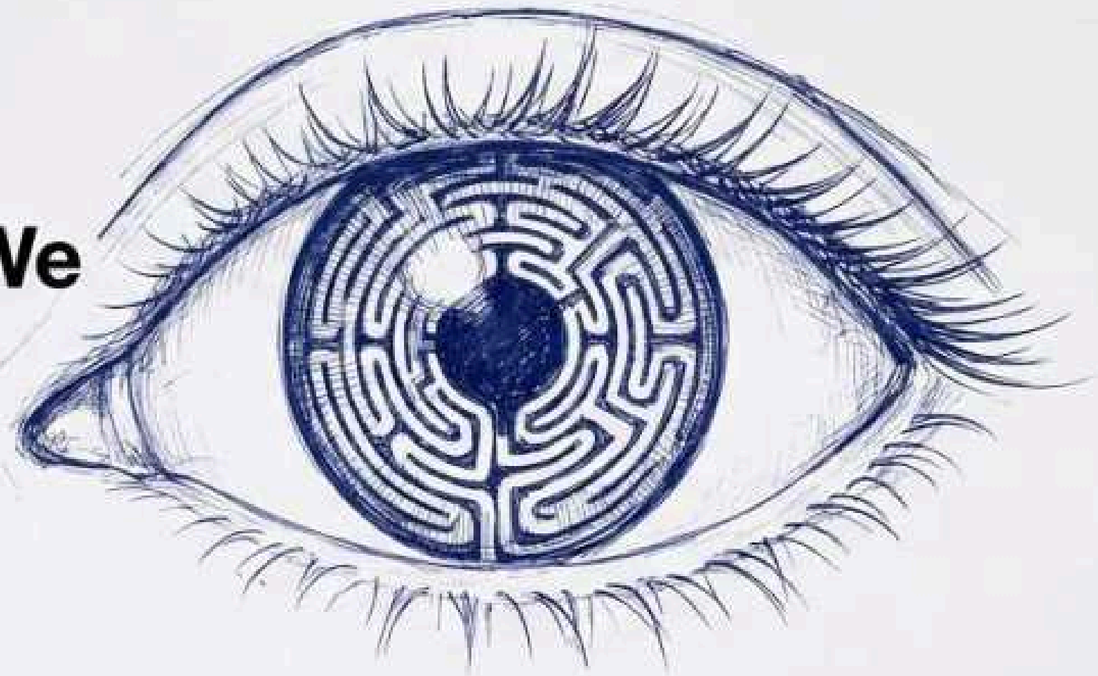
[¶ 4.1]

Lecture 4: How We Fool Ourselves.

Confirmation, coincidence, memory, and remedies.



[¶ 4.2]



"The first principle of science is that you must not fool yourself, and you are the easiest person to fool."

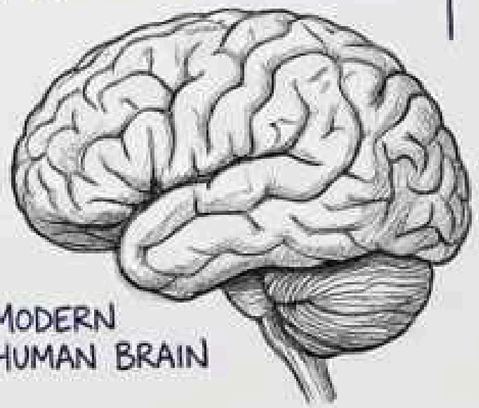
Our minds evolved for quick decisions, not for perfect accuracy.

