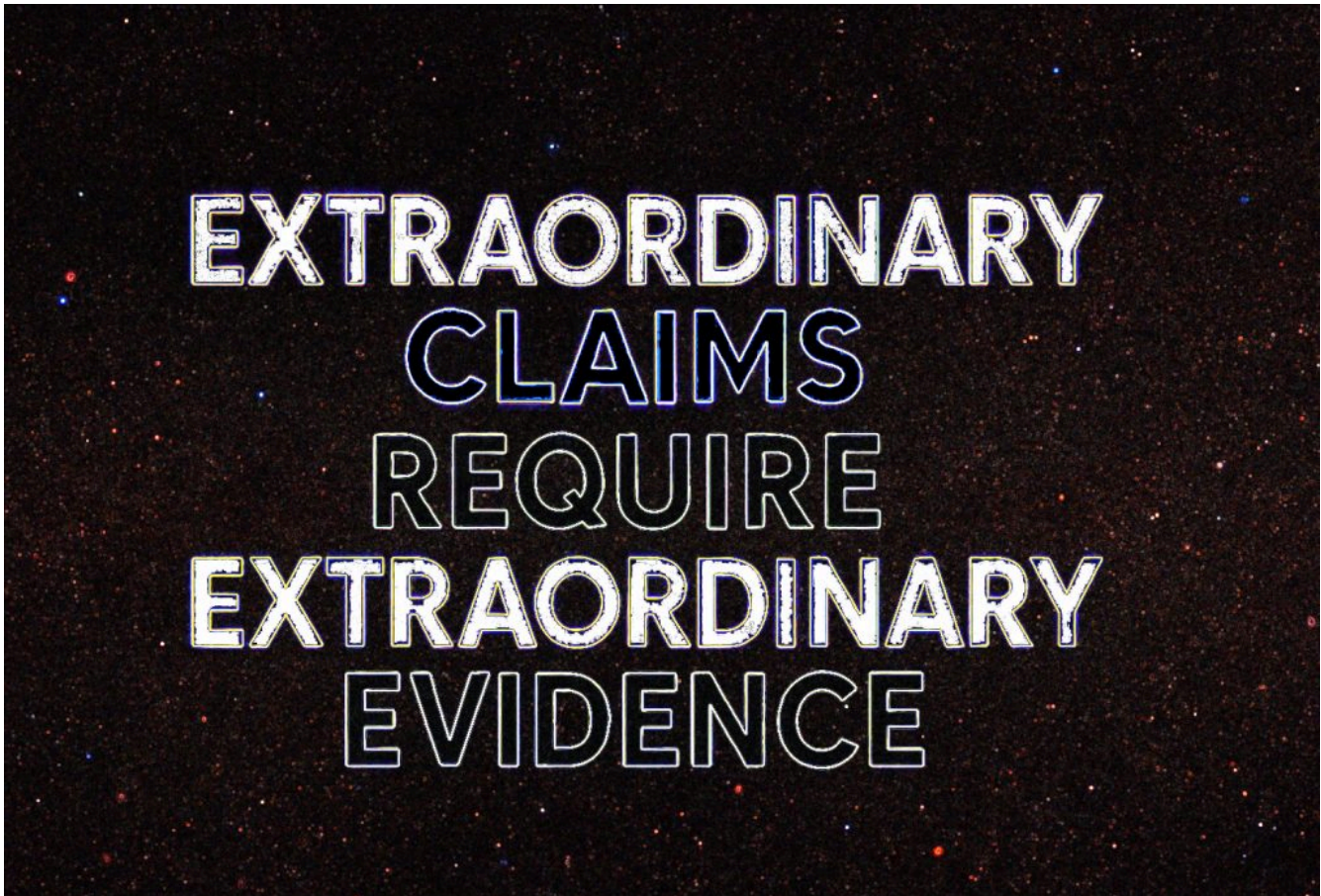


This is also a rhetorical strategy called **burden shifting** – improperly shifting the burden of

proof to distract from a lack of evidence for a claim — and it’s frequently used in misinformation materials or by people spreading disinformation. Whenever you hear someone say anything like “prove me wrong,” it’s a good bet you’re dealing with a claim with no evidence to back it up.

Extraordinary Claims

In the late 1970s, science communicator Carl Sagan popularized a notion that went back hundreds of years:



What counts as “extraordinary” will always involve some ambiguity, but the general idea is that different levels of claims require different levels of evidence. The more unlikely a claim is (given our current knowledge), the more evidence is needed before accepting that claim.

Here’s an example:

Pretend your friend told you “I went to the mall last week.” You likely wouldn’t require any evidence from your friend, because there’s nothing extraordinary about the claim. People go to malls all the time, it’s not difficult to go to malls, and so on. Your friend could technically be lying, but you’d probably just take their word for it.

Now pretend that friend told you “I went to the Grand Canyon last week.” That’s a slightly bigger claim than going to the mall, but it’s still perfectly feasible. You might ask to see some photos, but it probably wouldn’t take much to convince you of the claim.

Now, finally, pretend that friend told you “I went to the moon last week.” This person may be who you’re closest with in life, but you would still likely need a *lot* of evidence to believe them. Even some photos would be unlikely to do the job, as you would rightly assume that it was more likely your friend made fake photos than that they actually went to the moon.



This is, more or less, what we’re talking about with “extraordinary claims require extraordinary evidence.” If someone is making a highly improbable claim, you should require a large amount of strong evidence from them to support it.

WHY IS EPISTEMOLOGY IMPORTANT?

Epistemology helps our view of the world match closer to reality. When it comes to resisting **misinformation**, this becomes especially important. A piece of media content might *feel* true (for a variety of reasons we’ll cover in the following chapters), but that’s no guarantee of it actually *being* true.

It also helps you think about the strength of evidence that people provide for claims and beliefs, how well (or how poorly) it supports them, and whose job it is to provide that evidence in the first place.

Ultimately, valuing epistemology helps you prioritize doing a little bit of investigation to verify the truth of the content you engage with. In essence, it helps you put a critical eye on your own beliefs, as well as the beliefs of others, so you can better navigate the world.

TL;DR

IT'S IMPORTANT
TO THINK ABOUT
WHY YOU BELIEVE
WHAT YOU BELIEVE

A BELIEF BECOMES
KNOWLEDGE
WHEN IT'S JUSTIFIED
BY STRONG EVIDENCE

THE BURDEN OF PROOF IS ON WHOEVER IS MAKING THE CLAIM

CHAPTER QUIZ AND SHORT ESSAY

Knowledge Check: Epistemology



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Short Essay: Epistemology



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VOCABULARY

belief

something a person holds to be true without necessarily having rational justification for it

burden of proof

the idea that it's the responsibility of the person making a claim to provide evidence for it

burden shifting

improperly shifting the burden of proof to distract from a lack of evidence for a claim

epistemology

the study of how we know what we know

evidence

information offered to support or refute a belief

falsifiable

able to potentially be proven wrong through observation and experimentation

knowledge

something we hold to be true that's supported by verifiable evidence and reasoning; justified belief

objective

something about the world that can be observed and tested independent of personal feelings

reasoning

the process by which we analyze and evaluate evidence and arguments

subjective

based on personal feeling and preference; cannot be "true" or "false"

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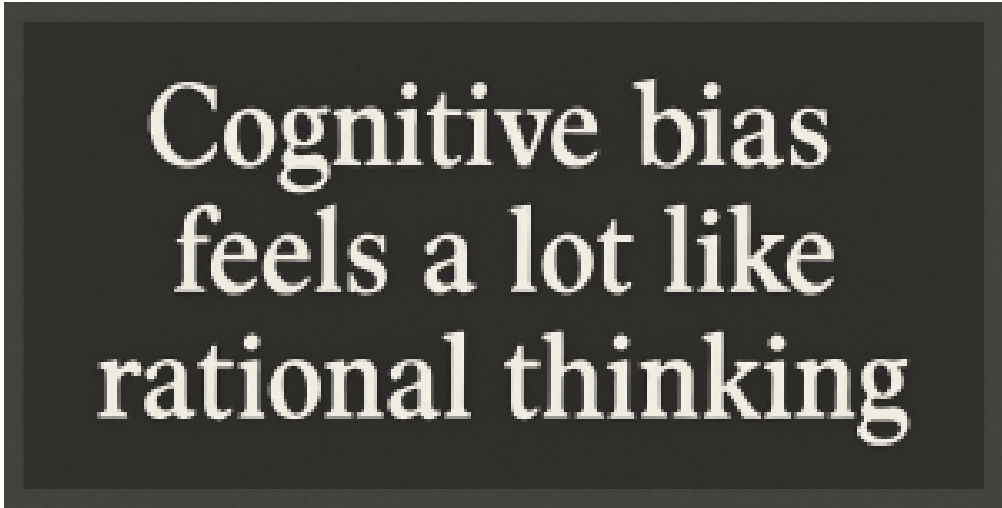
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COGNITIVE BIAS

KAINAN JARRETTE AND DIANA DALY

WHAT IS COGNITIVE BIAS?

Cognitive bias is the systematic ways our minds can lead us to misjudge, misunderstand, or ignore information. This is a largely *unconscious* process, which means:



Cognitive bias
feels a lot like
rational thinking

It's also important to note that *everyone* has some degree of cognitive bias — yes, even you. That's because, in terms of our evolution as a species, some of these biases were adaptive, meaning they served a useful purpose for our survival.

Some cognitive biases operate through **heuristics**: mental shortcuts our brains use to quickly make decisions. But where some of these shortcuts may have helped us thousands of years ago, they can often be an active hindrance in the modern world.



Here's an example:

If you were an early human and saw someone get mauled by a tiger, it was probably more safe and useful to just adopt a mentality of "I need to avoid all tigers." But in the modern world, if you saw someone with blonde hair attacking someone else, it probably wouldn't be useful to adopt a mentality of "I need to avoid all people with blonde hair."

Other cognitive biases are a result of factors ranging from our emotional responses, to the limitations of our memory, to the many social influences in our life. But in each case, cognitive bias hinders our ability to assess the truth of the world.

TYPES OF COGNITIVE BIAS

There are many different [types](#)¹ of cognitive bias, but we'll cover three of the most common:

Confirmation Bias

Confirmation bias is the tendency to look for, notice, and believe information that supports what you already think, while ignoring or dismissing information that challenges your beliefs. It's basically like viewing the world through tinted glasses (but without realizing you're even wearing glasses).

Let's say you have a belief that dogs are friendlier than cats. As you go about your daily life, you'll probably tend to mostly *notice* friendly dogs and grumpy cats, and *ignore* instances of grumpy dogs and friendly cats.

This bias is a result of having evolved in a world with an overwhelming amount of *stimuli* (sensory information) – far more than we can process at one time. As a result, your brain tends to only process the information it thinks is important, a process called **selective attention**. And what it tends to think is important is whatever information aligns with things you've already experienced.



You and Your Brain

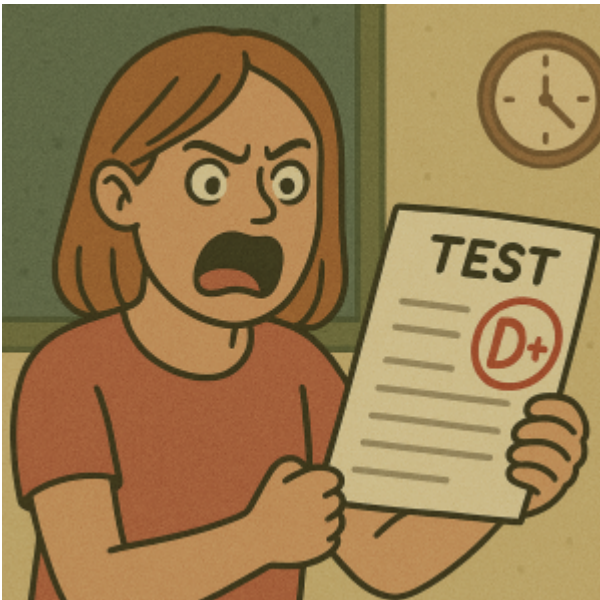
This book will sometimes refer to “your brain” doing certain things, as that usually makes the concepts we’ll be covering easier to talk about. But it’s important to remember that, at the end of the day, *you are your brain*.

So, when we talk about “your brain” doing something in this book, we’re using it more to reference the *unconscious mechanisms* of the brain.

Motivated Reasoning

Motivated reasoning is the tendency for people to process information in a way that reaches a conclusion they *want* to be true. You can also think of motivated reasoning as being emotional thinking that wears the mask of rational thinking.

Whereas confirmation bias is more about *consistency*, motivated reasoning is more *goal-oriented*.



Let’s say you take a test that you feel you aced, but when you get the test back, you actually did much worse than you thought. You start to immediately feel that it wasn’t actually your performance that was the problem, it must have been that the test was unfair. And further, you find yourself ignoring evidence that the majority of the class did well on the test (meaning it likely wasn’t unfair). That’s motivated reasoning at work.

This type of bias is *most* intense when it involves issues of your personal or group identity. **Personal identity** is how you view yourself as an individual, while **group identity** is how you view yourself in the context of a group you feel you belong to.

Identity is an incredibly strong motivator because it gives us a sense of stability and meaning. Our brains are wired to protect that sense of who we are and where we belong, *even if that’s not beneficial to us in the long-term*.

Given this, when you encounter information that involves your sense of identity, you should be especially on guard for your biases.

The Illusory Truth Effect

The **Illusory Truth Effect** is the tendency to believe something is true simply because we’ve had

repeated exposure to it. This effect is so powerful that it can still work even when we've been told the information is false.



Repetition tends to make it easier for our brains to process something (as it literally takes less [energy](#)²). When something becomes easy to process, we develop a preference for it, and it *feels* good. When information feels good, we tend to assume it's true.

Heard It All Before



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This is why, in [marketing](#)³, repeated exposure is very important (up to a [point](#)⁴). This same concept is true of **misinformation**. People or groups who are trying to actively and intentionally spread misinformation will repeat those falsehoods at every opportunity. (And social media

platforms now do a lot of the work of repetition on their own, through algorithmic [recommendations](#)⁵).

One of the best defenses against this is to focus on the **epistemology** we discussed in the previous chapter. When you think about a belief, ask yourself “why do I believe this is true?” If your only answer is “because I’ve heard it a lot” you should probably investigate that belief a little further.

NO CURE, JUST MANAGEMENT

Here’s the reality: none of us will ever be able to fully remove our biases, because the brain is simply built to have them. The goal, then, isn’t to rid ourselves of biases, but to *manage* them.

Successful management involves these components:

- *Building a mental system to notice when these biases may be happening*
 - This can be done through developing and strengthening **metacognition**, which is the awareness and understanding of one’s own thought processes. In simpler terms, it’s “thinking about thinking.”
- *Counteracting those biases once you notice them*
 - There are many ways to do this, including:
 - Diversifying your sources of information
 - Fact-checking content as soon as you’re exposed to it
 - Slowing down and reflecting on the content before just absorbing it
- *Knowing which areas in life are most important to do the above*
 - There are lots of instances where you don’t need to worry about all of this. For example, if you’re trying to decide which flavor of ice cream you want to buy, you’re probably safe to just go with your gut. But in other instances, such as building beliefs about how the world works, you probably want to be on guard for your biases.

