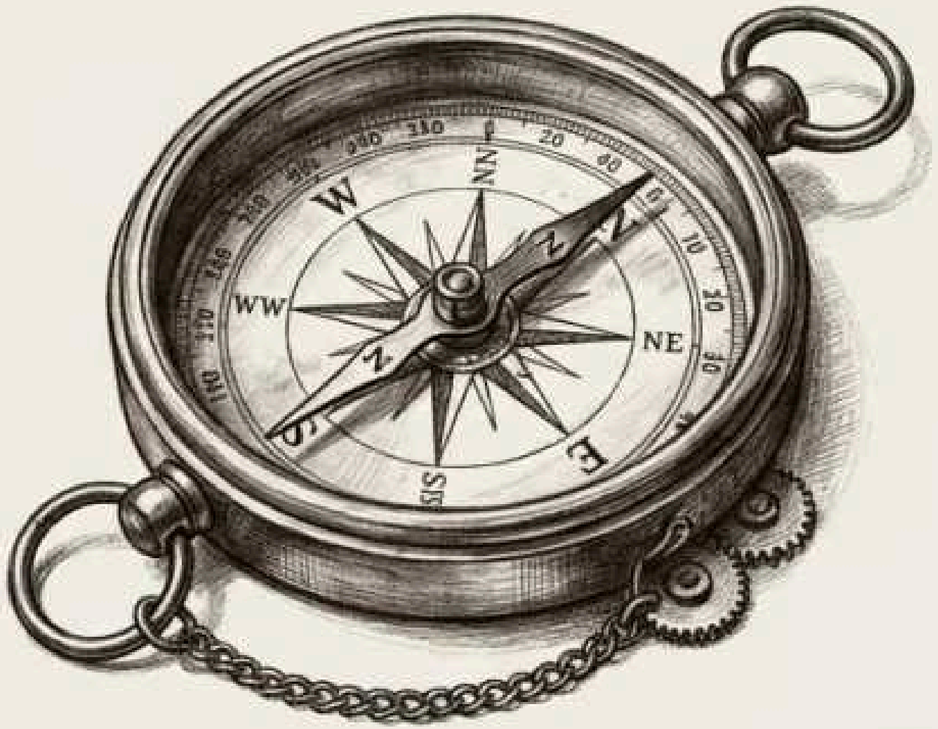
¶6.1

Welcome to Lecture 6: Induction and Everyday Critical Thinking

How inductive arguments work.



How to think critically every day.

How strong they can be.

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The Leap from Certainty to Likelihood

Deduction



True premises guarantee a true conclusion. (Certainty)

Induction



Evidence makes a conclusion likely, but not certain. (Probability)

Real life relies on induction: predicting the weather, diagnosing illnesses, and deciding whom to trust.

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The Anatomy of a Cogent Argument

True Premises + **Strong Inductive Argument** = **Cogent (Convincing)**



Unlike deduction, inductive strength comes in degrees.

More evidence usually pushes the needle stronger.

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¶ 6.4

Form 1: Inductive Generalization



Observe Sample
(Every raven I have seen is black)

⇨

Predict Whole Group
(All ravens are black)

Sample Criteria for Strength:

- ☑ Large enough.
- ☑ Representative (reflects the whole population fairly).

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The 1936 Polling Cautionary Tale

The Event: A magazine surveyed millions in 1936 predicting a Republican landslide. He lost badly.