Speed of Decision > Perfect Accuracy



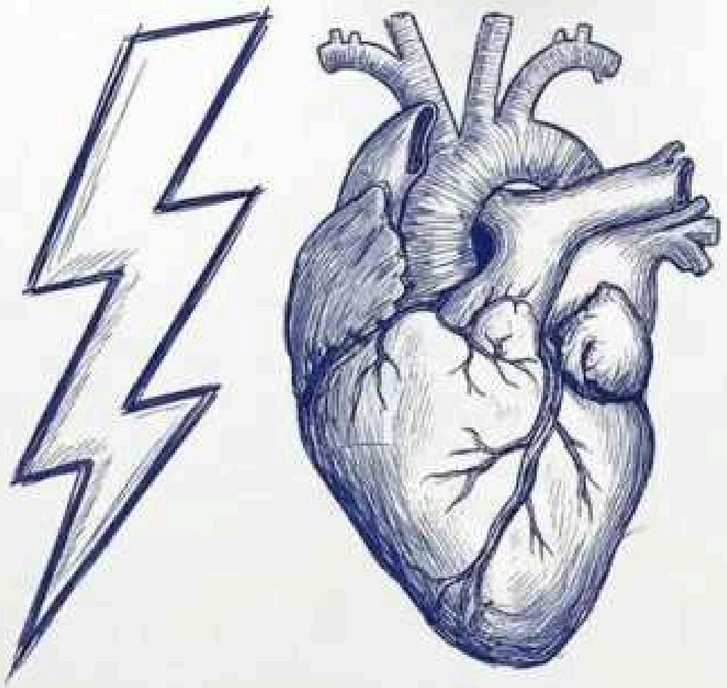
PRIMITIVE HOMINID SKULL



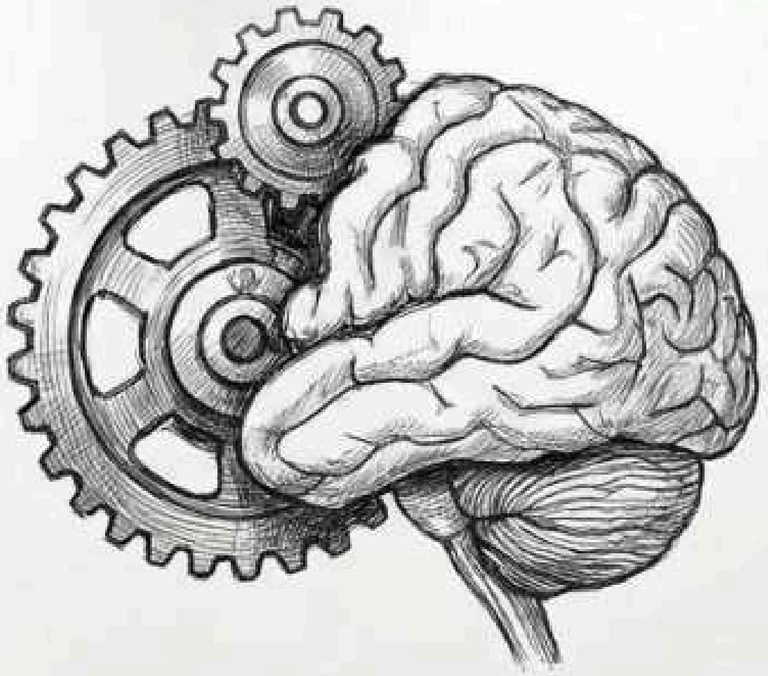


MODERN HUMAN BRAIN

[¶ 4.3]



Fast, Automatic, Intuitive.



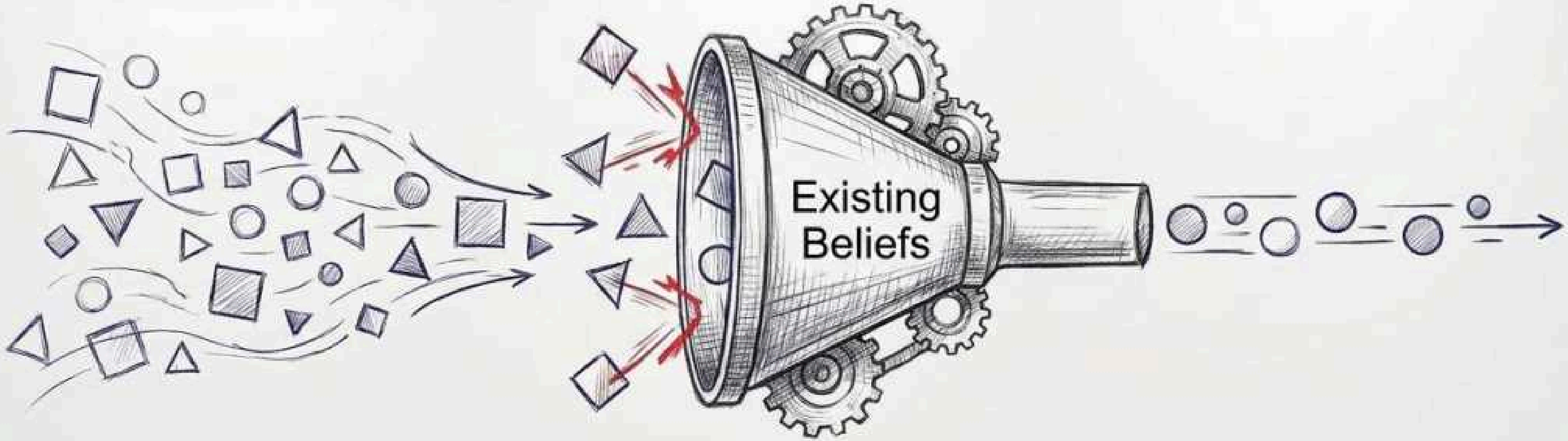
Slow, Careful, Effortful.

Kahneman & Tversky: Cognitive biases are the predictable failures of the fast mode.

Confirmation Bias.

[¶ 4.4]

We look for, notice, and remember fitting evidence.
We overlook the rest.