A COGNITIVE ARMS RACE

In the modern world, there are a wide variety of groups and individuals that are actively looking to take advantage of people’s cognitive biases: advertisements, media, politicians, etc. The

advent of more recent technologies has made this even easier to do. Most social media platforms, for instance, are specifically [designed](#)⁶ to take maximum advantage of people's cognitive biases.

The good news is that critical thinking is a great way to build up your mental defenses so that it's more difficult to have your biases fall victim to manipulation!

TL;DR

**CONFIRMATION BIAS
IS HOW WE
SELECT MISINFORMATION**

**MOTIVATED REASONING
IS HOW WE *DEFEND*
MISINFORMATION**

ILLUSORY TRUTH IS HOW MISINFORMATION GETS *EMBEDDED*

CHAPTER QUIZ AND SHORT ESSAY

Knowledge Check: Cognitive Biases



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Short Essay: Cognitive Biases



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VOCABULARY

cognitive bias

the systematic ways our minds can lead us to misjudge, misunderstand, or ignore information

confirmation bias

the tendency to look for, notice, and believe information that supports what you already think, while ignoring or dismissing information that challenges your beliefs

group identity

how you view yourself in the context of a group you feel you belong to

heuristics

mental shortcuts our brains use to quickly make decisions

metacognition

the awareness and understanding of one's own thought processes

motivated reasoning

the tendency for people to process information in a way that reaches a conclusion they want to be true

personal identity

how you view yourself as an individual

selective attention

processing only stimuli deemed to be important while ignoring stimuli deemed to be irrelevant

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LOGIC AND INTUITION

KAINAN JARRETTE AND DIANA DALY

WHAT ARE LOGIC AND INTUITION?

Logic is the set of rules and principles we use to determine whether a conclusion correctly follows from the information or assumptions of an argument. (An **argument**, in this context, is essentially the claim that's being made, including how that claim is backed up.)

Intuition, in contrast, is the immediate sense that something is true or accurate without consciously thinking through reasons or evidence. Another way to think about this is:

- Logic is a *conscious* and *multi-step* process (deliberate reasoning).
- Intuition is an *unconscious* and *instantaneous* process (spontaneous feeling).



How We Use the Term “Logical”

In everyday speech, the word “logical” is often used to represent that something makes intuitive sense to us. When we say something like “that sounds logical” in an informal conversation, we usually mean “that sounds correct to me without having to think it through.”

In a technical sense, however, this usage isn't very accurate. Logic and intuition are complete opposites of each other, and it would probably be more appropriate to say “that sounds intuitive” than “that sounds logical” in the context mentioned above.

So remember that in this textbook when we say something is “logical” we don’t mean it’s intuitive. We mean it was arrived at through a conscious and rational process of reasoning.

WHERE INTUITION FAILS



Broadly speaking, intuition and logic can both serve useful purposes, depending on the situation. For instance, intuition is useful when we have to make low-stakes decisions around personal preference (e.g. choosing what to eat for breakfast).

However, when it comes to *assessing information* and *determining truth*, intuition is unreliable, prone to error, and often actively harmful.

Below, we’ll go over some areas where intuition fails us, and why that is.

Probability and Statistical Thinking

Test Your Statistical Intuition!



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Did you do better or worse than you expected?

We didn’t evolve to be able to grasp extremely large numbers, randomness, and chance. As a result, our intuition about these concepts is *very* inaccurate. In fact, there’s a whole list of just [statistical errors](#)¹ we tend to make. These include:

- Overestimating the likelihood of rare but dramatic events (like plane crashes)
- Underestimating the role of randomness (like when we're gambling)
- Misunderstanding base rates (like in medical diagnoses)

Correlation and Causation

A **correlation-causation error** is when we [incorrectly](#)² assume that because there is a **correlation** between two things, one must be causing the other. We evolved to seek out patterns, and we intuitively assume connections that often aren't really there. This works well for surviving in the wild, but not so much for navigating a complex civilization.

Correlation-causation errors can lead us to [falsely](#) believe things like:

- Video games cause violent crime [**they don't!**]
- Vaccines cause autism [**they don't!**]
- Presidential administrations cause gas prices to rise or fall [**they don't!**]

Large-scale Systems and Abstract Data

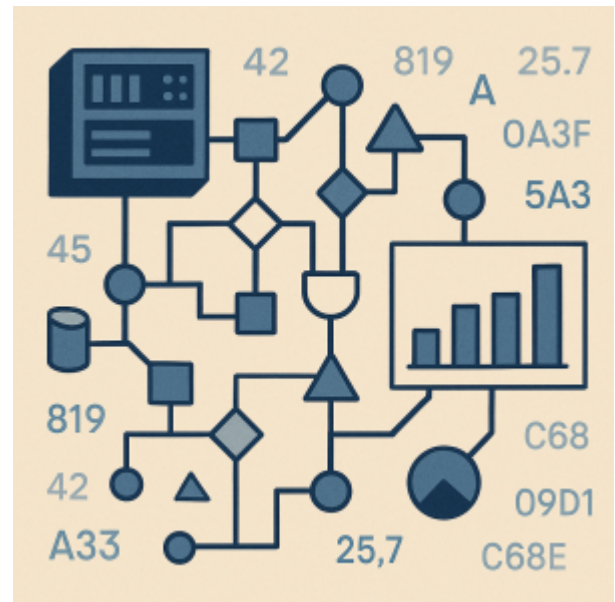
We evolved to deal with small groups and visible, quick cause-and-effect relationships. Our intuition falls apart when dealing with large and complex [systems](#)³, especially when those systems have *delayed feedback* (meaning there's a large gap in time between an action and its consequences). This leads us to struggle to understand things like:

- Global economic models
- Pandemics
- Climate and ecological systems

Confirmation and Disconfirmation of Beliefs

As we discussed in the previous [chapter](#), our **cognitive bias** leads our intuition to focus on things that confirm our existing beliefs and ignore things that don't. This leads to:

- Believing a stereotype is true because we've "seen it happen" – even though there were likely many more examples where it didn't happen that we ignored
- Needing only a few confirming anecdotes to increase our confidence in a pre-existing belief, whereas we need many more disconfirming anecdotes to weaken that same belief



Assessing Our Own Competence and Knowledge

Consistent with our poor intuition for statistics and large numbers, we also tend to have poor intuition when it comes to our own competence and knowledge. We tend to:

- [Overestimate](#)⁴ our knowledge and understanding of a topic
- [Rate](#)⁵ ourselves as **better-than-average** in most domains, even when we're not

Understanding "Average"

When we talk about being "average" in a domain, there are some important things to remember:

Average Is Not the Same Thing as Poor.

By definition, extremely high or extremely low ability is rare. We live in a world where there is often an intense pressure to be exceptional, but this pressure is unnecessary and misguided. Average doesn't mean you don't know what you're doing, it just means you know what you're doing about as well as most other people in that domain.

Average in a Domain Doesn't Mean Lack of Uniqueness as an Individual.

While we can assess ability in different specific domains, an individual person is an incredibly complex bundle of a wide variety of traits that are shaped by an incalculable number of influences. Just because, for instance, you're an "average driver" doesn't mean you're "just like everyone else" in a broader sense. As whole individuals, everyone is unique, because no two people (even identical twins) have exactly the same set of genes, experiences, beliefs, abilities, and so on.

Emotion and Identity



At our core, we're very [emotional](#)⁶ creatures who highly value our sense of [identity](#)⁷ (sometimes sacrificing our lives for it). As a result, our intuition is at its worst when the information we're being asked to assess:

- Connects with our sense of identity
- Heightens our emotions or provokes an immediate emotional response

To be clear, we're not arguing that everyone should be emotionless robots. Emotions are fundamental to our human relationships and our shared and personal human experience. But when it comes to assessing the accuracy of information, emotions don't serve us best.

WHY LOGIC HELPS

For all the areas we just discussed where intuition fails, it's important to understand that:

- You'll still have an intuitive response.
- That intuitive response will feel coherent and correct (although it usually isn't).

When things feel right, that tends to demotivate us from learning more about the topic and checking if our feeling matches reality. This means that it's very easy to end up thinking we have a better understanding of the world than we actually do.

Using logic helps us gain a more accurate view of the world by applying rules and techniques

that circumvent our errors of intuition. It's why logic is the backbone of *the scientific method* — without which we wouldn't have anything from asphalt-paved roads to life-saving medicine to modern smart-phones.

TL;DR

**REALITY OFTEN
WORKS IN
WAYS THAT FEEL
CONTRARY
TO OUR INTUITION**

**WE OFTEN
DON'T KNOW
HOW MUCH
WE DON'T KNOW**

**WE ARE MOST
SUSCEPTIBLE TO
MISINFORMATION
WHEN OUR EMOTIONS
AND IDENTITY
ARE INVOLVED**

CHAPTER QUIZ AND SHORT ESSAY

Knowledge Check: Logic and Intuition



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Short Essay: Logic and Intuition



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VOCABULARY

argument

in the context of logic, the claim that's being made, including how that claim is backed up

better-than-average effect

the tendency to overestimate our ability relative to other people

conjunction fallacy

a cognitive bias where people incorrectly assume that a specific combination of events is more likely than one of the individual events within that combination

correlation-causation error

when we incorrectly assume that because there is a correlation between two things, one must be causing the other

gambler's fallacy

the mistaken belief that past random events can influence future outcomes in independent events

intuition

the immediate sense that something is true or accurate without consciously thinking through reasons or evidence

logic

the set of rules and principles we use to determine whether a conclusion correctly follows from the information or assumptions of an argument

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MEDIA LITERACY

KAINAN JARRETTE AND DIANA DALY

WHAT IS MEDIA LITERACY?

Self-evaluation!

Before reading on, fill out and export the following survey:



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Media literacy is the ability to access, understand, analyze, evaluate, and create media in a critical and informed way. By **media** we're referring to any channel or method of communication. This includes (but isn't limited to):

- Books
- Magazines
- Newspapers
- Radio/podcasts
- Television
- Movies
- Videos
- Websites
- Social media

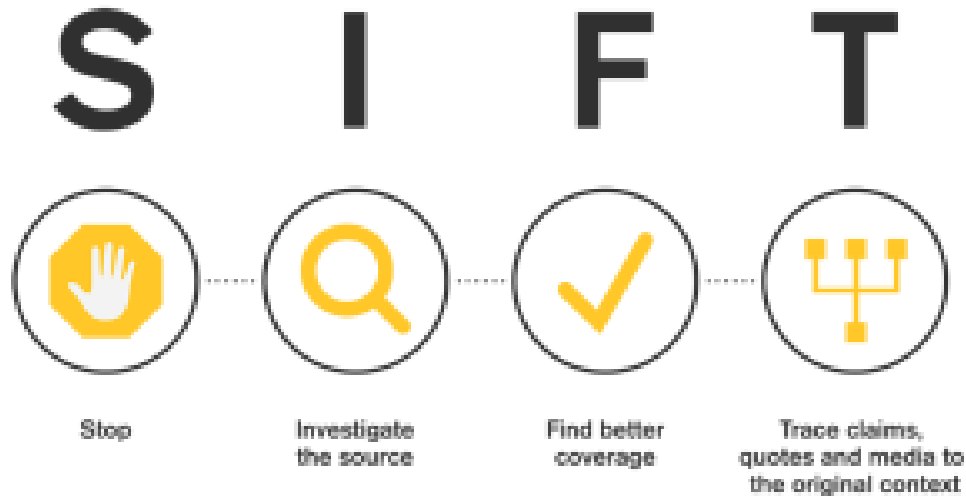


As you can see, you encounter media all the time in your everyday life. And whether it's fictional or non-fictional content, it's all helping to shape your view of the world. Therefore, being able to apply **critical thinking** when engaging with this content is vital.

This book will be focusing primarily on non-fictional content, but it's still important to know that media literacy also applies to fictional content. In practice, good media literacy can look like:

Non-Fiction Content	Fictional Content
Discerning if a particular website is a credible source of information	Recognizing when something is parody or satire (such as The Onion)
Being able to fact-check claims made in a Facebook post	Recognizing intentional irony
Reading an entire news article before sharing, as opposed to just the headline	Recognizing that fiction can still contain bias and ideological framing
Recognizing the difference between opinion and journalistic reporting	Recognizing that fictional portrayals of history and real events aren't neutral or reliably accurate
Understanding how algorithms shape what you see and are suggested	Understanding allegory, metaphor, and subtext
Navigating user reviews of products online	Recognizing how tropes can be harmful in the real world
Recognizing emotionally manipulative language in content	Recognizing that fictional behavior is not a substitute for ethical norms

THE “SIFT” METHOD



Developed by Mike Caulfield, the [SIFT method](#)¹ is a simple and straightforward way to investigate the credibility of information, particularly for online sources. The steps are:

Stop



Before reading or sharing content, STOP!

With everything going on in a typical day, it's very easy to be in a state where you're *passively* engaging with media. But passive engagement means we're likely not scrutinizing the content or ourselves to the level we should be when this type of information is presented.

Taking a moment to stop lets you switch to an active engagement, where you can more specifically exercise your media literacy skills, such as:

- Evaluating the emotional content of an article
- Assessing your own emotional state as you're reading
- Thinking about what you already know on the topic

Investigate the Source

Take a moment to look up the author, website, etc of the content you're engaging with. In particular, look for things like:

- Does the source likely have an ideological bias or goal in mind?
- Does the source have any authority on the topic being discussed?



Find Better Coverage



It's important to see what *other* sources are saying about the same claim or topic. Try to find other credible sources that either:

- Corroborate the information or claim
- Dispute the information or claim

Additionally, it's often a good idea to see if credible, non-partisan fact-checking sites have already covered the article or content. These can include:

- [Snopes.com](https://www.snopes.com)
- [FactCheck.org](https://www.factcheck.org)
- [Politifact.com](https://www.politifact.com)

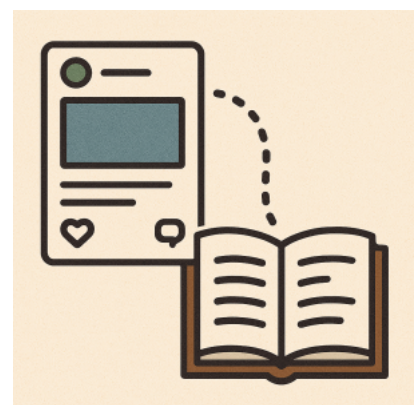
Trace Claims, Quotes, and Media to Their Original Source

Articles will frequently make claims based on other second-hand information, such as:

- Academic studies
- Quotes from other people, groups, and articles
- Visuals such as graphs, photos, or videos

However, it's not uncommon for articles to misrepresent these things. This could mean:

- Improperly summarizing the findings of a study
- Taking a quote out of context
- Using visuals out of context



It's important to try to find the primary source of content like the above, and ask yourself questions like:

- Do the conclusions drawn by the author(s) of a study match the claims that were made in the article referencing the study?
- Did a referenced quote come from the person the article claimed it did? Was the way the article used that quote fair to the context the quote came from?
- Are the visuals that are used actually directly related to the content discussed in the article? Did the article edit anything out of the original piece of media that was important?

RED FLAGS AND FAKE GREEN FLAGS

Red Flags

In addition to the “SIFT” method, there are also some consistent **red flags** you should be on the lookout for in both the headlines and body of articles, posts, media, etc.