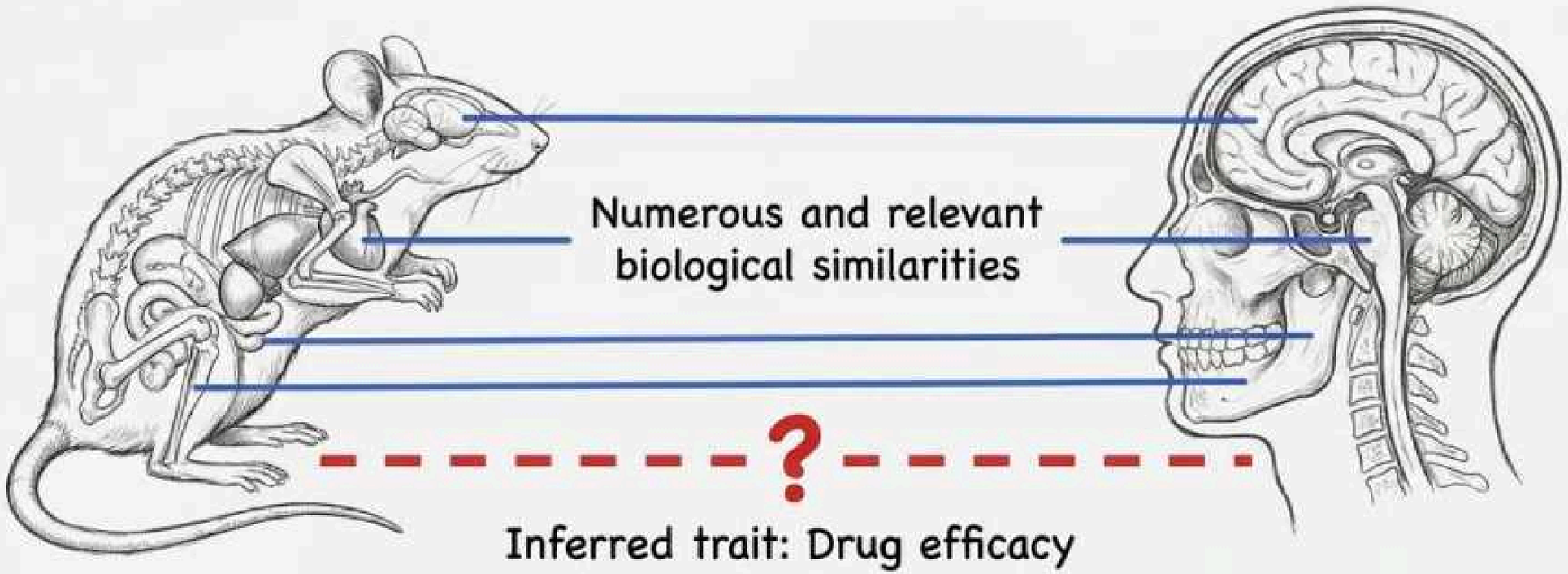
The Flaw: The sample was drawn from phone books and car registrations, overrepresenting wealthy voters during the Great Depression.

The Lesson: A huge sample is completely useless if it is biased.

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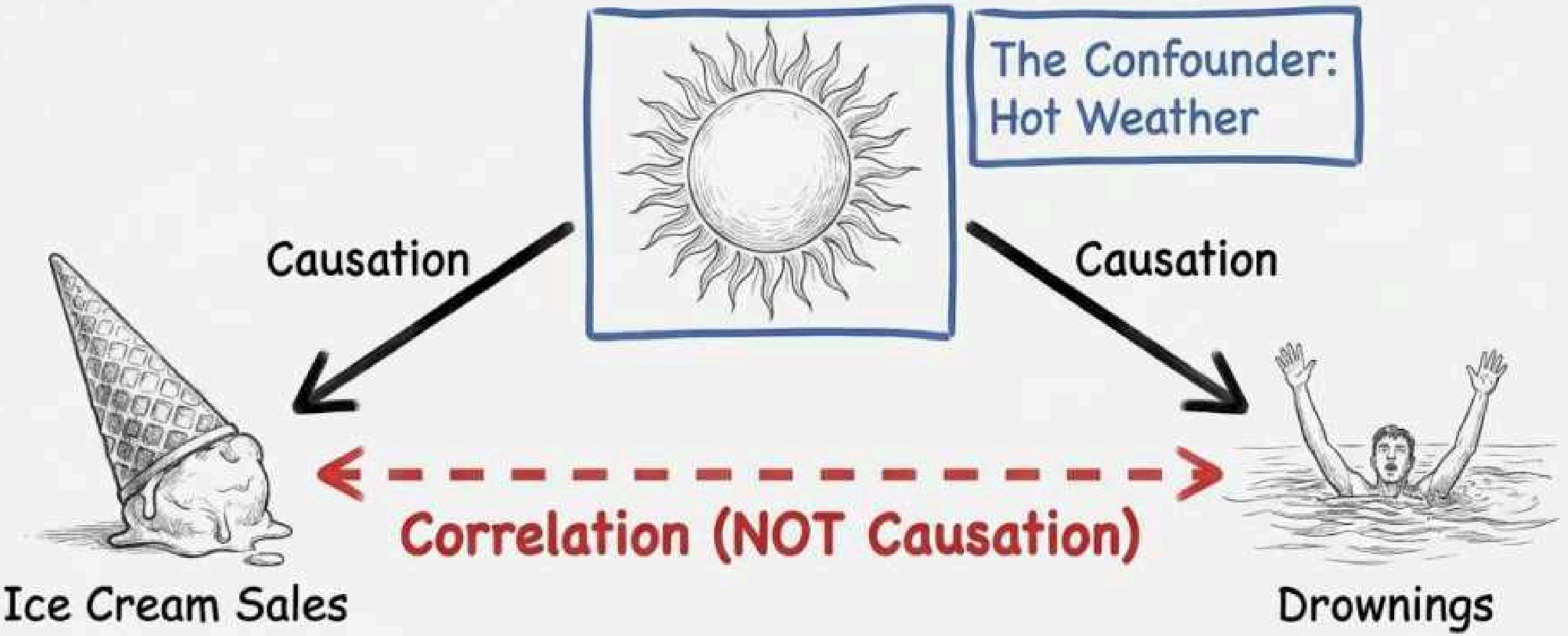
¶ 6.6

Form 2: Argument from Analogy



Two things alike in known ways are probably alike in another. Stronger when similarities are numerous, weaker when there are important differences.