If x=2, y=4, z=6
Hypothesis Test: n, n+2, n+4
Reality: a < b < c

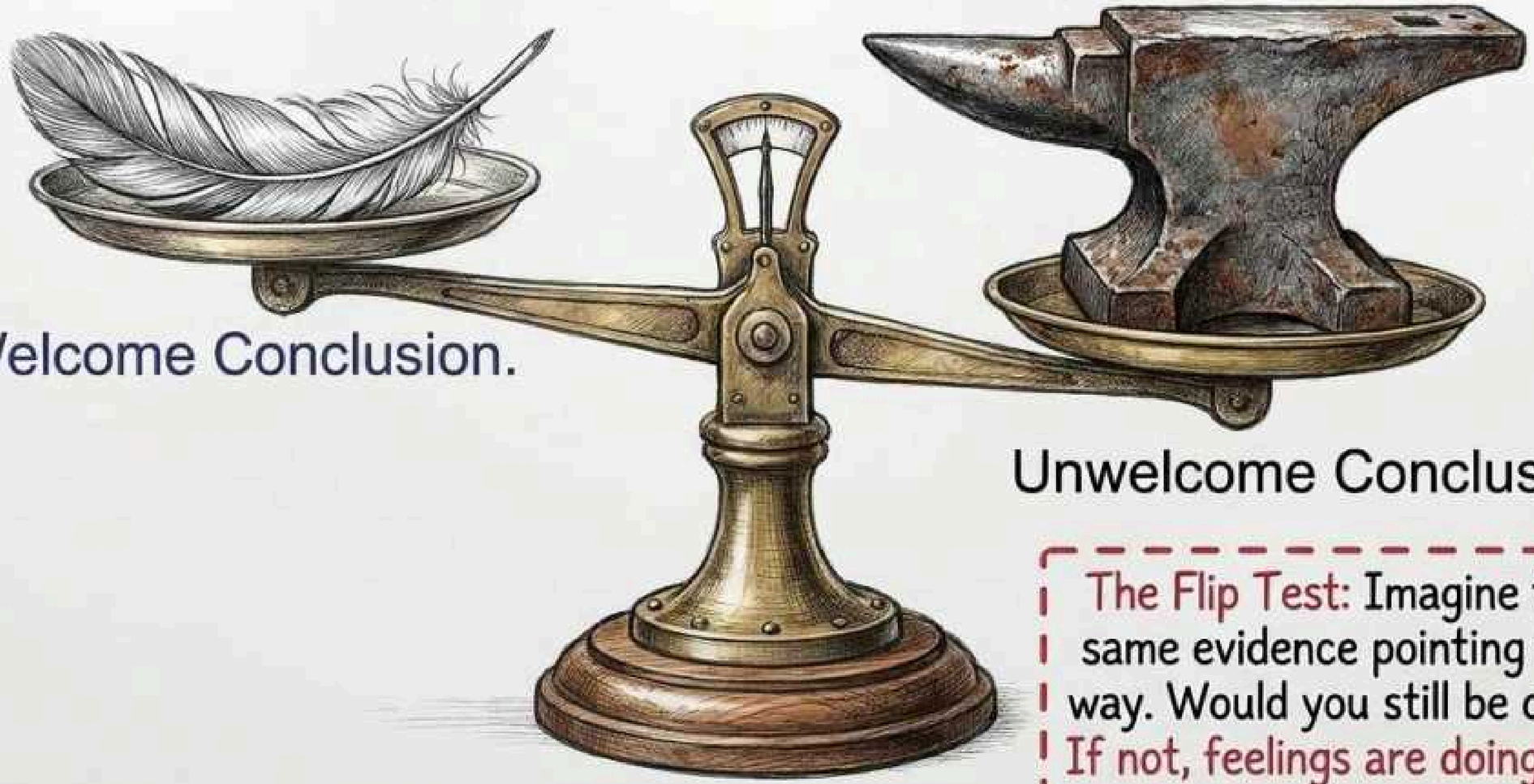
Most test only examples that fit their first guess.

Motivated Reasoning.

[¶ 4.5]

Can I believe this?

Must I believe this?



Welcome Conclusion.

Unwelcome Conclusion.

The Flip Test: Imagine the exact same evidence pointing the other way. Would you still be convinced? If not, feelings are doing the work.

Availability Bias.