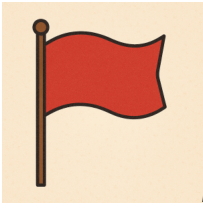
No Author or Organization Listed

If you can't tell *who* created the content or what organization is behind it, it's hard to hold it accountable or verify its credibility.



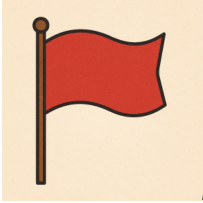
Emotionally Charged or Sensational Language

Terms and phrases like “under attack,” “BETRAYAL,” “You’ll never guess...,” “EXPOSED” and so on are examples of language specifically designed to trigger your emotions. As a general rule, if you find the language being used is giving you an *immediate* emotional response, you should be on guard.



No Sources or Unsupported Claims

Reliable media backs up its claims with sources, and ideally ones that are cited, linked, or verifiable. An article that makes no attempt to back up its claims with specific and direct sources is a major red flag.



Poor Grammar, Spelling, or Formatting

Frequent errors or sloppiness can indicate a lack of editorial standards or rushed, low-effort content generation. This doesn't mean an article with these errors is definitely inaccurate, but it's a red flag that should make you examine the content much more closely.



One-Sided or Highly Biased Presentation

Particularly if the content is about something you know to be controversial, a one-sided presentation is a major red flag. Most media outlets have some degree of a political leaning, but reputable outlets will still cover both sides of an issue, because they want you to have the full context.

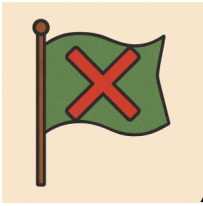
Fake Green Flags

In addition to red flags, it's also important to recognize what we'll call **fake green flags**. These are things that mimic credibility, but without doing the other steps to support it. It's easy to mistake them for signs of trustworthiness, which can leave you vulnerable to misinformation.



The speaker sounds confident and articulate.

Confidence can be very appealing, but it doesn't equal accuracy. Skilled speakers (and influencers) can make false or misleading claims sound persuasive, even when they're wrong.



A lot of technical or academic-sounding language and visuals are used.

Jargon can impress, but also obscure. Complex language can be used to overwhelm or distract rather than clarify. The same is true of “science-y” visuals, such as graphs and charts. These things aren’t inherently bad, but they’re also not a reliable sign of accuracy.



Buzzwords like “balanced,” “independent,” or “free thinker” are used.

These words and phrases can be used as rhetorical shields against actual critical thinking. Typically speaking, a credible author won’t have to rely on buzzwords to convince you that they’re fair and balanced – they’ll just present the information in a fair and balanced way.



The content is posted in a “documentary” or “news-style” format.

Styling something like journalism doesn’t make it journalism. Many propaganda videos mimic traditional news to gain trust. Again, this style doesn’t guarantee a source is untrustworthy, but it also doesn’t guarantee that it’s accurate either.



The post or video has gone viral.

Popularity is not proof. Viral content spreads because it’s emotional, surprising, or relatable—not because it’s true.

TL;DR

**Not all information
is created equal.**

**Just because something
looks credible
doesn't mean it is**

**Trustworthy media avoids
emotional manipulation and
provides context, evidence,
and transparency**

CHAPTER QUIZ AND SHORT ESSAY

Knowledge Check: Media Literacy



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Short Essay: Media Literacy



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VOCABULARY

media

any channel or method of communication

media literacy

the ability to access, understand, analyze, evaluate, and create media in a critical and informed way

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AI LITERACY

KAINAN JARRETTE AND DIANA DALY

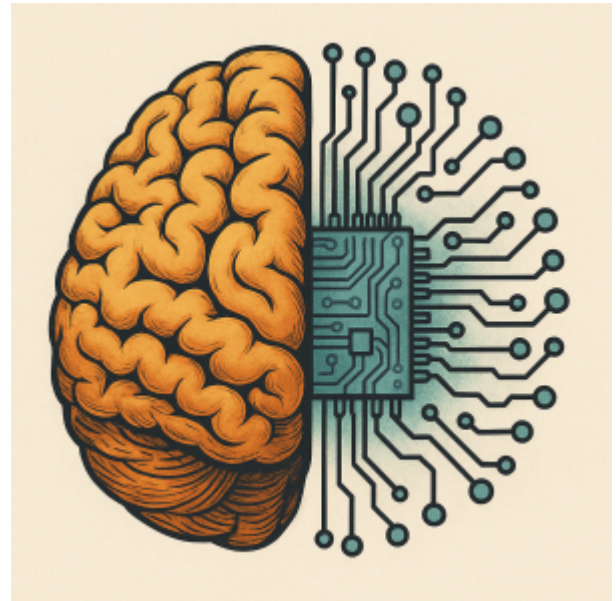
WHAT AI IS AND ISN'T

“Artificial Intelligence” and “AI” are terms that have begun to dominate our cultural conversations. AI is being integrated into a wide variety of industries, there are countless books and other media on the topic, and everyone seems to have an opinion about it. It’s popular to love it, it’s popular to hate it, and yet most of us can’t identify everywhere it shows up in our daily lives.

So let’s start out by giving a useful definition. **Artificial Intelligence** (or AI) refers to computer systems that are built to perform tasks that typically require human intelligence. At the time of this writing, most AI systems being used are referred to as **narrow AI** – smaller systems designed to perform a very limited and specific set of tasks. **General AI** is the idea of actually replicating flexible, adaptive human intelligence in a single system – something that hasn’t been achieved yet.

You might also have heard the term **Large Language Model** (or LLM). A Large Language Model is essentially just an AI that has been trained on a *vast* amount of data so that what it generates (including text) is much more complex. These are AI such as ChatGPT, Gemini, or LLaMA. Whereas AI like what’s used to predict text when you’re typing on your phone would be considered a “small language” model.

Before we go further, let’s clear up three common myths about AI:



AI Myths



Myth 01: AI is Conscious.

It's not. AI replicates patterns, not inner-experience. Which isn't to dismiss that the concept of AI raises some incredibly interesting philosophical questions. But it *is* to say that, at least for now, nobody has to worry about "sentient AI."

Myth 02: AI is Objective and Infallible.

It's not. As we'll discuss more below, AI absorbs all the biases and flaws of the data it's trained on and prioritizes giving *any* answer over giving a correct answer.

Myth 03: AI is monolithic.

It's not. AI is often talked about as though it's one central force or system, but in reality it's a broad concept used in tons of different and unique systems. This also means that not all AI provides the same benefits, has the same flaws, or poses the same risks.

Skepticism vs Panic

There are a lot of misconceptions and misinformation about AI, but we also want to acknowledge that the application and integration of AI raises some very serious and valid concerns. *It's healthy to be skeptical of how AI is used.*

The issue arises when that skepticism turns to panic and fear. Fearing a technology makes us want to disengage with it, and we need skeptics to be engaging. Otherwise, only the blindly optimistic are left to guide where this technology goes, and that usually doesn't end up well.



AI AND MISINFORMATION

The concepts and tenants of **critical thinking** have been around long before AI was even a dream. However, AI has come to influence media and information culture so much that covering certain AI topics is unavoidable when talking about **misinformation**.

Here are some basic concepts to keep in mind when it comes to how AI fuels misinformation:

Hallucinations



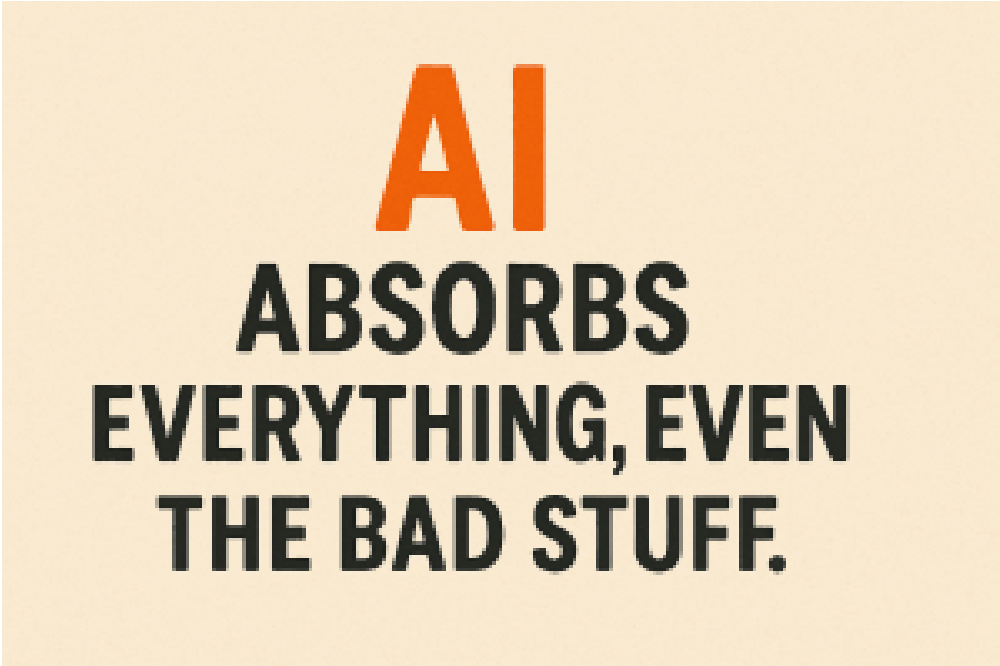
AI
MAKES
THINGS UP.

In particular, LLMs such as ChatGPT or Google Gemini are:

- Designed to predict patterns, not create a repository of truth
- Generate text based on what *sounds* right, not what *is* right
- Designed to “fill in the blanks” rather than say they don’t know

Importantly, not only will AI fabricate inaccurate information, but it will do so confidently and (often) convincingly. So much so that AI hallucinations have sometimes even made their way into mainstream [publications](#)¹.

Biases and Flaws



AI
ABSORBS
EVERYTHING, EVEN
THE BAD STUFF.

LLMs are designed to learn from very large datasets created by extracting (also called **scraping**) all sorts of media from across the internet. However, this also means that these AI models are absorbing whatever biases and flaws are inherent in that data. This means it can end up replicating [prejudices](#)², [stereotypes](#)³, or cultural [bias](#)⁴.

Ideally these datasets are curated by humans to remove or mitigate those flaws, but unfortunately that's not something we can currently count on.

Manipulative Media



AI
CAN CREATE
CONVINCING
FAKE MEDIA.

It's a big enough issue that AI can create fake and inaccurate text. But recent advancements

have seen a huge leap in AI's ability to create more detailed fake media, such as photos, audio, and video. What's more, it's become very difficult to spot that these pieces of media are AI creations. While most people still think they're good at spotting them, [research](#)⁵ shows otherwise.

You can test your own ability to spot a deepfake by taking this online quiz developed by iProov [here](#).

Erosion of Human Thinking

**OVER-RELIANCE ON
AI
WEAKENS OUR OWN
COGNITIVE SKILLS.**

Simply put, there is a growing body of [research](#)⁶ that seems to indicate that when we let AI do too much of our thinking for us, it actually weakens our own cognitive ability. Our brain is set up to maintain neural networks and connections based on how often they're used.

Growing up, you may have heard the idea that "your brain is like a muscle." While biologically this isn't accurate, and the phrase itself has grown cliché, it is incredibly useful as a metaphor. In the most basic sense, if you don't exercise your brain, it *will* grow weaker.

TIPS FOR USING AI WISELY

Given the above ways that AI can fuel misinformation, there are two main tips that can help you use AI while still protecting yourself against misinformation and manipulation:

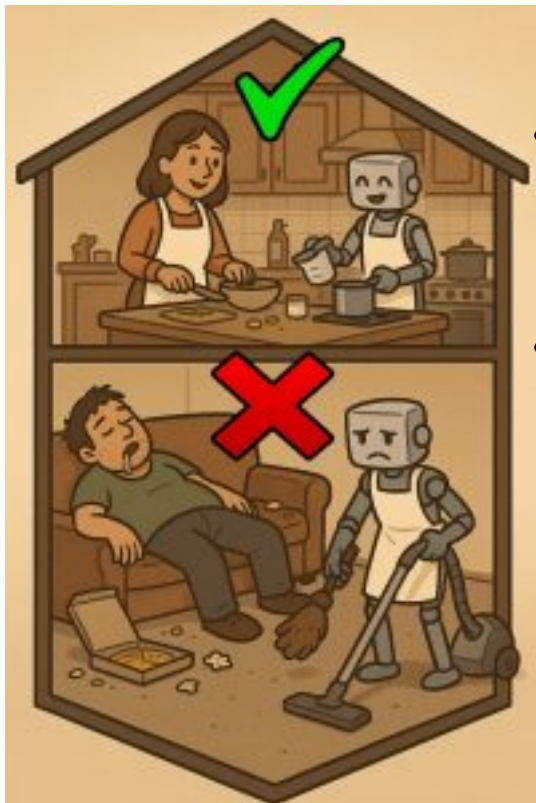
01. Always Verify Facts and Citations AI Provides

It's not a great idea to ever *assume* that AI is giving you accurate information. AI provided information should always be verified in ways like:

- If AI makes a claim, ask it directly to cite the sources it's using for that claim.
- When AI provides sources or citations, verify that they actually exist.
 - Make sure you can find the sources and citations *outside* of the AI tool you're using.
- If sources and citations are real, check for bias and reliability as you would any source



02. Treat AI as a Collaborative Tool, Not a Substitute for Your Own Reasoning



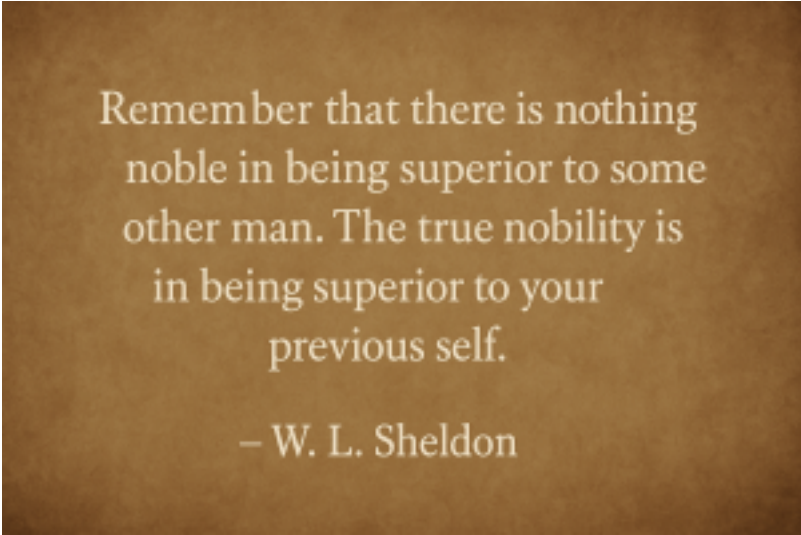
If you find that AI is doing a majority of the work, you're probably using it wrong. This means:

- *Use AI as a brainstorming tool*
 - For example, rather than asking AI to write an entire essay for you, instead ask it to help you brainstorm things like topic ideas, structure, key points, etc.
- *If using generative AI, leave some creativity for yourself*
 - A nice use of generative AI is providing simple image-based media for people who may not have any real illustration ability. However, this doesn't mean you need to let AI do *everything*. If, for instance, you want to make an image, don't just prompt the AI to "make a comic about red herrings." Think about what you want that image to be and try to describe it in as much detail as possible in your prompt. Not only does this usually end up being faster, but it allows you to still work cognitive and creative muscles.
- *Avoid using AI for final drafts of text-based media*
 - There may be cases where you feel it's appropriate to have AI write an entire first draft of something for you. But even then, you should always be revising what it gave you to make sure it's in your own voice.