Form 3: Causal Reasoning and Confounders

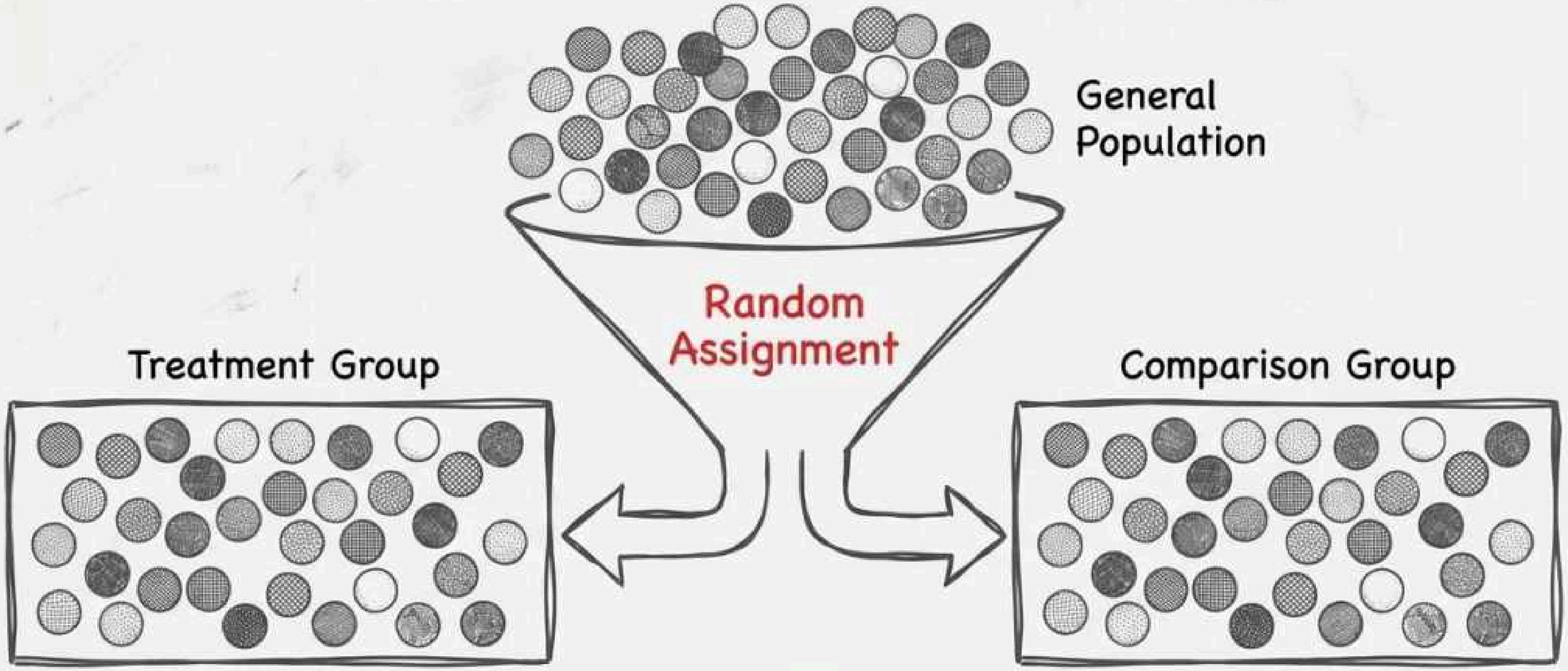


Before claiming a cause, look for hidden third factors, and consider whether the cause and effect might simply be reversed.