[¶ 4.6]

Perception



Reality



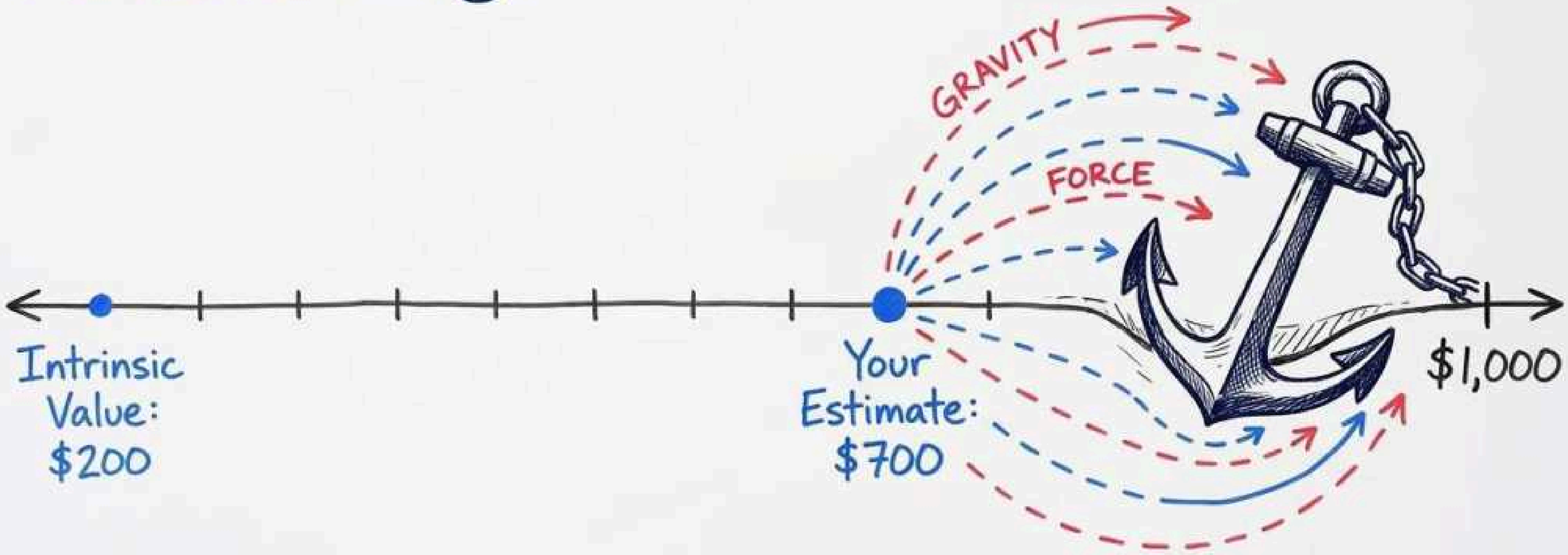
$$P(\text{Danger}) \neq \text{Volume of Headlines}$$

We judge how common something is by how easily examples come to mind.

What is vivid is not always what is frequent.

[¶4.7]

Anchoring.

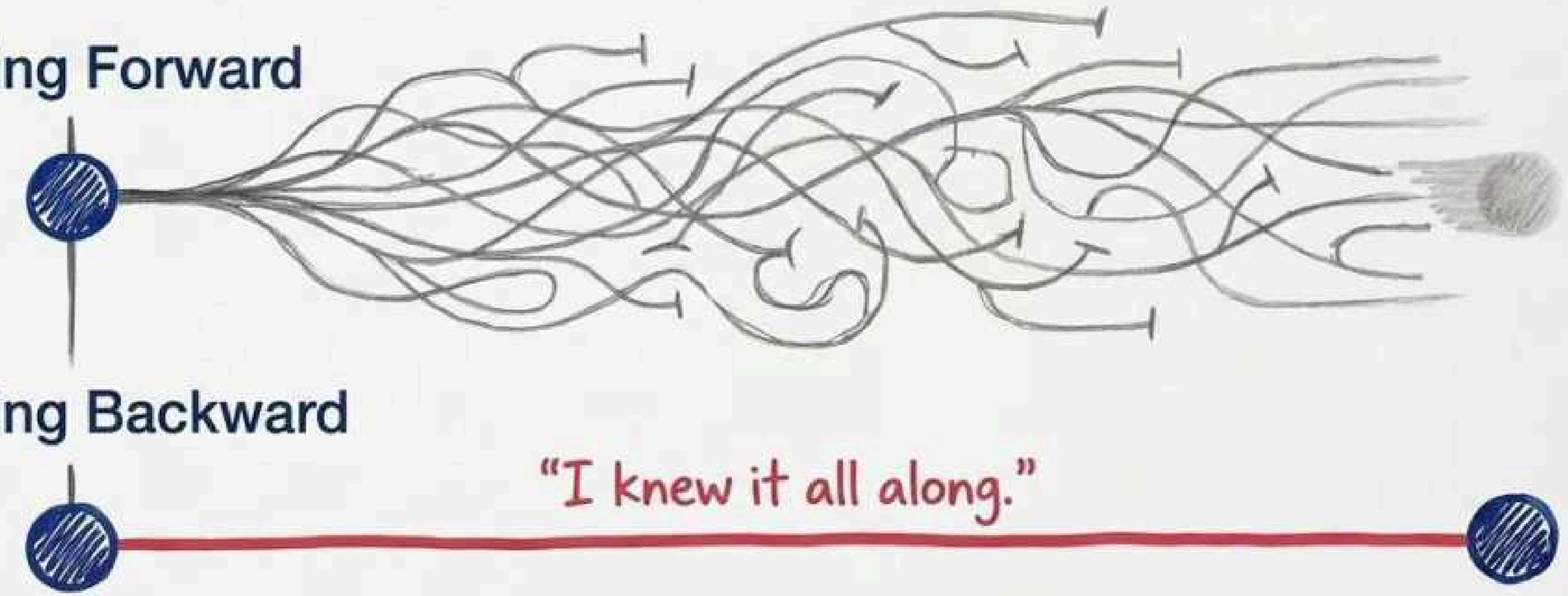


An initial number—even if completely irrelevant—exerts a gravitational pull on our estimates.