AN EXAMPLE OF HOW AI AND MISINFORMATION INTERACT

The Sheldon Quote

In the introduction chapter of this section, you saw a quote:



Remember that there is nothing
noble in being superior to some
other man. The true nobility is
in being superior to your
previous self.

– W. L. Sheldon

From "What to Believe: An Ethical Creed," Ethical Addresses (Apr 1897)

It's likely you've seen some version of that quote before, but it's significantly less likely that you've seen it attributed to W.L. Sheldon. That's because the quote is most often attributed, at least online, to Ernest Hemingway. In fact, if you Google the first line of the quote exactly, the first and most prominent results will tell you it's a Hemingway quote. It's in the AI Overview, it's listed as a Hemingway quote on Goodreads, on Reddit, and so on.

The problem is that **Ernest Hemingway never said or wrote this.**

We found this out when trying to verify the attribution (this is, after all, a book on misinformation, and inaccurately attributing a quote because we didn't do our due diligence would be slightly embarrassing). There's not a single source anyone can point to that verifies this was ever even a quote Hemingway adapted. He simply never said it.

But if you ask AI (including any of the LLMs) to identify the quote, it will confidently tell you some form of "this quote is widely attributed to Ernest Hemingway." And it does this because that's who the majority of internet sources attribute it to. When you ask it to cite where exactly Hemingway said this, however, it will just as quickly admit that there's no evidence Hemingway ever said or wrote it.

Here's where things get even stickier. If you then ask AI to tell you where the quote *did* originate, it will... make something up. ChatGPT got close by attributing it to the wrong Sheldon, in a text that doesn't exist.

Gemini attributed it to a current middle-aged author, implying the quote didn't exist before then. And so on.

Eventually, through our own research and digging, we were able to verify that:

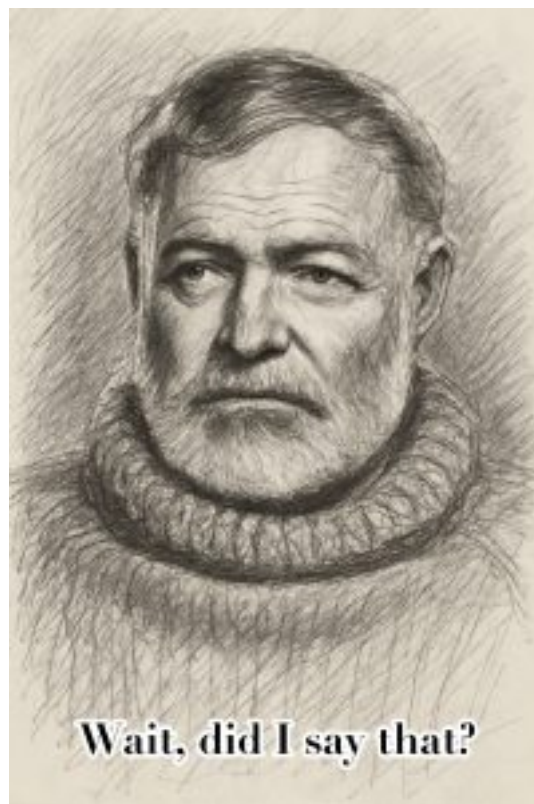
- This quote does indeed [appear](#)⁷ in "What to Believe: An Ethical Creed," by W.L. Sheldon in 1897
 - Sheldon was an American lecturer and ethicist who founded the Ethical Society of St. Louis, which claimed to focus on building community around shared ethical endeavor, rather than shared religion, philosophy, etc. (although it should be noted that Sheldon was highly religious).
- While the *idea* of the quote likely pre-dates the Sheldon publication, the Sheldon publication is most likely the first time the quote appeared in print

How Misinformation Spreads and Is Reinforced

To begin with, this anecdote is a nice reminder that a *lot* of quotes floating around the internet are misattributed – keep that in mind the next time you're about to share one.

While a misattributed quote is generally one of the least harmful types of misinformation, it highlights one of the processes by which misinformation becomes culturally embedded:

- At some point, someone actively decided to misattribute the quote to Hemingway
 - Evidence suggests that *Playboy* magazine was the [culprit](#)⁸, as early as the 1960s



- The general public doesn't question the attribution to Hemingway, likely because:
 - Very few people know who W.L. Sheldon was
 - *Playboy* was considered a reputable and influential publication at the time
 - It sounds like something Hemingway would have said
- Once the internet became popularized in the 90s, the quote had enjoyed three decades of false attribution without question. What started as misinformation in print media becomes misinformation in digital media.
- The falsely attributed quote is then shared to exponentially larger degrees than before, particularly with the rise of social media and the increasing "memefication" of culture.
- The falsely attributed quote becomes so digitally embedded that even AI (incorrectly viewed by many as infallible repositories of knowledge) declares the quote to be from Hemingway, embedding the misinformation even further into both local and global culture

In many ways, this is similar to the **Illusory Truth Effect** we talked about in an earlier chapter.

This gives you an idea of how easy it is for misinformation to spread, even without malicious intent. It also shows how important it is to question the information AI is giving you.

Who Said That?

Try this as a quick exercise:

Think of a quote you **love**, but that you've never verified. *Who do you currently think quote is attributed to?*

Now, go try to find research where the quote actually originated.

- *What do the top Google results say?*
- *What does AI say?*
- *Can you find and verify a source of origin? If so, did it match with who you originally attributed the quote to?*

VOCABULARY

artificial intelligence

computer systems that are built to perform tasks that typically require human intelligence

general AI

replicating flexible, adaptive human intelligence in a single AI system

Large Language Model

a type of AI that has been trained on a vast amount of data so that what it generates is much more complex

narrow AI

smaller AI systems designed to perform a very limited and specific set of tasks

scraping

the process by which AI extracts large amount of data from online sources

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INTRODUCTION TO LOGICAL FALLACIES

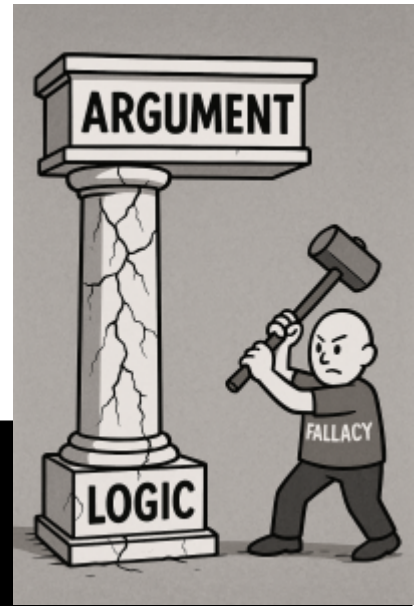
KAINAN JARRETTE AND DIANA DALY

WHAT IS A LOGICAL FALLACY?

A **logical fallacy** is an error in reasoning that undermines the **logic** of an **argument**.

Sometimes fallacies are used as intentional deception, and other times they're made unconsciously and without malicious intent.

Logical fallacies often feel compelling — not because they're logically sound, but because they take advantage of **cognitive biases** we've discussed in the previous section.



WHY LOGICAL FALLACIES MATTER

Logical fallacies are one of the most significant factors in undermining **critical thinking**. They make unreasonable and irrational arguments sound reasonable and rational, which makes those arguments much easier to absorb and believe. Essentially:

LOGICAL FALLACIES PERSUADE WITHOUT GOOD REASONING

Unfortunately, logical fallacies also show up *everywhere*. You can find them in politics, advertising, social media, personal conversations, and even academic settings.

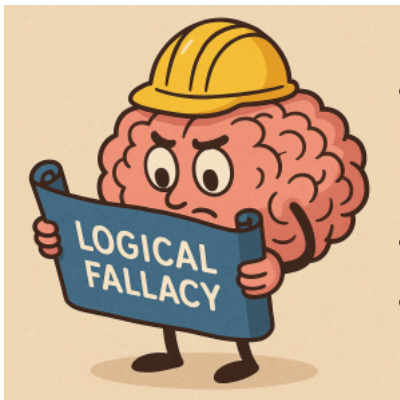
Understanding logical fallacies helps you:

- Become more resilient to the manipulation and misinformation you're likely to encounter throughout your life
- Become better at constructing your own arguments

WHAT TO FOCUS ON IN THIS SECTION

Each of the following chapters will focus on a specific logical fallacy. There are [dozens](#)¹ of logical fallacies, but we'll just be highlighting the most common ones you're likely to encounter.

As you read through the chapters, try to:



- Make sure you understand how the fallacy works on a structural level (if you have any confusion, ask your instructor for clarification!).
- See if you can spot examples of them in your daily life.
- Notice that sometimes different logical fallacies can overlap or be used in combination with others.

What's in a Name?

There's a growing and concerning trend in many forms of media around weaponizing the identification of logical fallacies. Many popular media personalities are quick to use the terminology around logical fallacies, often without having a good grasp of what that fallacy means.

This in itself can be a form of manipulation and misinformation. Just because somebody says something like "that's a straw man argument!" doesn't mean it actually is.

The important part isn't naming the fallacy, it's being able to understand and explain where and how the error in reasoning is occurring.

VOCABULARY

logical fallacy

an error in reasoning that undermines the logic of an argument

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RED HERRINGS

KAINAN JARRETTE AND DIANA DALY

WHAT IS A RED HERRING?

RED HERRING

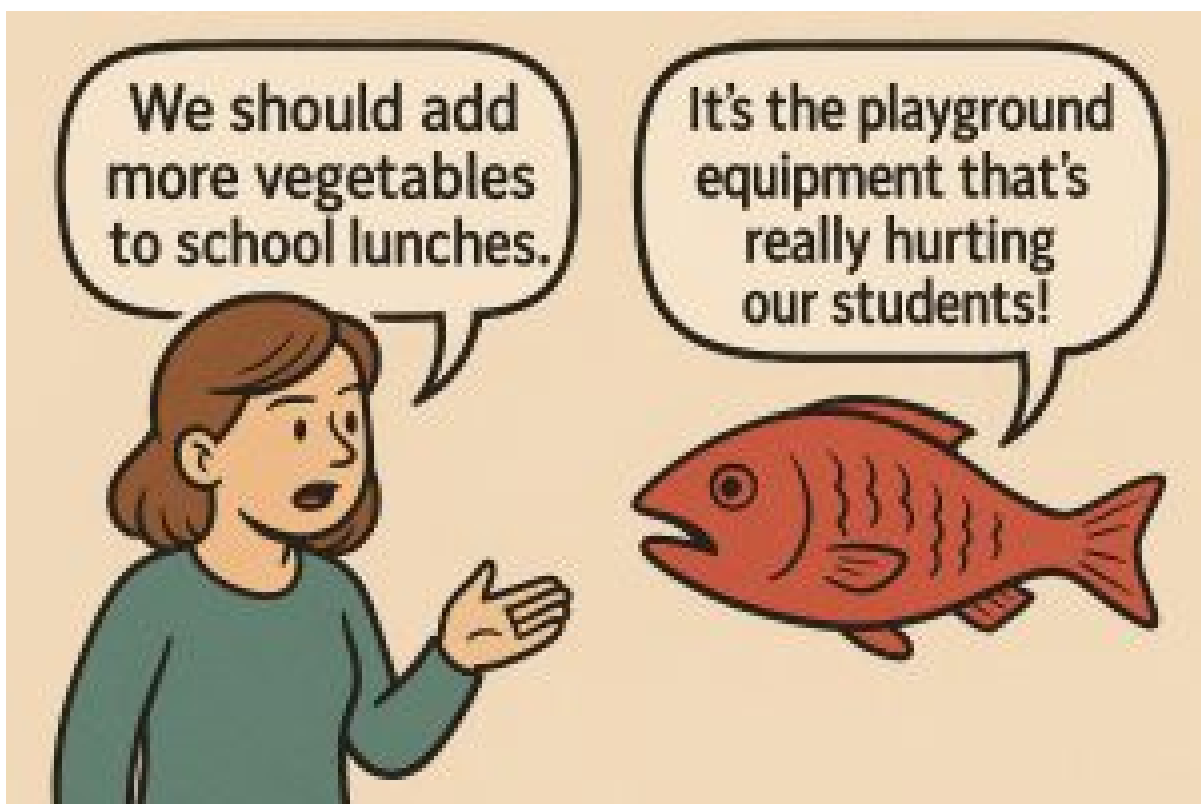


A **red herring** is something irrelevant that's introduced to distract from the actual argument.

The term comes from the old practice of using a strong-smelling, smoked herring to distract hunting dogs from a scent trail.

It's also commonly used as a literary term, particularly in mystery novels, to describe something meant to distract the reader away from figuring out the real answer to a question (such as "who's the murderer?").

EXAMPLES



HOW TO SPOT A RED HERRING

A red herring will often feel noticeable, because we tend to pick up on when a subject of conversation is being [changed](#)¹. However, if the red herring is effectively appealing to our **cognitive biases**, we have a much harder time noticing it.

When you're looking at any type of response to an issue or argument, ask yourself:

**DOES THIS
RESPONSE
RELATE TO
THE ISSUE
AT HAND?**

If it doesn't — even if it feels good or you agree with the general idea — it's a red herring.

Whataboutism

One of the most common types of red herrings is something usually referred to as “whataboutism.” **Whataboutism** is when someone deflects criticism or scrutiny by pointing to someone else's wrongdoing.

Anyone who grew up with siblings probably encountered a form of this as a kid. Let's say you and your brother are arguing and you end up calling him a jerk. In return, he gets angry and hits you. You tell your mom, who chastises your brother and tells him “Hitting is never okay!” But your brother responds by pointing to you and saying: “But what about her! She called me a jerk!”

Should you have called your brother a jerk? Probably not. But that doesn't justify nor excuse his hitting you.

WHY RED HERRINGS MATTER

Let's be clear: exploring the context of a situation, the potential hypocrisy of a person or group, or even related topics can have a lot of value. The problem comes when that's used to *distract* from actually responding to the initial issue. If we don't address one thing before moving on to another, we could easily get caught in a loop of diversions that doesn't let us resolve *anything*. And addressing an issue usually isn't difficult.

Let's take the sibling example above. Imagine after your mother told your brother "Hitting is never okay!" he responded by saying "You're right, I shouldn't have hit my sister and it was wrong. I apologize. I'd like to talk about her calling me a jerk, though, as that hurt my feelings."

This isn't that much longer of a response, but probably strikes most of us as much more reasonable than "But what about..." — because it is! It's actually addressing the issue *before* exploring something else.

Look Who's Talking!