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The Gold Standard: Controlled Experiments

¶ 6.8

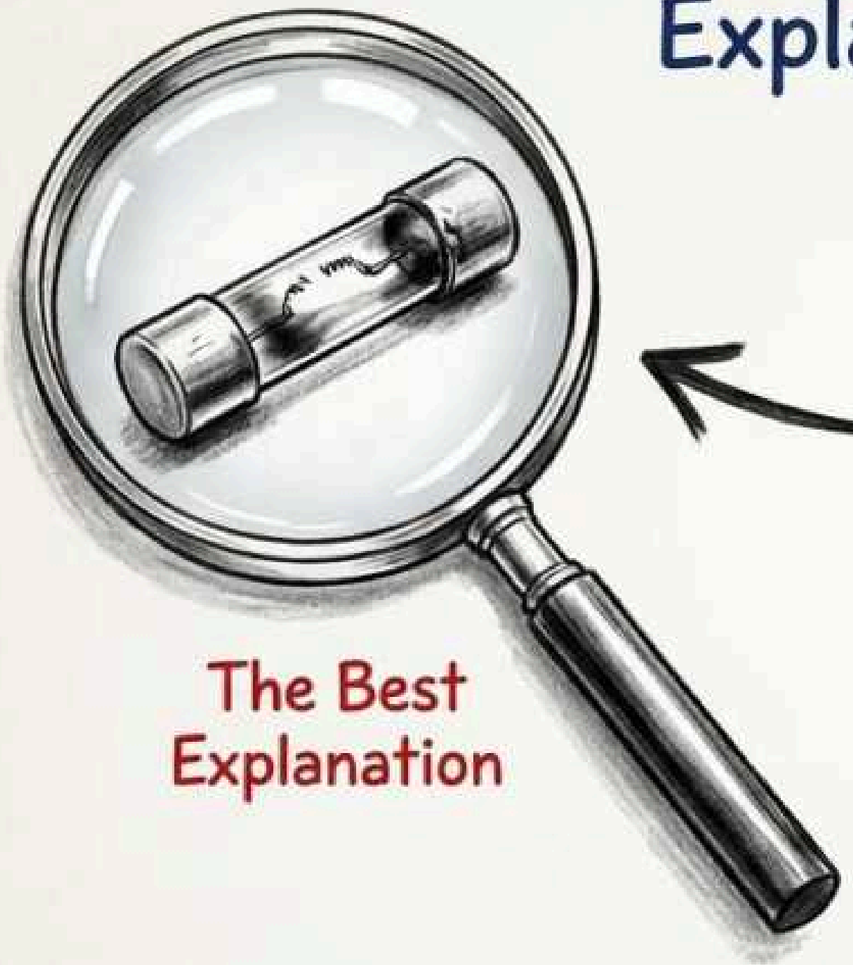


Random assignment spreads all hidden factors evenly. If the groups differ afterward, the treatment is the likely reason—something observation alone can never guarantee.

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Form 4: Inference to the Best Explanation (Abduction)