Ask where the figure came from. Make your own estimate first.

[¶4.8]

Hindsight Bias.



Makes us overrate our own judgement and makes past decision makers look foolish.

☑ Remedy:
1. Write predictions in advance.
2. Date them.
3. Check them honestly.

Pattern-Seeking (Pareidolia).

[¶ 4.9]

Perception \ Reality	Predator Exists	Just a Rock
See Predator		Pareidolia: Low Cost
See Rock	Fatal Error	

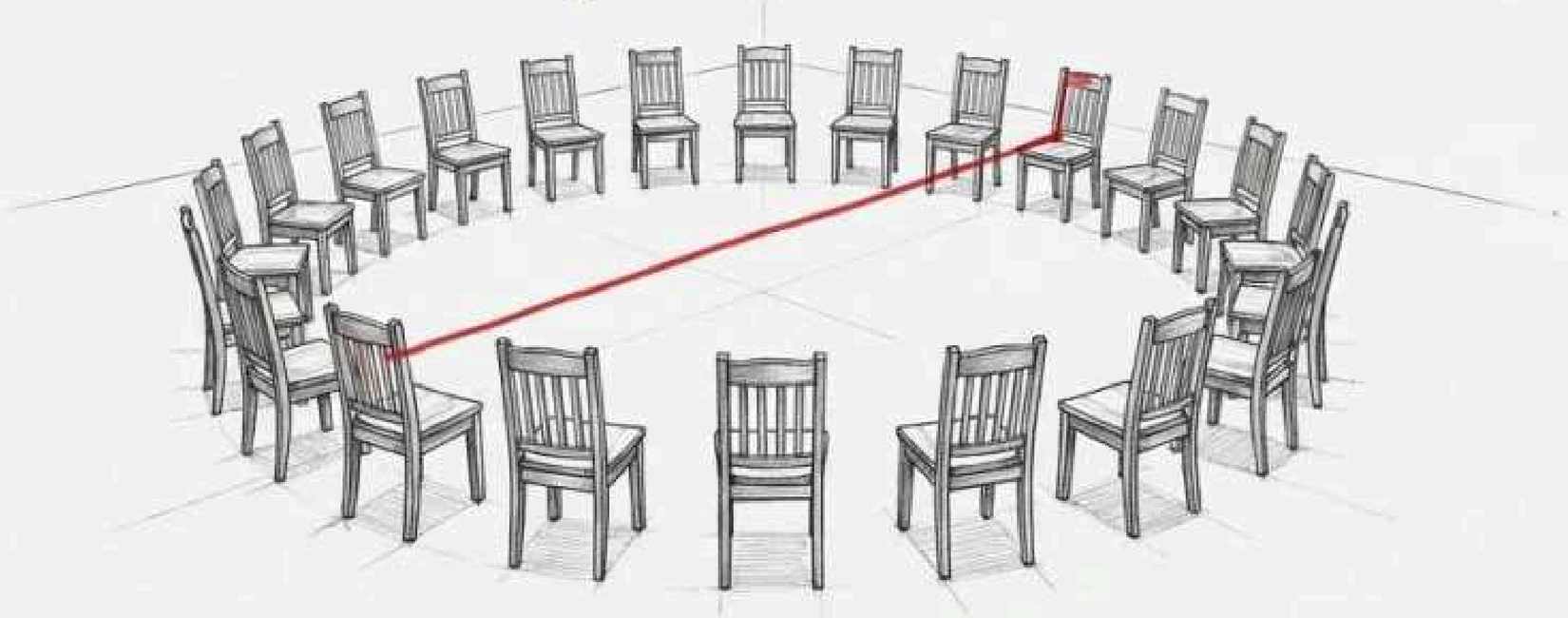


Mistaking a rock for a predator costs a little. Missing a real predator costs a life. The price of this caution is seeing meaning in random noise.

Coincidences & Probability.

[¶ 4.10]

$$P(\text{shared}) = 1 - \left(\frac{365!}{365^{23} \cdot (365-23)!} \right) > 50\%$$



In a room of just 23 people, the chance that two share a birthday is over 50%. With enough chances, rare things happen all the time.

The Texas Sharpshooter Fallacy.