We can all make red herring arguments from time to time without meaning to. But if you see a speaker who *frequently* distracts from uncomfortable points, they're likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience. This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: Red Herrings



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VOCABULARY

red herring

something irrelevant that's introduced to distract from the actual argument

rhetorical strategy

any deliberate technique a speaker or writer uses to persuade, influence, or shape how an audience thinks or feels about an issue.

whataboutism

when someone deflects criticism or scrutiny by pointing to someone else's wrongdoing

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STRAW MAN ARGUMENTS

KAINAN JARRETTE AND DIANA DALY

WHAT IS A STRAW MAN ARGUMENT?

STRAW MAN

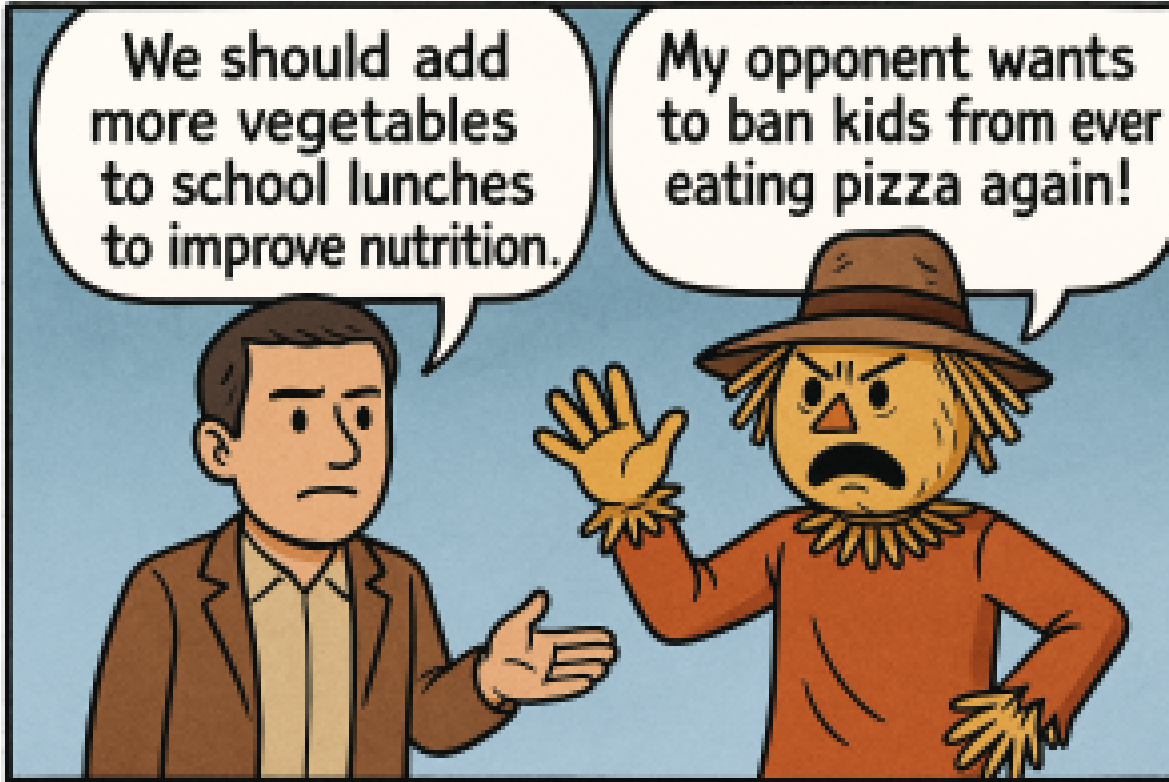


A **straw man argument** is when someone attacks a distorted, exaggerated, or oversimplified version of the argument that is actually being made.

The term comes from old practices like using straw-filled dummies for military drills or as scarecrows – they lack any real substance.

Imagine a friend told you “I just won a fight with a scarecrow!” It’s unlikely you’d find that very impressive.

EXAMPLES





HOW TO SPOT A STRAW MAN ARGUMENT

A straw man argument can be a little harder to spot, but here are some key points to look for when assessing an argument or response:

- *Lack of nuance*
 - When the original argument is talking about *specific* aspects of a person, institution, or idea but the response conflates this with talking about the *entirety* of that person, institution, or idea.
 - Example: "We should have some environmental regulations on business" becomes "You want to shut down all business."
- *Loaded words*
 - Similar to the above, look for absolutist words like "always," "never," "everyone," or "everything" (among others).
 - Example: "I think we should reduce our meat consumption" becomes "You want us to never eat meat."

- *Ignoring evidence*
 - If the original argument provided specific evidence, but the response acts as though it didn't.
 - Example: “Studies show a healthy sleep routine improves cognitive functioning” becomes “You can’t just magically become more intelligent by sleeping.”

When you’re looking at any type of response to an issue or argument, ask yourself:

**IS THIS REPRESENTATION
SUPPORTED BY
WHAT THE
OPPOSING SIDE
ACTUALLY SAID?**

If it isn't, you're looking at a straw man.

Principle of Charity

A good sign someone is arguing fairly is if they're trying to adhere to the **principle of charity** – assuming the most reasonable and rational interpretation of someone's statement or argument, even if it's flawed, before criticizing it. This is usually done by summarizing the argument in some form.

Unfortunately, this principle is not always seen on social media, which [rewards](#)¹ speed and outrage (and on some platforms has character or word limits). Given this, if you see a post criticizing an idea or argument, make sure you have a *good understanding of what the actual idea or argument is*. The best way to do this: hear the argument directly from the person making it, not from someone else's interpretation of it.

WHY STRAW MAN ARGUMENTS MATTER

Any type of argumentation – be it formal (a debate) or informal (social media posts) – isn't about *winning*, it's about trying to find truth or trying to persuade. Attacking a weakened form of an argument make feel like scoring points, but it doesn't do anything to actually strengthen your own argument or get any closer to truth.

Further, and perhaps more importantly, if you keep distorting what people say, you start to distort who you think they are. That's how arguments become personal and divisions get deeper.

This comes back to our concept of **epistemology**. You want to make sure you have an accurate view of the world, which includes the people that inhabit it.

Look Who's Talking!



Sometimes we can accidentally stumble into making a straw man argument out of a legitimate misunderstanding. But if you see a speaker who *frequently* misrepresents arguments, they're likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience. This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: Straw Man Arguments



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://opentextbooks.library.arizona.edu/decodingdeception/?p=74#h5p-2>

VOCABULARY

principle of charity

assuming the most reasonable and rational interpretation of someone's statement or argument, even if it's flawed, before criticizing it

rhetorical strategy

any deliberate technique a speaker or writer uses to persuade, influence, or shape how an audience thinks or feels about an issue.

straw man argument

when someone attacks a distorted, exaggerated, or oversimplified version of the argument that is actually being made

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AD HOMINEM ATTACKS

KAINAN JARRETTE AND DIANA DALY

WHAT IS AN AD HOMINEM ATTACK?

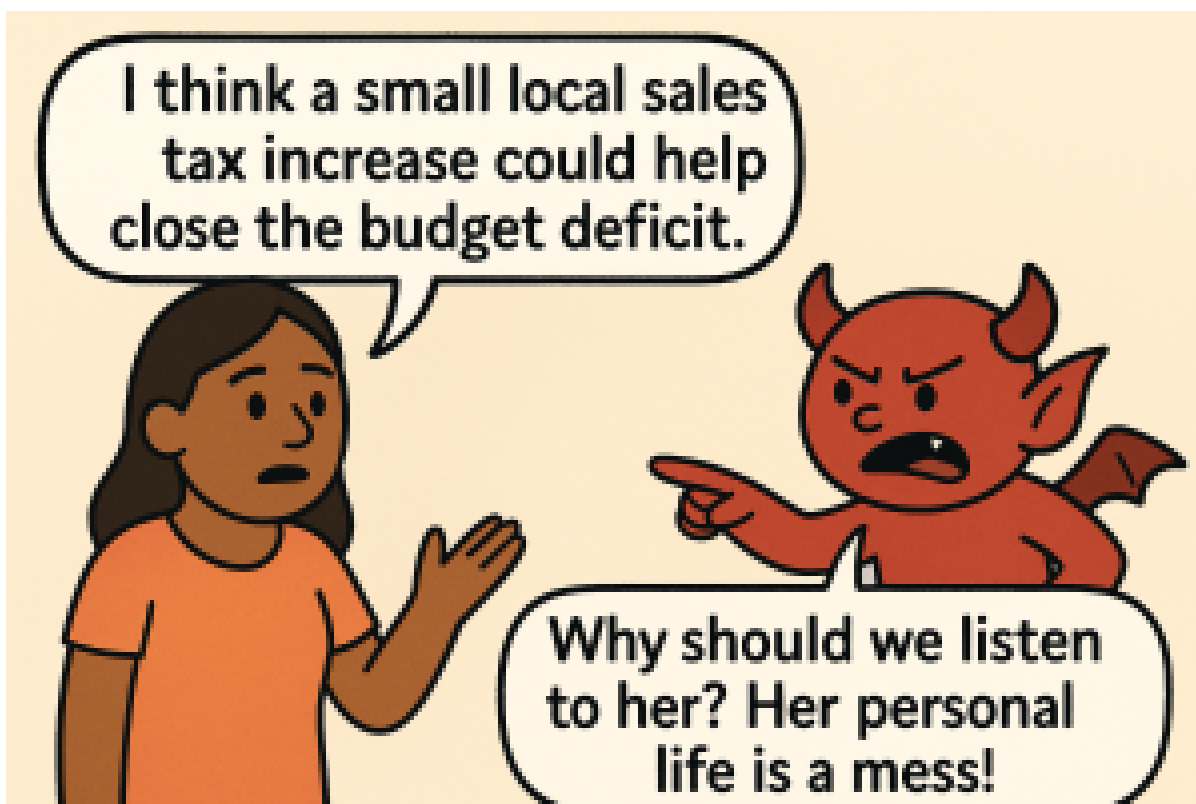
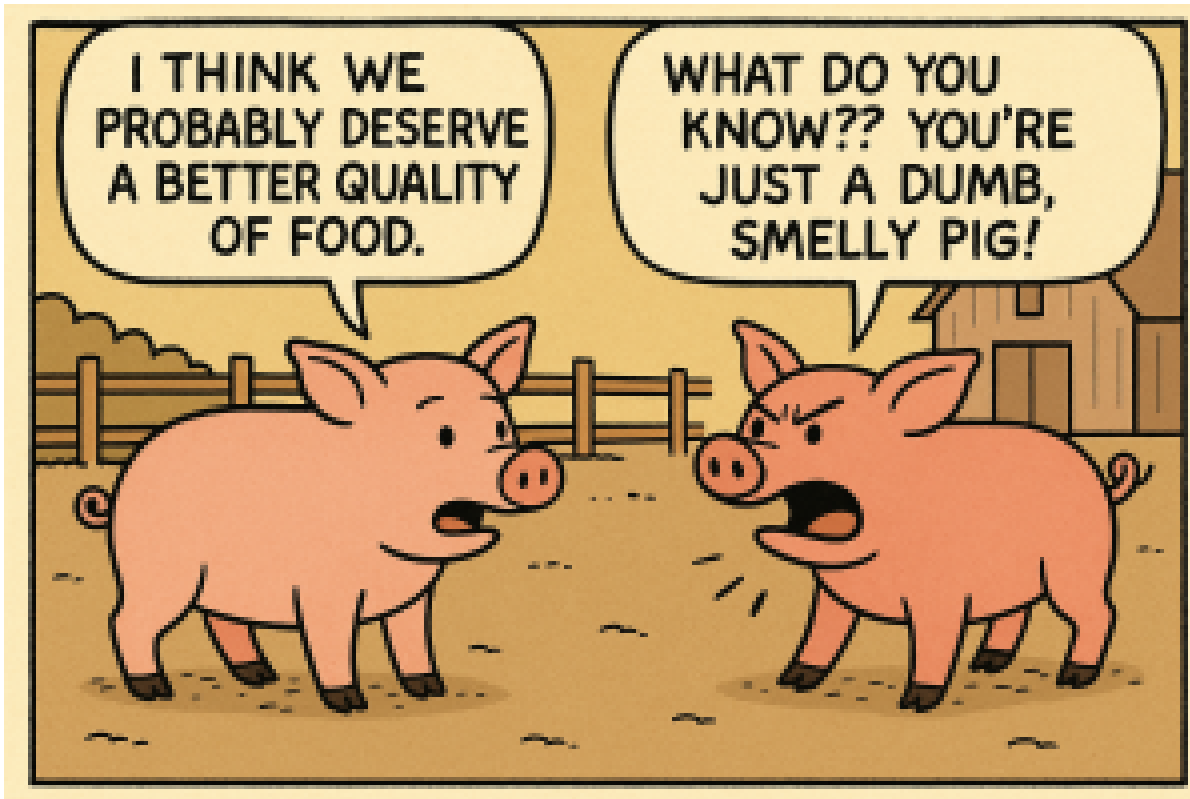
AD HOMINEM



An **ad hominem attack** is when someone attacks the speaker rather than the argument, as a means of invalidating the argument.

The term comes from Latin (yes, it's that old), meaning "to the person." It was popularized to a new level by philosopher [John Locke](#) in the 17th century.

EXAMPLES



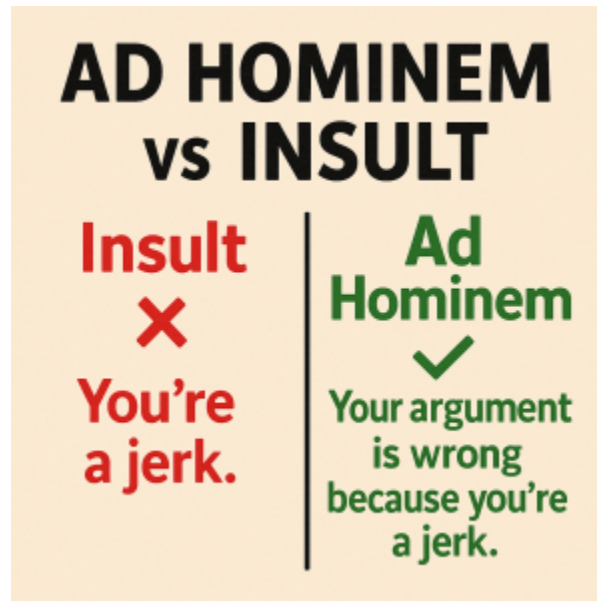
HOW TO SPOT AN AD HOMINEM ATTACK

Ad hominem attacks are usually very easy to spot because they target the speaker. However, we can often excuse or ignore them when they're attacking a speaker *we already don't like*.

As discussed below, though, ad hominem attacks are always counter-productive to true argumentation and logic – don't let them slide, no matter who is making them!

Ad Hominem Attacks vs Insults

There's an important distinction to make between ad hominem attacks and insults: an ad hominem attack is an insult *used to invalidate an argument*.



Exceptions

At this point, you may be asking yourself:

IS BRINGING UP SOMETHING PERSONAL ABOUT A SPEAKER ALWAYS AN AD HOMINEM ATTACK?

No, not necessarily! If the personal information about the speaker is truly *relevant* to what's being debated, then bringing it up may be appropriate.

However, there are generally only two areas it *would* be (potentially) relevant:

01. The speaker is part of the topic at hand.



02. The speaker is claiming expertise or authority on the topic at hand.



What's important to keep in mind is that the personal information that's brought up shouldn't feel like an insult. If, in the above cartoon, the response had been "You lost your medical license for malpractice *because you're a monster!*" the bulk of the response may be appropriate, but the insult undermines your credibility.