¶ 6.9

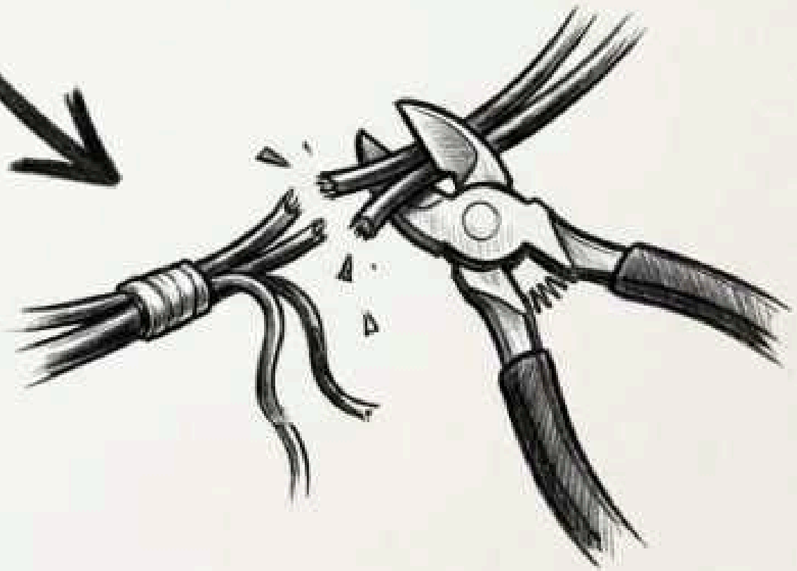


The Best Explanation



The Evidence: The Lights Go Out

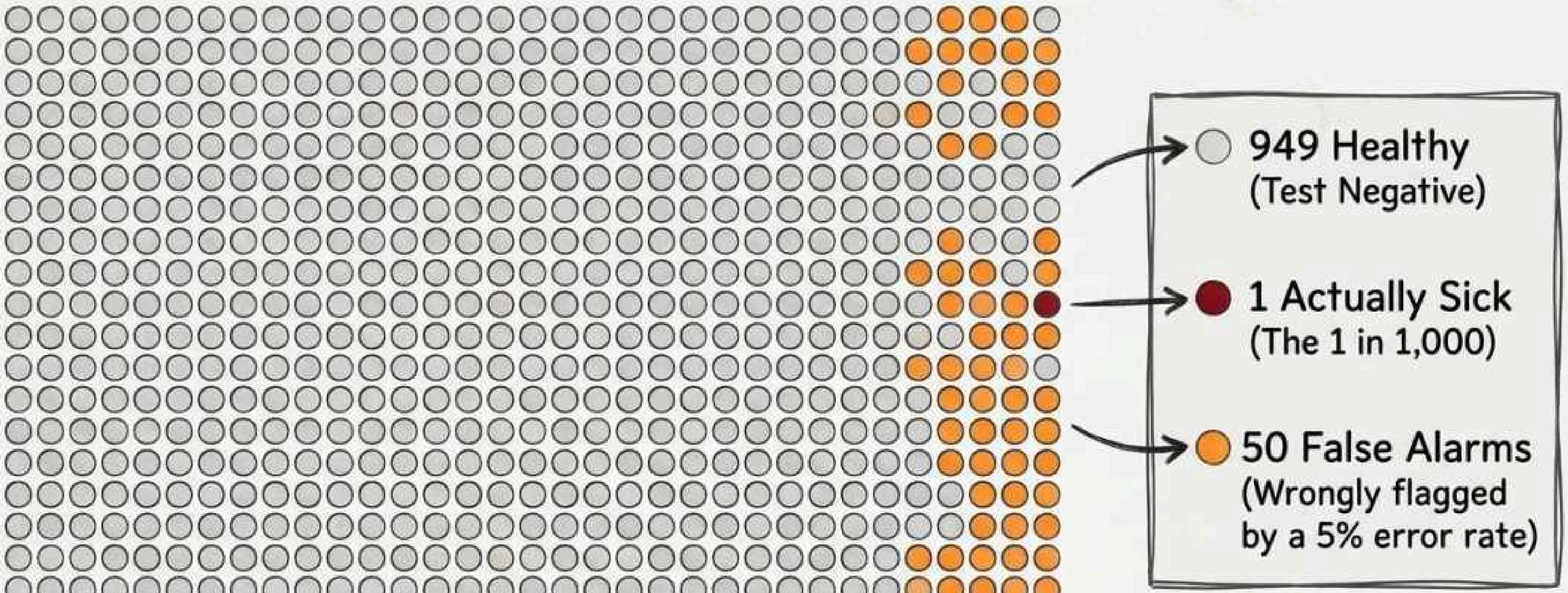




The hidden risk: The actual best explanation might not be one you have thought of yet.

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The Probability Layer: False Positives



If you test positive, are you probably sick? **No.** Most positive results (50) are false alarms compared to actual cases (1).

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The Base Rate Fallacy and Bayes' Rule

¶ 6.11

Prior Probability
(The Base Rate/
Underlying Frequency)

New Evidence
(The vivid test result)