[¶ 4.11]



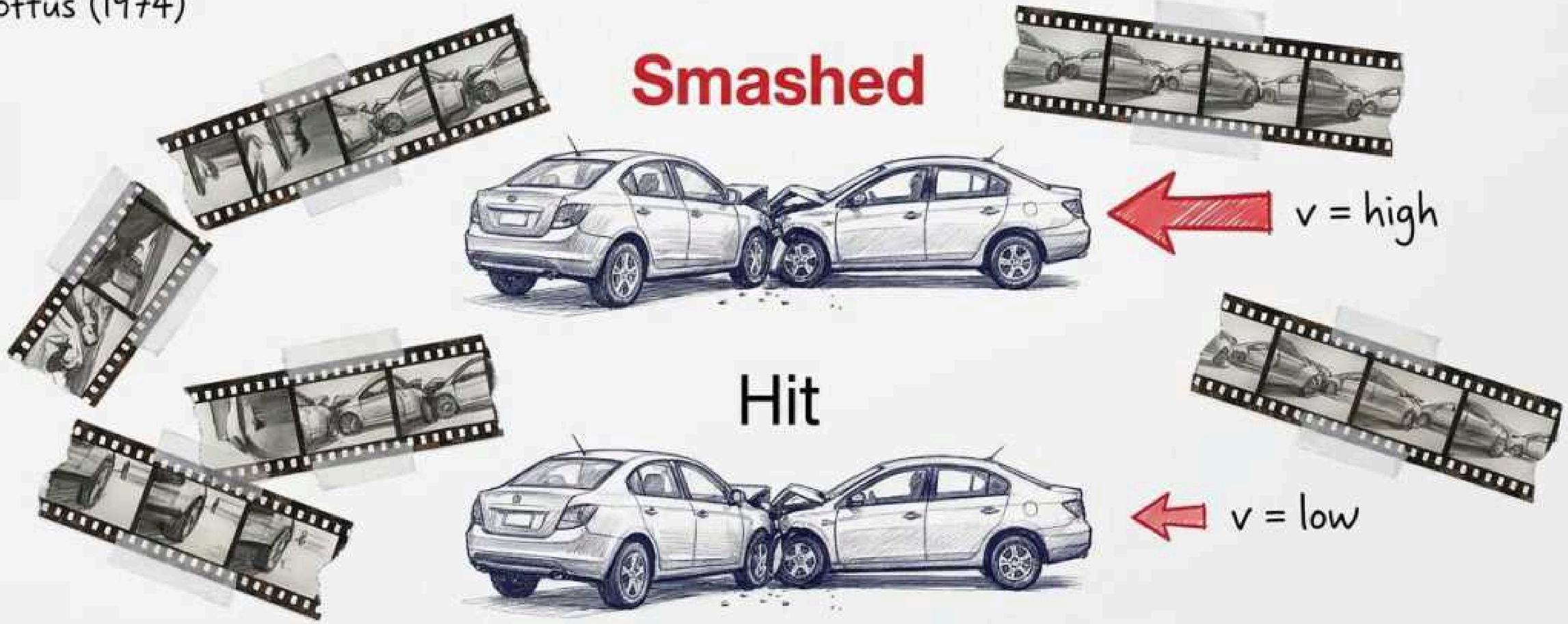
Hypothesis (Target) MUST precede Data (Shot)

Searching a pile of data for a pattern after the fact, and claiming you predicted it.

Memory Reconstruction

[¶ 4.12]