Remember: just stick to the facts.

WHY AD HOMINEM ATTACKS MATTER

Ad hominem attacks pull double duty, acting as both a personal insult and a distraction. They also have a particular allure because they directly tap into our emotions. But ultimately all an ad hominem attack does is help turn a civilized argument into a *fight*, increasing polarization.

Look Who's Talking!



All of us have emotions, and so we can all occasionally make the mistake of resorting to an ad hominem attack. But if you see a speaker who *frequently* insults opposing speakers, they're likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience. This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: Ad Hominem Attacks



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VOCABULARY

ad hominem attack

when someone attacks the speaker rather than the argument, as a means of invalidating the argument

rhetorical strategy

any deliberate technique a speaker or writer uses to persuade, influence, or shape how an audience thinks or feels about an issue.

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FALSE EQUIVALENCES

KAINAN JARRETTE AND DIANA DALY

WHAT IS A FALSE EQUIVALENCE?

FALSE EQUIVALENCE



A **false equivalence** is when someone is inaccurately equating two things as being equal.

You can also think of this in terms of one of our most popular English colloquialisms:

“It’s like comparing apples and oranges!”

EXAMPLES





HOW TO SPOT A FALSE EQUIVALENCE

Someone making a false equivalence will tend to focus on *any* similarities between the things being compared. For instance, someone might argue “apples and oranges are both fruit!” But if we’re debating which one has more vitamin c, that similarity doesn’t really matter.

What’s important is to look at the comparison and ask:

ARE THE SIMILARITIES RELEVANT AND MEANINGFUL?

- By **relevant**, we mean that the similarity should relate to the topic being discussed.
 - *Example: if the topic is nutrition, it's not relevant that a twinkie and a banana are both yellow*
- By **meaningful**, we mean that the two things being compared should share the trait to a similar degree.
 - *Example: a twinkie and a banana both technically provide nutrition, but they don't provide nearly the same degree of nutrition*

Factual Relativism

One of the most harmful false equivalences is **factual relativism** — the assertion that all ideas are inherently equal and valid, regardless of their content or the evidence to support them.

Take the following two arguments:

- *Argument 1* – “I believe [narwhals](#) exist. I've taken photos of them, I have other people who can confirm they've also seen them, and in fact we have one in captivity that anyone can come look at.”
- *Argument 2* – “I believe unicorns exist. But I haven't personally seen one, and there's nowhere I can point you to go see one for yourself.”

Do these two arguments feel equal to you? Most of us would say the first argument is stronger and more valid precisely because it offers evidence to support the claim.

So what's the harm in this? Well, imagine you had a panel meant to discuss animal life on the planet and you invited a biologist, a zoologist, an environmental scientist, and someone who believed unicorns were real. Audience members watching the panel might assume that the idea

of unicorns being real has more validity than it does, simply because it was given an “equal platform” with the ideas of the other panel members.

WHY FALSE EQUIVALENCES MATTER

One of the biggest problems with false equivalences is that, especially over time, they tend to flatten the world into an inaccurate “sameness.”

Firstly, this makes it much more difficult to make good, informed decisions. If someone has convinced you twinkies and bananas are basically the same, your dietary health will probably suffer.

Secondly, it can also breed **cynicism** — the belief that people’s motives are always selfish, dishonest, or corrupt, and that nothing is really trustworthy or worth believing. Let’s say you’ve been having a specific issue with your current cell-phone carrier, and you ask a friend if their cell-phone carrier has the same issue. Your friend responds “eh, they’re all the same, they all suck.” Not only is this not helpful, it can make you feel quite hopeless.

Lastly, it can platform and normalize **extremism**, especially through the factual relativism mentioned above. Rather than just being an “unpopular opinion,” extremism is a rigid and inflexible commitment to an idea, characterized by a complete unwillingness to even engage with evidence. It’s essentially like a child holding their hands to their ears and shouting “na na na, I’m not listening, I’m not listening!”

Perhaps most importantly, though, extremism can often lead to justification of violence and dehumanization — things a healthy society tries to avoid.

Look Who's Talking!

**I mean, they both
make fire!**



Everyone can make a false equivalence from time to time, especially as an honest misunderstanding. But if you see a speaker who *frequently* equates two things as being equal when they're not, they're likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience. This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: False Equivalences



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VOCABULARY

cynicism

the belief that people's motives are always selfish, dishonest, or corrupt, and that nothing is really trustworthy or worth believing

extremism

a rigid and inflexible commitment to an idea, characterized by a complete unwillingness to even engage with evidence

factual relativism

the assertion that all ideas are inherently equal and valid, regardless of their content or the evidence to support them

false equivalence

when someone is inaccurately equating two things as being equal

rhetorical strategy

any deliberate technique a speaker or writer uses to persuade, influence, or shape how an audience thinks or feels about an issue.

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GAME BREAK: LIAR'S LANDSCAPE

KAINAN JARRETTE AND DIANA DALY

LIAR'S LANDSCAPE

Liar's Landscape is an H5P game that teaches you about four common fallacies:

- Red Herrings
- Straw Men Arguments
- Ad Hominem Attacks
- False Equivalences

It's a quicker, streamlined, and more interactive way to learn about these fallacies, or to just refresh your knowledge!



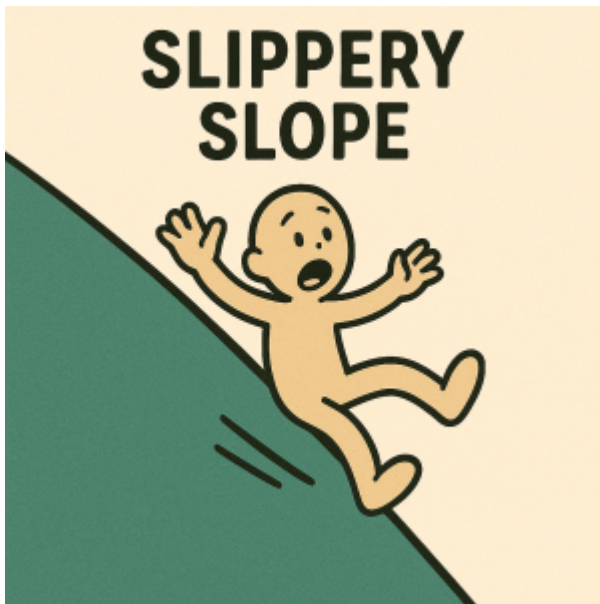
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SLIPPERY SLOPE ARGUMENTS

KAINAN JARRETTE AND DIANA DALY

WHAT IS A SLIPPERY SLOPE ARGUMENT?



A **slippery slope argument** is when someone asserts that accepting one idea or policy will unavoidably lead to a series of negative outcomes, without showing clear evidence for how or why those outcomes would actually follow.

It's essentially arguing that "if we take the first step of A, we will inevitably slide into Z."

The term as a metaphor has been used in various domains for at least a couple centuries, even before its more formal inclusion into logic and critical thinking.

EXAMPLES





HOW TO SPOT A SLIPPERY SLOPE ARGUMENT

Believe it or not, there was actually a time when people making this type of argument would just use the phrase "It's a slippery slope..." Unfortunately, people aren't usually *that* obvious anymore. But there's still **inevitability language** — the use of words and phrases that suggest something is certain and unavoidable — that can signal you may be dealing with a slippery slope argument. This includes:

- "The next thing you know..."
- "Once we start down this path..."
- "Before you know it..."
- "Where do we draw the line?"

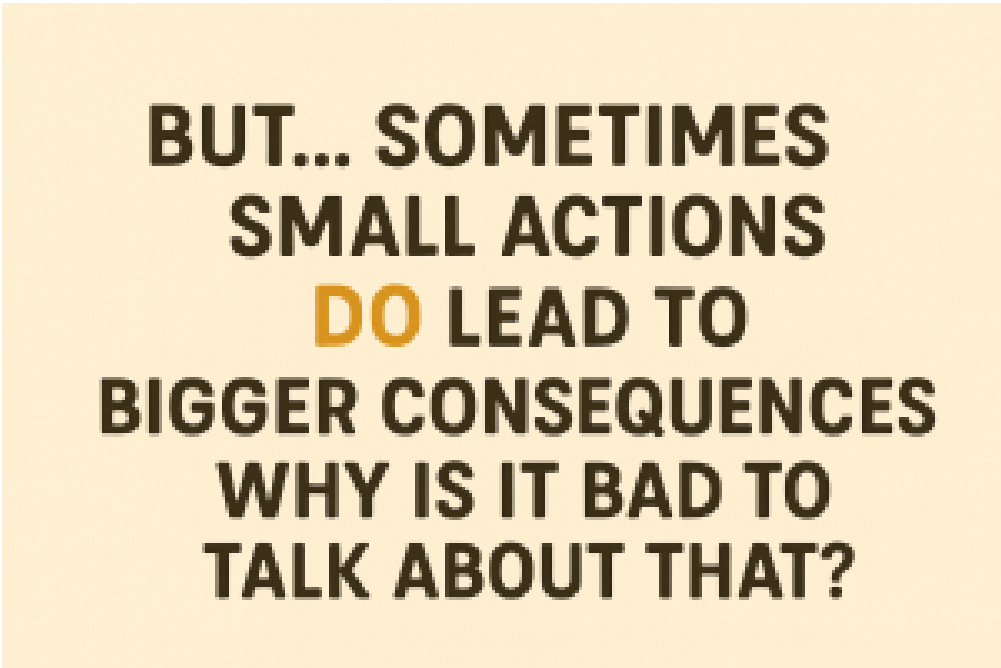
- “It’s only a matter of time before...”
- “First it’s [A], then it’s [B], then it’s [C], then it’s...”

Phrases like this are then followed by some type of exaggerated claim that is *many steps* away from the original action or policy being discussed.

For example, if you said “If you take a shower, then you’ll be wet” that wouldn’t involve any type of slippery slope. Being wet is the logical consequences of taking a shower. But if you said “If you take a shower, then you’ll slip in the water and break your head” that is a slippery slope (no pun intended). Injuring yourself is *not* a typical consequence of taking a shower.

There are Valid Chain-of-Consequences Arguments

Some readers may understandably be thinking to themselves at this point:



**BUT... SOMETIMES
SMALL ACTIONS
DO LEAD TO
BIGGER CONSEQUENCES
WHY IS IT BAD TO
TALK ABOUT THAT?**

The answer is: it’s not! Not every chain of consequences is a slippery slope. It’s only fallacious when the argument jumps from a minor premise to a major conclusion *without sufficient evidence or reasoning*.

Here are some components of a valid chain-of-consequences argument, as opposed to a slippery slope:

<u>Component</u>	<u>VALID ARGUMENT</u>	<u>SLIPPERY SLOPE</u>
<i>Each step in the chain is supported with evidence and reasoning.</i>	"If we remove these safety regulations, then more accidents will happen, because reports by the Consumer Product Safety Commission indicated that those regulations had reduced accidents after they were implemented."	"If we remove these safety regulations, then lots of people will die. Just think about it!"
<i>Intermediate steps in the chain are acknowledge and explained.</i>	"If we remove these safety regulations, then more car accidents will occur. If more car accidents occur, then insurance rates will likely go up. If insurance rates go up, you'll have less disposable income."	"If we remove these safety regulations that just means less money in your pocket!"
<i>The progression of the chain is both possible and probable.</i>	"If more car accidents occur, insurance rates are likely to go up."	"If more car accidents occur, they'll just start outlawing driving altogether."

WHY SLIPPERY SLOPE ARGUMENTS MATTER

When you sit down and logically work through a slippery slope argument, the error in reasoning is often fairly obvious. However, slippery slope arguments tend to make claims that aren't just exaggerated, but are *emotionally charged*. As we discussed in earlier chapters, arguments that appeal to our emotions can easily circumvent rational thinking.

This means slippery slope arguments can be very good at taking advantage of other **cognitive biases** like:

- **Loss aversion** – our tendency to feel the pain of a loss more intensely than the pleasure of an equivalent gain
- **Status quo bias** – when faced with a decision involving change, we tend to choose the option that keeps things as they are, even if there may be benefits to alternatives
- **Moral panic** – a disproportionate reaction to a perceived social problem, where the fear is often greater than the actual threat

Progress and advancement are important, be it culturally, politically, economically, etc. This doesn't mean every idea for change is good, but the only way to work that out is by logical reasoning through the idea. Slippery slope arguments hijack our emotions to manipulate us into favoring what we know over what we don't, so that we never even do the work of reasoning.

Look Who's Talking!



Sometimes our emotions can get the better of us and we can leap to a conclusion without good reasoning. But if you see a speaker who *frequently* seems to argue extreme or exaggerated outcomes as a consequence of small actions, they're likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience. This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: Slippery Slope Arguments



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<https://opentextbooks.library.arizona.edu/decodingdeception/?p=245#h5p-24>

VOCABULARY

inevitability language

the use of words and phrases that suggest something is certain and unavoidable

loss aversion

our tendency to feel the pain of a loss more intensely than the pleasure of an equivalent gain

moral panic

a disproportionate reaction to a perceived social problem, where the fear is often greater than the actual threat

slippery slope argument

when someone asserts that accepting one idea or policy will unavoidably lead to a series of negative outcomes, without showing clear evidence for how or why those outcomes would actually follow

status quo bias

when faced with a decision involving change, we tend to choose the option that keeps things as they are, even if there may be benefits to alternatives

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FALSE DILEMMAS

KAINAN JARRETTE AND DIANA DALY

WHAT IS A FALSE DILEMMA?

FALSE DILEMMA



A **false dilemma** (also called a *false dichotomy*) is when someone frames a situation as having only a very limited set of choices (usually two) when more actually exist.

It oversimplifies complex issues by acting like there are only two possible sides or outcomes, one of which is usually extreme and the other of which is usually unacceptable.

EXAMPLES





HOW TO SPOT A FALSE DILEMMA

False dilemmas are usually among the easier logical fallacies to spot, because they'll always involve presenting a situation as having limited options, and most situations in life have many options.

So when you see someone only offering a small number of choices (especially if it's only two), that should probably make you look closer at the argument.

However, as you can see from the examples, there is also a specific structure these arguments tend to take:

EITHER...

OR...

When you see “either/or” language, that’s another sign you should be on guard.

Do Some Things Actually Have Only Two Options?

There is a limited set of situations where there are only two (or around two) options, and they usually all involve a very specific context. These are things like:

- If you’re a student in a pass/fail class, you either pass the class or you fail the class.
- If you’re a member of a jury, you either find the defendant guilty or you find them not guilty (or the jury is hung).
- If you are trying to get pregnant, you either are pregnant or you aren’t pregnant.

What you might notice from these examples is that these are all things that are very unlikely to be debated in the first place. Students are familiar with the pass/fail system, most citizens understand the basics of how a jury works, people trying to get pregnant understand it’s dichotomous, and so on.

If a topic is being debated (be it formally or informally), that’s usually a sign that there are multiple options – hence why the topic is being debated in the first place.

WHY FALSE DILEMMAS MATTER

False dilemmas tend to polarize thinking by:

- Framing disagreement as opposition or threat (“you’re either with us or against us”)

- Pushing people toward *all-or-nothing* decisions
- Making moderate, mixed, or uncertain views invisible or unacceptable
- Creating a sense of urgency, fear, or identity crisis if you don't "choose a side"

Over time, this pushes people away from nuanced thinking and into **extremism**.