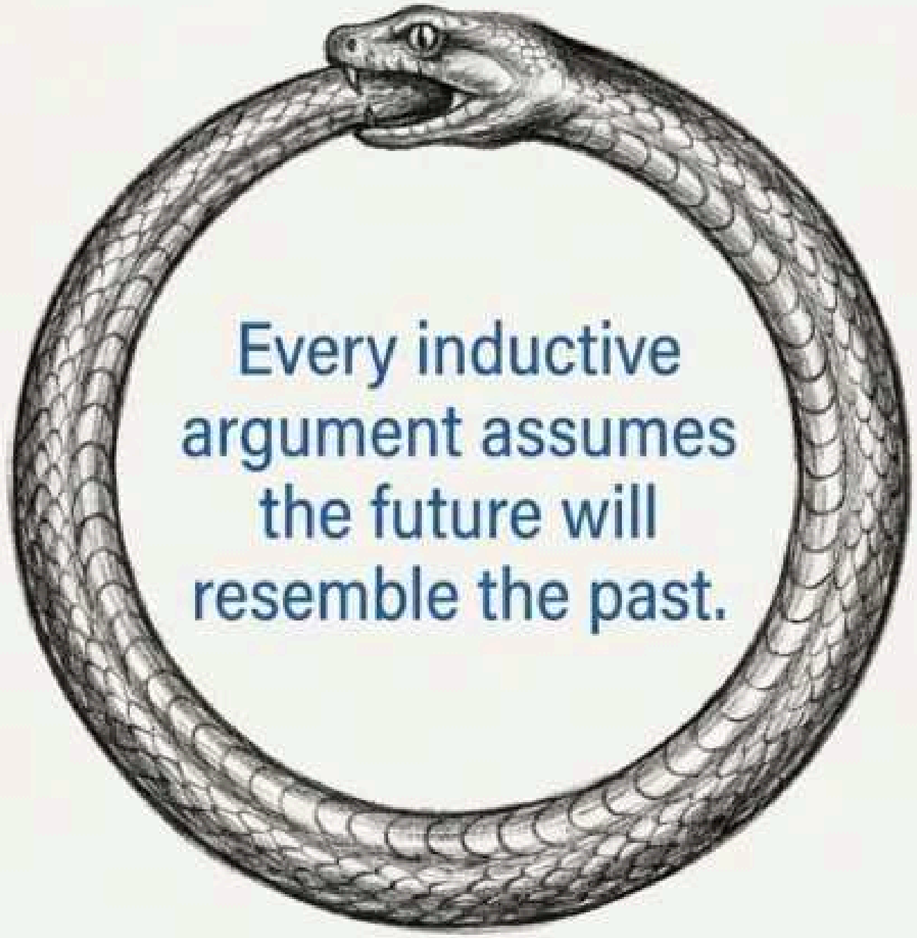
$$P(A|B) = \frac{P(B|A) * P(A)}{P(B)}$$

People tend to focus on a vivid test result and forget the underlying frequency in the population. Bayes' rule combines prior probability with new evidence—the foundation of modern statistics.

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¶ 6.12

David Hume and the Problem of Induction



- But how do we know that? Any argument to prove it must rely on induction itself.
- The problem is never fully settled, though induction remains our best guide.

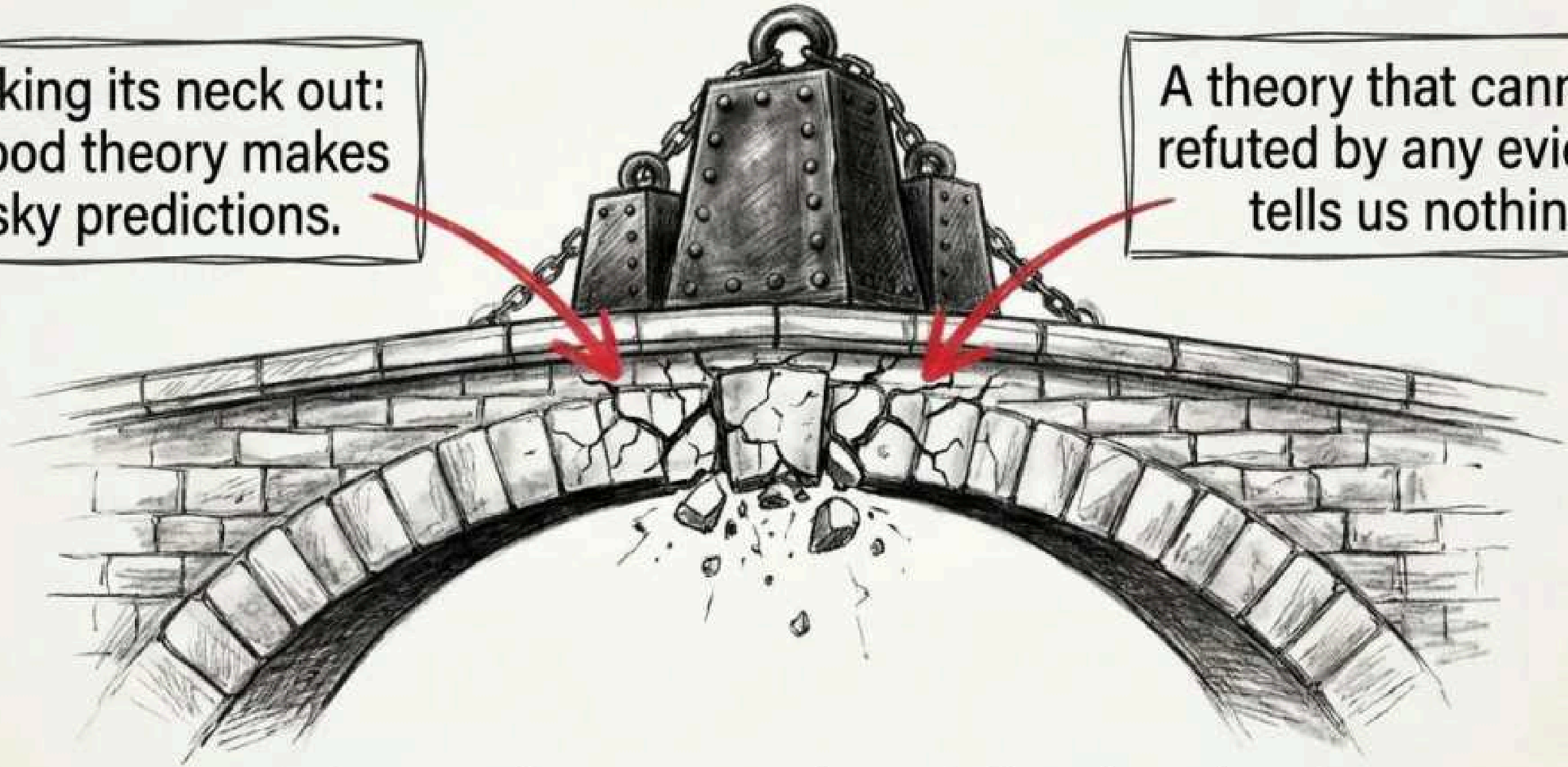
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¶ 6.13