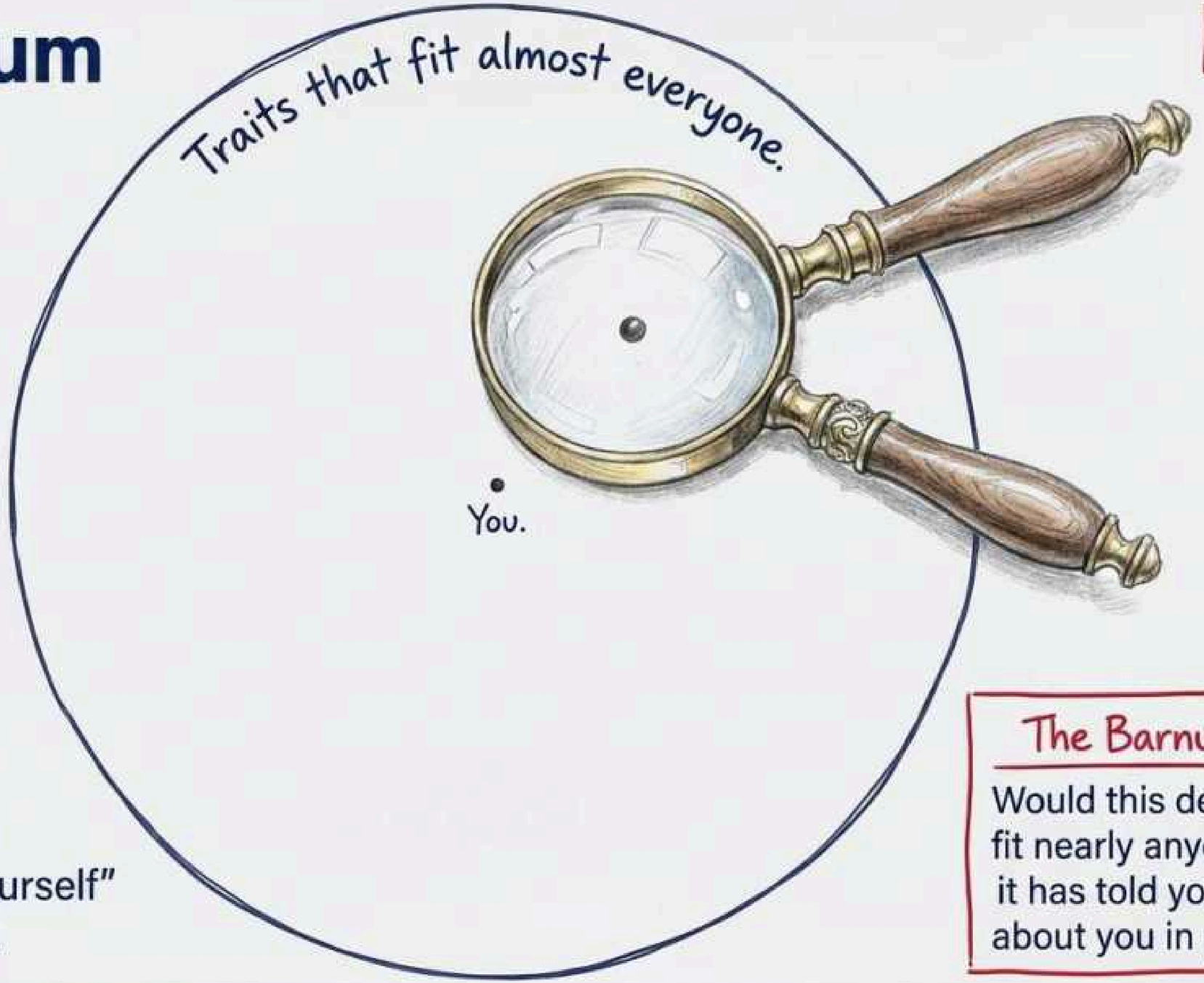
Loftus (1974)



Memory is not a recording. We rebuild it each time we recall, and confident memories can be entirely wrong. Vividness is no proof of accuracy.

The Barnum Effect

[¶ 4.13]



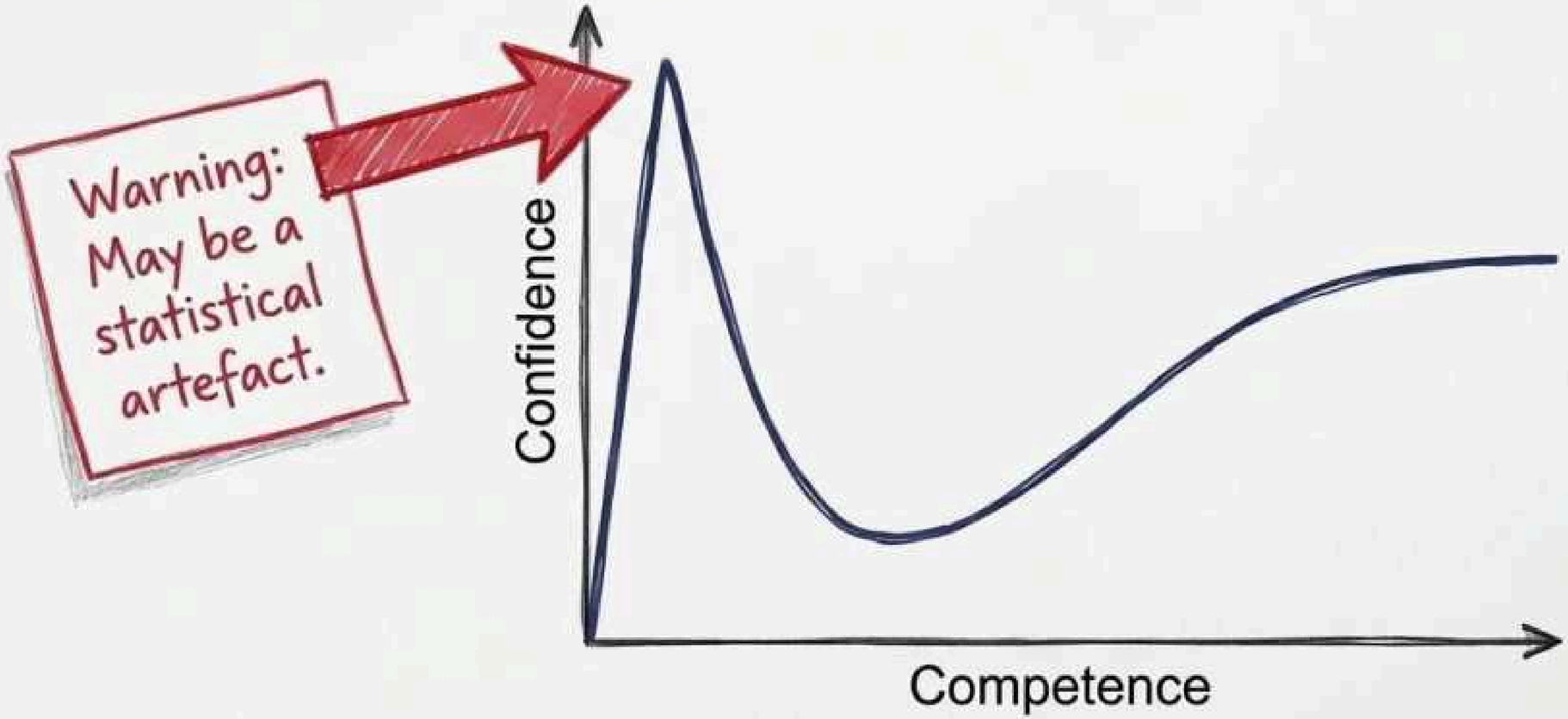
Statements like "you sometimes doubt yourself" feel deeply personal.