Extremism and polarization has become a particular issue in recent years, as seen in the continued laments of our country being "more divided than ever." False dilemmas only make that situation worse, undermining many of the systems and philosophies that make a society function in a healthy manner.

Look Who's Talking!



It's possible to be mistaken about the possible options of a situation and accidentally fall into a false dilemma. But if you see a speaker who *frequently* seems to frame issues as all-or-nothing, they're likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience (and shut down debate). This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: False Dilemmas



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VOCABULARY

false dilemma

when someone frames a situation as having only a very limited set of choices – usually two – when more actually exist; (also called a false dichotomy)

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APPEAL TO AUTHORITY

KAINAN JARRETTE AND DIANA DALY

WHAT IS AN APPEAL TO AUTHORITY?

APPEAL TO AUTHORITY



An **appeal to authority** is when someone claims a belief must be true solely because an authority figure said so, without critically examining whether the authority is relevant or reliable.

As we'll cover below, there are valid ways to use certain figures of contextual authority to support an argument. Using an authority becomes fallacious when it's irrelevant and circumvents the actual process of reasoning and evidence.

EXAMPLES





HOW TO SPOT AN APPEAL TO AUTHORITY

Appeals to authority can sometimes be tricky to spot, because we live in a world where a *lot* of people claim authority on a wide variety of topics.

When someone is using an authority as evidence to support their claim, focus on these three questions:

Is This Authority Relevant?

At the most basic level, you want to make sure that the authority being appealed to has expertise on the actual topic at hand. As an example, if you're discussing climate change, it probably wouldn't be relevant to use the opinion of a geneticist. The geneticist is very likely intelligent, but that doesn't mean they have authority in unrelated domains.

AUTHORITY IN ONE AREA DOES NOT GUARANTEE AUTHORITY IN ANOTHER

While this may seem obvious, this is often hard to do thanks to a cognitive bias called the **halo effect**, where we assume that because someone is good, smart, or credible in one domain, they must be equally trustworthy in others.

People can experience this bias even when evaluating themselves, leading to mistakes like:

- A high-performing athlete in one sport assuming they'll be equally good at all sports
- A CEO of a popular engineering company assuming they can run a social media platform with equal success
- A famous businessperson or actor assuming they're equally qualified for politics

Unfortunately, though, being good in one domain often has little bearing on ability in a different domain. When someone is referencing an authority as part of their argument, what's important *isn't* if that authority is generally smart or nice.

What's important is: does their authority actually extend to the topic being discussed?

Is This Authority Reliable?

Even if you've established that someone's authority is in the proper domain of what's being discussed, this still doesn't mean they're a valid and reliable source of information.

AUTHORITY DOES NOT GUARANTEE RELIABILITY

There are doctors who spread medical misinformation, politicians who spread political misinformation, scientists who spread science misinformation, and so on.

When an authority is being referenced, some important points to investigate include:

- Is this person generally respected in their field or are they considered fringe?
- Does this person have a history of lying or spreading misinformation?
- Does this person have any **conflicts of interest** (such as paid endorsement) related to this topic or claim?

As a general rule, if a single authority's view on something is valid and reliable, many other related authorities can also be referenced to support the claim. Which leads nicely into our last question:

Is This Authority the Sole Piece of Evidence Being Provided?

While it's valid to use relevant and reliable authorities as part of support for a claim, remember that:

AUTHORITY IS NOT A REPLACEMENT FOR EVIDENCE

For example, if you were debating the efficacy of vaccines, it wouldn't be a very strong argument to say "Well, my dad is a doctor and he says they're fine."

Instead, a strong argument for vaccinations might look like:

- Referencing the overwhelming medical consensus that they're safe
- Referencing [studies](#) showing what the actual side-effects of vaccinations are (and their likelihood of occurring)¹
- Referencing the fact that the modern day vaccination scare was created by a single man who lost his medical credentials for [fabricating](#) evidence²

Strong arguments are often based on robust and varied evidence. If someone is trying to end a debate with a single appeal to an authority, that's a major red flag.

WHY APPEALS TO AUTHORITY MATTER

Authority of any kind can be very naturally convincing to us, even when it's entirely misplaced or irrelevant. Further, it's arguably never been easier for someone to simply claim authority on a topic they have very little understanding of.

This very idea can often be used to obfuscate the very idea of evidence and truth. It's not uncommon in popular media now to hear things like "Well, you have your experts you can reference and I have mine, so who's to say who's right?"

But not all expertise and authority are equal, and while untangling that may require work, it doesn't mean that the search for truth is meaningless or impossible.

Using authorities in this way usually ends up tying into the idea of **group identity** we discussed

in an earlier chapter. The goal is to get people to redefine authority not through relevance and reliability, but through in-group association. A “valid authority” becomes anyone who agrees with the group, and any authority that disagrees is dismissed entirely.

Once this happens, false authorities can become super-spreaders of misinformation within that group or community, because of the high degree of misplaced trust.

Look Who’s Talking!



Sometimes we all take a shortcut and appeal to an authority when we probably shouldn’t. But if you see a speaker who *frequently* appeals to authority figures (particularly if they are the same figures) instead of providing evidence, they’re likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience (and shut down debate). This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: Appeal to Authority



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VOCABULARY

appeal to authority

when someone claims a belief must be true solely because an authority figure said so, without critically examining whether the authority is relevant or reliable

halo effect

a cognitive bias where we assume that because someone is good, smart, or credible in one domain, they must be equally trustworthy in others

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HASTY GENERALIZATIONS

KAINAN JARRETTE AND DIANA DALY

WHAT IS A HASTY GENERALIZATION?

HASTY GENERALIZATION



A **hasty generalization** is when someone draws a conclusion about a group, trend, or idea based on a small or unrepresentative sample.

Basically, it's jumping to conclusions based on too little and too weak of evidence (such as personal anecdotes or experience).

You can also think of this in terms of the colloquial English phrase "painting with a broad brush."

EXAMPLES





HOW TO SPOT A HASTY GENERALIZATION

Hasty generalizations can be both easy and difficult to spot, depending on the context. Importantly, if the generalization tends to match our existing beliefs, our **cognitive bias** means we'll more readily accept it.

Here are some things to look for that may indicate you're dealing with a hasty generalization:

- *Absolutist Language*
 - Are words like "everyone," "nobody," "always," "never," "all," etc. being used?
- *Stereotypes*
 - Does the argument rely on existing stereotypes about a group?
- *Personal Anecdotes*

- Are the only examples being provided from personal experience?

Anecdotes, Evidence, and Experience



clowns) are actually violent.

There is a fine line to walk when talking about anecdotes and personal experience. Personal experience is relevant to an individual, as it's almost certainly shaping that individual's thoughts and beliefs. The idea is not to entirely invalidate that personal experience can be meaningful. Rather, it's to acknowledge that personal experience is quite often not as representative of the greater whole as it sometimes feels like.

Let's say you get attacked by someone dressed as a clown. It's reasonable in your **subjective** experience to develop a nervousness around clowns as a result. However, **objectively** speaking, your personal experience doesn't prove that all clowns (or even most

When Generalizations Are Okay

There are times when generalizations are relatively accurate and can be used. Take, for example, the claim "smoking causes cancer." We largely accept this as an obvious truth now, because it is generally true. But let's look at a couple key points that set this claim apart from a *hasty* generalization:

- *There is an overwhelming amount of scientific evidence to support the claim*
 - There are hundreds of studies and replications done over several decades that [support](#) the idea that there is a *causal* link between smoking and developing cancer.¹
- *The claim is understood to not be literal, instead meaning "smoking significantly increases your chances of developing cancer"*
 - If you were to ask most scientists or doctors "does smoking *guarantee* you'll develop cancer?" they would tell you no. The claim isn't seeking to assert something is absolute, only that its likelihood is high enough that it poses a significant risk.

A generalization is usually considered **hasty** when it *lacks sufficient evidence* and *seeks to be absolute*.

WHY HASTY GENERALIZATIONS MATTER

Hasty generalizations can have a profoundly negative effect both on a personal level and a broader societal level.

On a personal level, they can lead to bad decision-making. If, for instance, you let one bad experience with a dentist prevent you from ever going to a dentist again, your teeth are likely to suffer as a result.

On a societal level, they can fuel stereotypes and prejudice. They flatten the variation that's usually seen in most groups into something monolithic, either by asserting that everyone in the group is entirely negative or entirely positive. This type of oversimplification makes **misinformation** using this fallacy spread quickly and easily.

Ultimately, hasty generalizations undermine **critical thinking**. When we jump to a conclusion, we're inherently not doing the work of reasoning.

Look Who's Talking!



It's human to jump the gun a little, and make an assertion before there's sufficient evidence to support it. But if you see a speaker who *frequently* generalizes complex topics or groups, they're likely doing so as an intentional **rhetorical strategy**, meant to manipulate the audience (and shut down debate). This should raise serious red flags, as it undermines their credibility as an accurate source of information.

Knowledge Check: Hasty Generalizations



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://opentextbooks.library.arizona.edu/decodingdeception/?p=587#h5p-27>

VOCABULARY

hasty generalization

when someone draws a conclusion about a group, trend, or idea based on a small or unrepresentative sample

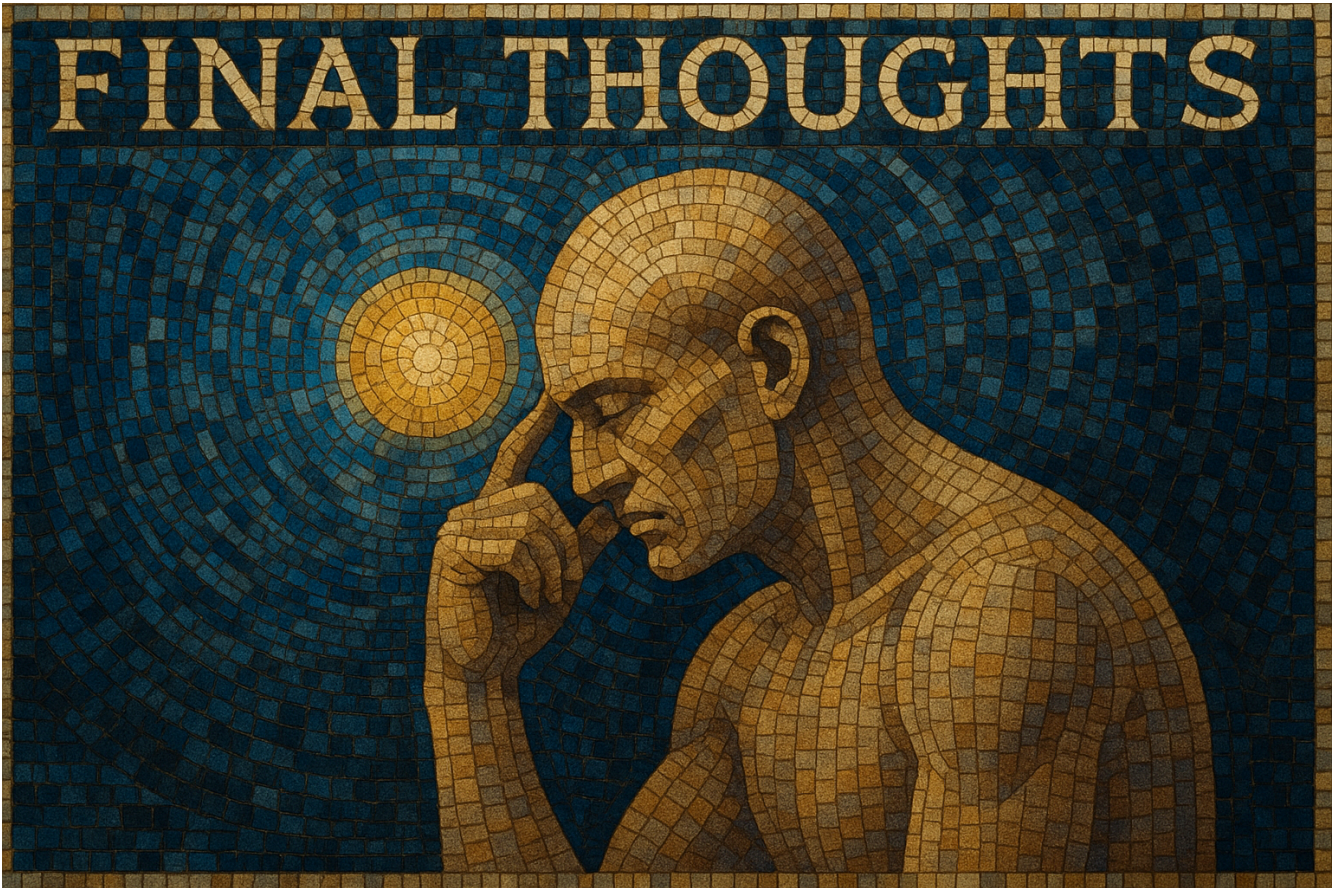
REFERENCES

¹ Lee, P. N., Forey, B. A., & Coombs, K. J. (2012). Systematic review with meta-analysis of the epidemiological evidence in the 1900s relating smoking to lung cancer. *BMC cancer*, 12, 385. <https://doi.org/10.1186/1471-2407-12-385>

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FINAL THOUGHTS



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AI AND THIS BOOK

KAINAN JARRETTE AND DIANA DALY

AI AND THIS BOOK

AI can be an incredibly helpful tool, but it’s important to be transparent about its use. When developing this book, we used AI (mostly ChatGPT and occasionally Google Gemini) for support in various areas:

Help with Wording for Definitions

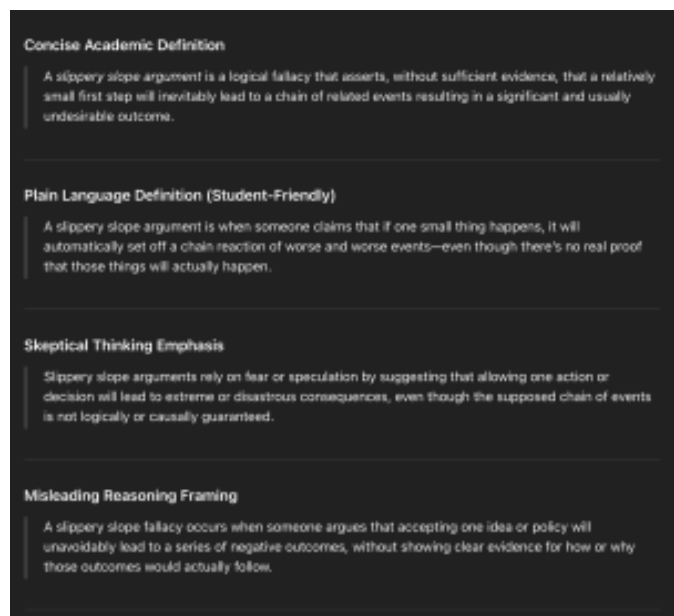
How terminology is defined is very important, particularly when first introducing that terminology to readers. You don’t want something overly complicated or detailed, but you also don’t want something that’s oversimplified.