Karl Popper and the Falsification Response

Sticking its neck out:
A good theory makes
risky predictions.

A theory that cannot be
refuted by any evidence
tells us nothing.

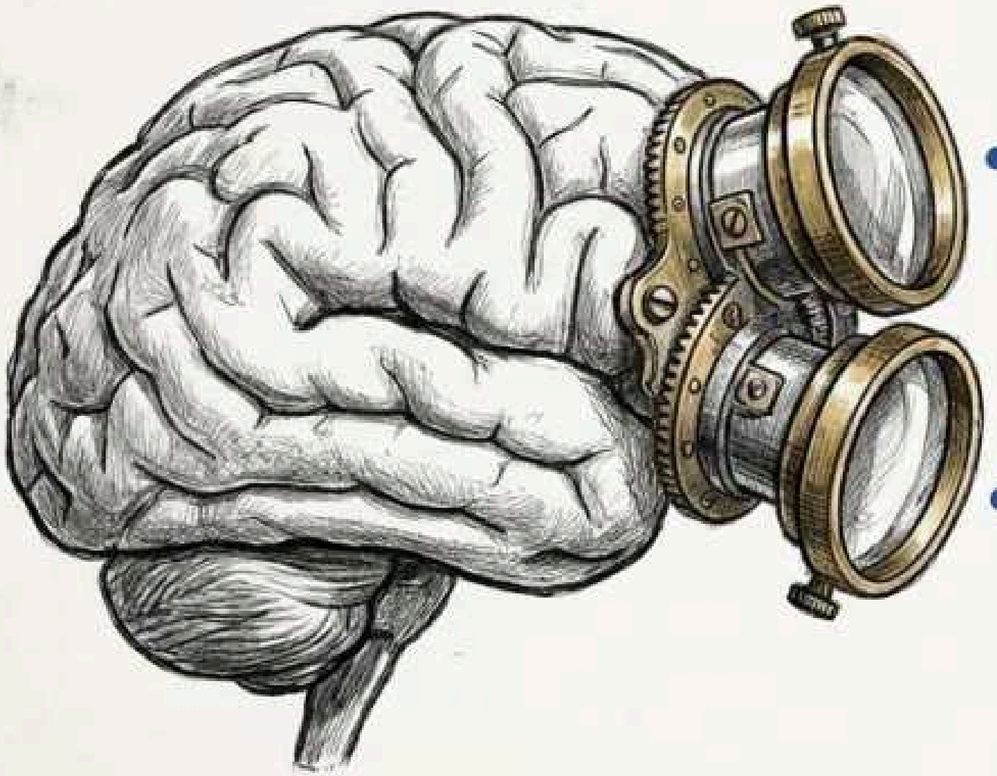


Science advances not by proving theories, but
by testing them and discarding those that fail.