Typically, we would ask AI to generate several different definitions of a term, each of varying complexity or aimed at different audiences. We would then take what we liked from those options to create a “hybrid” definition that we felt was most appropriate for this book.

Help Creating Images

Neither of the authors of this book have particularly good or fast illustration skills, nor did we have enough funding to hire a professional illustrator. As such, we used generative AI to help us create images.

From previous work, we knew that it’s both quicker and more fun to not hand everything over



Some examples of different definitions of “slippery slope” provided by AI

to AI. Prompts were often pretty specific in terms of content, framing, etc, as opposed to overly broad. We'll give an example below.

An overly broad prompt would look like:

Generate a cartoon showing a slippery slope argument.

Which created this image:



If anyone can figure out what's actually happening here, please let us know!

A more specific prompt (that we used for an image in this book) would be:

Make me an image of:

- *Two cartoon monkeys*
- *One monkey is on the right side of the frame and is holding out (offering) a banana to the second monkey who is on the left side of the frame*
- *The second monkey (the one on the left side of the frame) is holding its hand out to decline the banana*
- *The second monkey (the one on the left side of the frame) is also saying "If I have one now, tomorrow I'll have a dozen, and by the end of the week there won't even be any left."*

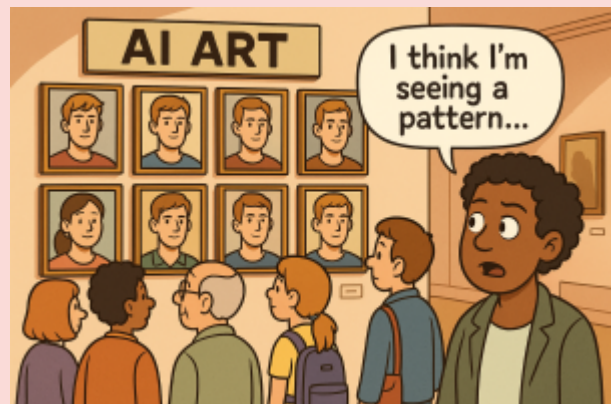
Which created this image:



An Example of AI Bias

When it came to images involving people, we would usually try to include in the prompt that the people should be a random gender and ethnicity (and, in some cases, a random age). This was due to our quick realization that AI has a natural tendency to create its human characters as young white men.

While certainly not perfect, asking it to randomize gender and ethnicity hopefully helped to create at least slightly more diversity and representation among the images.



Help Brainstorming Examples



Some AI generated examples of a slippery slope argument

Help With Visual Theme Decisions

It was important to us that the book not simply be aesthetically pleasing to our personal tastes, but have aesthetics that helped match best design and learning practices. To this end, we asked AI to help identify best practices for things like what fonts we used and what color schemes we used.

This is mostly referring to the [Logical Fallacies](#) section of this book. We would ask AI to provide us with a lists of examples of whatever fallacy we were covering, often generating between 10-20 examples. These would typically be broken down into “general” examples and “context specific” examples (meaning situations readers would be more likely to encounter in their own lives).

These examples were used to help create both cartoon images found in the chapters, as well as questions in the various Knowledge Checks.

It was rare that we would directly use one of those examples, but it was helpful to provide some structure for our own creativity. For instance, the above example of a slippery slope using monkeys came about as an adaptation of an example AI gave us of a human character rejecting cookies.

AI THINK YOU SHOULD TRY AGAIN

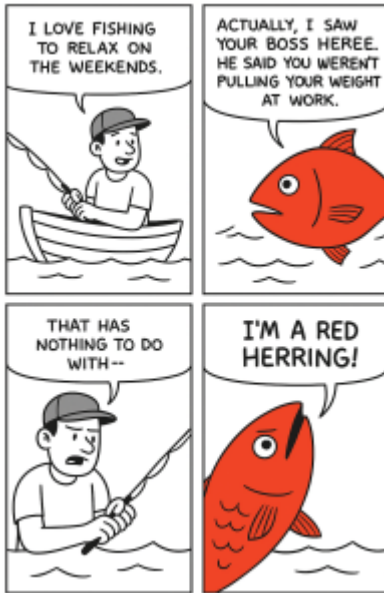


While there are definitely impressive aspects of how AI can generate art, it's far from actually replicating a real human artist. Below are some fun examples of early or unused drafts of images for this book, all highlighting some issues with generating AI art.

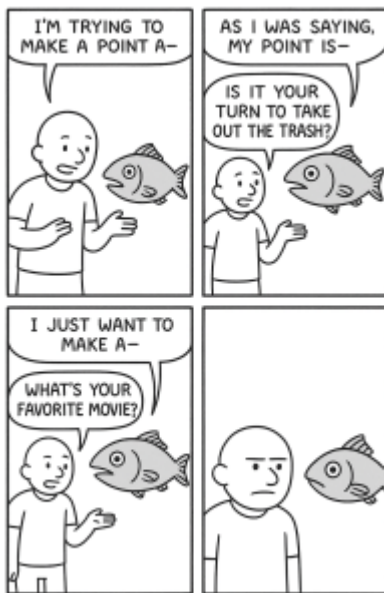
Close, but No Red Herring

As discussed above, overly broad prompts leave too much to an AI's "imagination"... and its imagination isn't very good, nor is it very coherent. These comics were based on an overly broad prompt looking to generate a comic humorously showing a red herring argument.

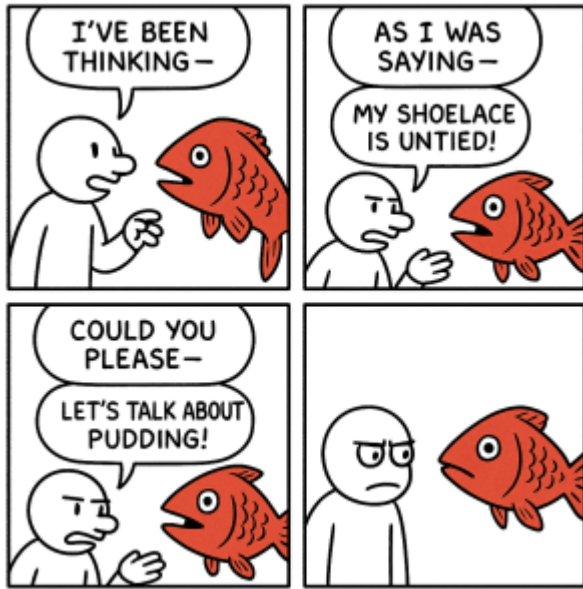
What's interesting to note is how the AI seems to understand the general structure it's going for, but is seemingly lost on how to fill that structure in with appropriate content.



A little on the nose...



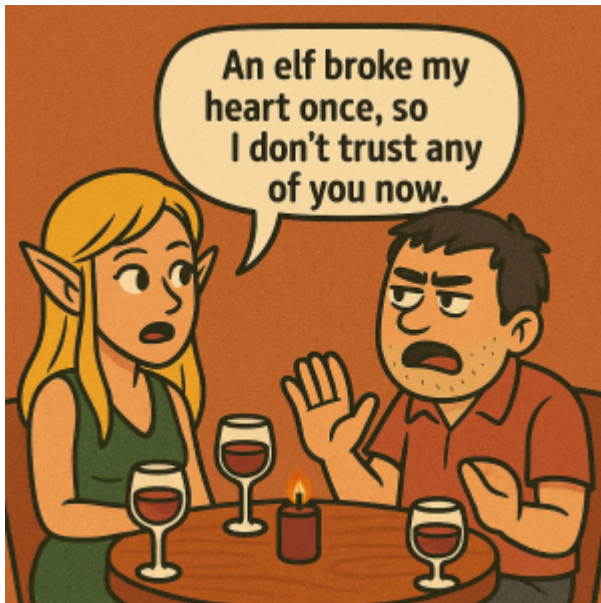
Wait, who's the red herring here?



Let's talk about pudding!

Not Too Cold, Not Too Hot, Just Right

Other times, AI can get the basics pretty well, but needs some fine tuning. Below shows some stages of a cartoon we ended up using:



First attempt; several clear errors present



Third attempt; no flaws, but style is slightly too detailed



Final attempt; a happy middle-ground

Extra Appendages and Missing Windows

Sometimes, even when you have more specific prompts, AI can still make mistakes that it's unlikely a human would make. For instance, adding extra appendages (like tails), or forgetting that cars have windshields.



Two tails are better than one, right?



I think the real crime is this cartoon.

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CONCLUSION

KAINAN JARRETTE AND DIANA DALY

REVISITING THE CORE JOURNEY

We've gone over a lot in this book, and as we come to an end, it may be helpful to recap the areas we've hit.

In [Epistemology](#), we discussed how we know what we know. This included clarifying the difference between **knowledge** and **belief**, defining the characteristics of strong **evidence**, and covering the concept of **The Burden of Proof**. Ultimately, we learned that it's important to think about *why* we believe what we believe.



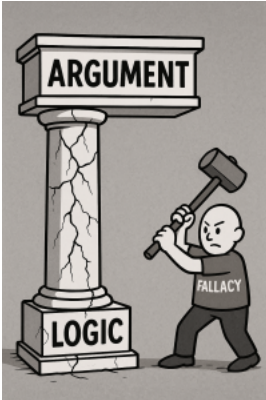
In [Cognitive Bias](#), we covered how the brain's hidden shortcuts and traps can influence how we engage with information. This included investigating biases like **Confirmation Bias**, **Motivated Reasoning**, and the **Illusory Truth Effect**. Ultimately, we learned that it's important to be aware of and to manage our biases.

In [Logic and Intuition](#), we compared rational analysis and gut feeling. This included going over the various ways our intuition fails us, including statistical thinking, large-scale systems, self-assessment, and situations that heavily involve our emotions and identity. Ultimately, we learned that reality often works in ways that feel contrary to our intuition.



In [Media Literacy](#), we discussed how to navigate information sources with a critical eye. This included covering the SIFT method for when you encounter a piece of media, as well as typical red flags and fake green flags of untrustworthy sources. Ultimately, we learned that credible media avoids emotional manipulation and provides context, evidence, and transparency.

In [AI Literacy](#), we covered some of the current state of AI tools and their pitfalls. This included dispelling some myths around AI, covering ways AI can fuel misinformation (such as hallucinations and absorbing bias), and tips for how to use AI wisely. Ultimately, we learned to have a healthy skepticism about the information AI provides, as well as to use AI as a collaborative tool rather than a replacement for our own thinking.



In the chapters on [Logical Fallacies](#), we covered various errors in reasoning that commonly show up in misinformation. This included how to spot [Red Herrings](#), [Straw Man Arguments](#), [Ad Hominem Attacks](#), [False Equivalences](#), [Slippery Slope Arguments](#), [False Dilemmas](#), [Appeals to Authority](#), and [Hasty Generalizations](#). Ultimately, we learned that while logical fallacies can oftentimes feel appealing, they ultimately lack good reasoning and only serve to undermine an argument.

A FRAMEWORK FOR CRITICAL THINKING

In the interest of making a TL;DR section for this entire book, it may be useful to distill all of what we've covered into a **Five Question Filter** for when you encounter new media and information.

FIVE QUESTION FILTER

01. WHERE DOES THIS INFORMATION COME FROM?
02. WHAT SUPPORTS IT, AND HOW RELIABLE IS THAT EVIDENCE?
03. DOES THE REASONING HOLD UP?
04. WHAT BIASES (MINE OR THEIRS) MIGHT BE AT PLAY?
05. WHAT'S MISSING OR LEFT UNSAID?

EMPOWERMENT, HUMILITY, AND SHARED RESPONSIBILITY

Hopefully this book has given you some new tools and insights around **critical thinking** to help you better navigate the increasingly messy and complicated information landscape. Having the means to slow down when information feels overwhelming, ask better questions, and recognize

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This is where you can add appendices or other back matter.

VERSION UPDATE HISTORY AND NOTES ON ADAPTING THIS BOOK

KAINAN JARRETTE AND DIANA DALY

A NOTE ON ADAPTING THIS BOOK

Thank you for your interest in this resource! You are welcome to copy this book using the Pressbooks cloning process for more customized use. Please be aware, however, that large H5P content such as the Liar’s Landscape game may not copy over due to its size. Contact your Pressbooks administrator to learn more.

CURRENT VERSION: 1.1

About Update History

In the future, there may be certain parts of this book that are updated or expanded. This page will track those changes based on release “versions.”

Revisions and Updates We May Make

- Minor re-wordings or re-phrasings of concepts
 - Largely based on student and instructor feedback. If the wording of something seems to be a consistent problem, we’ll try to update it appropriately.
- Expanding chapter material
 - We may decide we want to expand on an idea in a chapter with a little more content or context
- Adding new parts and chapters
 - There may be new concepts, areas, or fallacies we want to explore that warrant

having a whole new chapter

- Expanding the question bank for H5P quizzes
 - We may add more questions into the bank the quizzes pull from to provide a more diverse experience between users

What We WILL NOT Change

We don't want instructors to feel like this book will constantly be going through massive changes and be unreliable as a result. The following are things we are committed to keeping as constants throughout any versions:

- Parts and chapters will never be removed.
- Concepts and glossary terms will never be removed.
- H5P content will never be removed.

VERSION HISTORY

Version 1.1 (08/19/2025)

- Added alternate text descriptions to all images in the book (including H5P content).
- Re-coded heading structure for better accessibility

Version 1.0 (08/18/2025)

- Full initial publication date: 08/14/25

ABOUT THE AUTHORS

Diana Daly is an associate professor in information science at the University of Arizona. A qualitative researcher and award-winning educator, her work touches on many information-related issues including trust and manipulation and complex questions around artificial intelligence and academic integrity. Dr. Daly is also the author of *Humans R Social Media*, a popular OER and Pressbooks' August 2024 book of the month. She enjoys spending time with her family and hiking in the mountains of Tucson with her dog Rita Perrita.

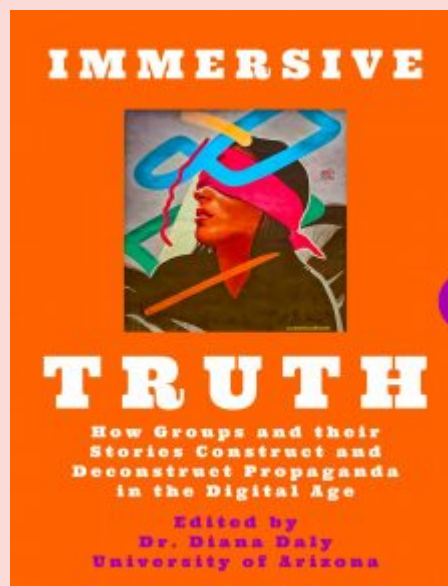
Kainan Jarrette is a student studying psychology at University of Arizona. He met Dr. Daly at an improvisational theater class, eventually becoming her research assistant in studies and intervention materials related to misinformation. Kainan has developed a passion for trying to teach critical thinking and looks forward to future projects in this field. He currently lives with his girlfriend and two cats, Dude and Margo.

OTHER OER WORKS BY DIANA DALY AND KAINAN JARRETTE



HUMANS R SOCIAL MEDIA – 2024 “LIVING BOOK” EDITION

Diana Daly; Jacquie Kuru; Nathan Schneider; Alexandria Fripp;



IMMERSIVE TRUTH

Diana Daly; Kainan Jarrette;