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¶ 6.14

Distortions in Reasoning: Cognitive Biases



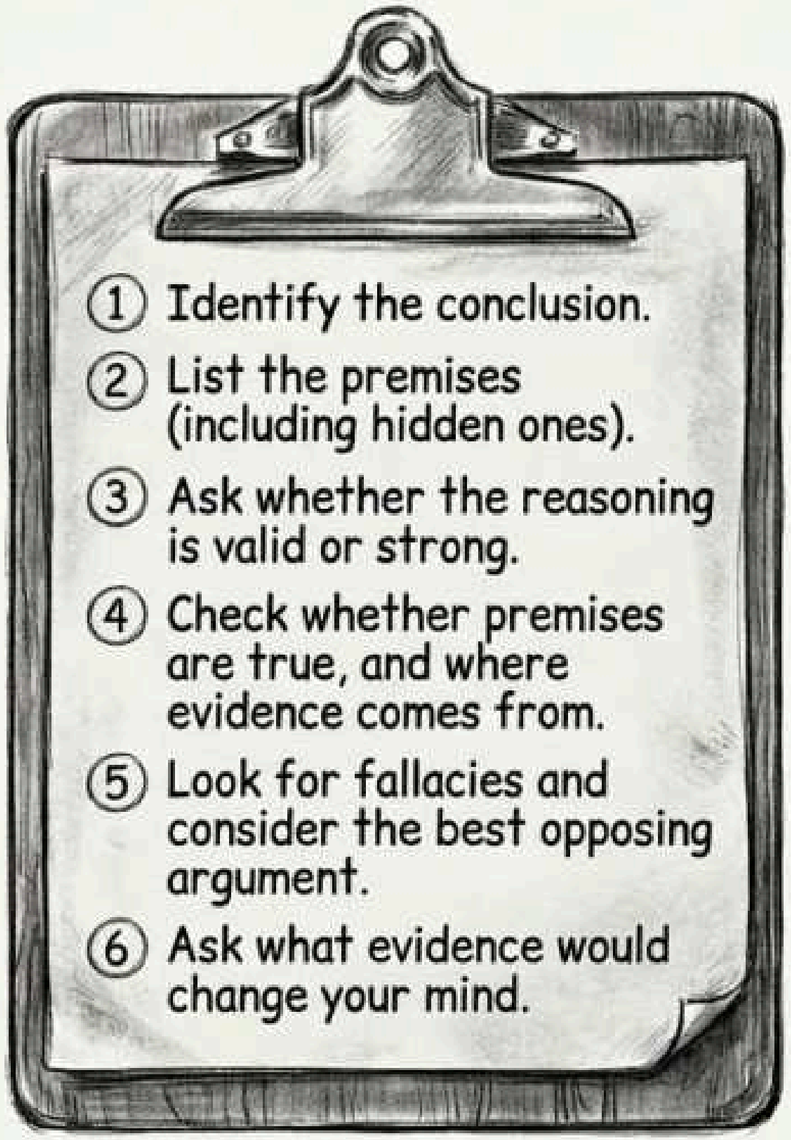
Confirmation Bias: The habit of noticing evidence that supports what we already believe, and overlooking opposing evidence.

Availability Bias: Overestimating what is easy to recall, such as dramatic news stories.

Knowing about these psychological tendencies does not remove them, but it helps us guard against them.

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The Practical Toolkit



Works universally: for a newspaper column, an advertisement, or a kitchen table conversation.

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¶ 6.16

A Final Thought on Attitude



Hold beliefs in proportion to the evidence.

Change course when the evidence changes.

Treat a good argument from an opponent as a gift (a chance to improve).

Logic works best when used on yourself first. It is easy to find flaws in others, but hard to see them in your own arguments.

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¶ 6.17

The Final Exercise

Standard Form

Premise 1: _____

Premise 2: _____

Conclusion: _____

Think of a belief you hold strongly.

Write your best argument for it above.

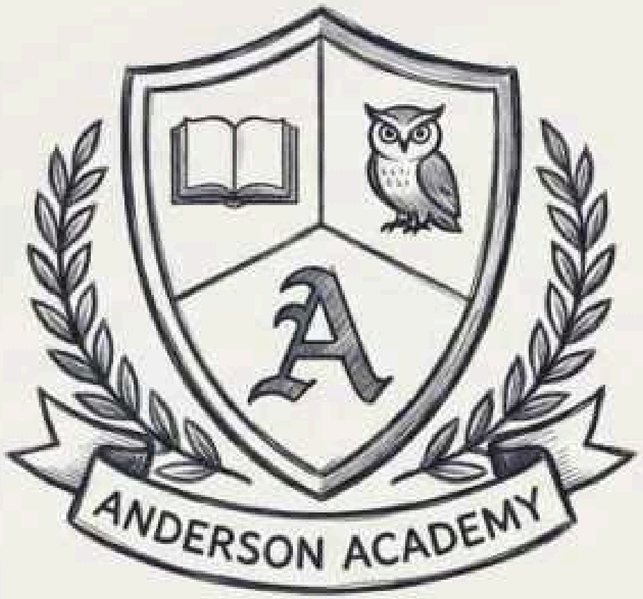
What is the strongest objection?

What evidence, if you saw it, would lead you to change your mind? (If nothing could, ask yourself why).

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¶ 6.18

End of Philosophy 102 B



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Thank you for taking Philosophy 102 B, and may your reasoning always be valid and sound.

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