The Barnum Test

Would this description fit nearly anyone? If so, it has told you nothing about you in particular.

Overconfidence (Dunning-Kruger)

[¶ 4.14]



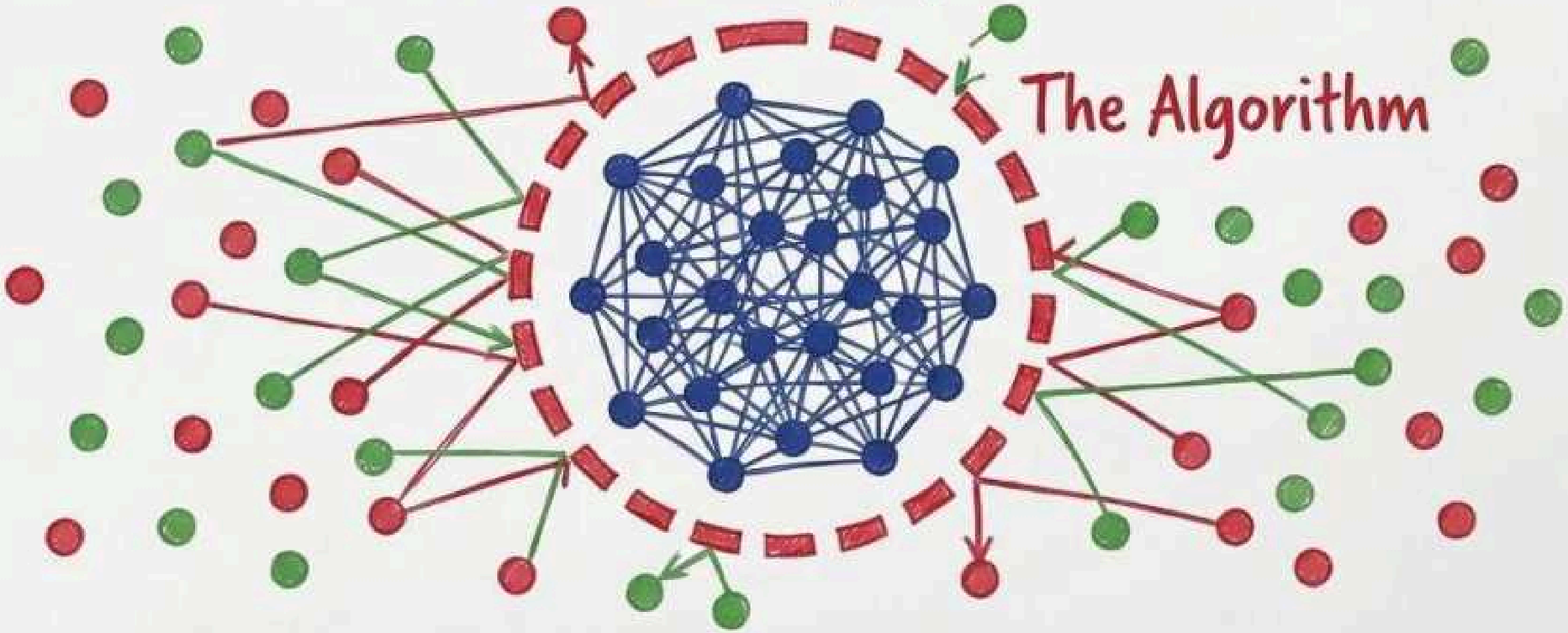
Most people rate their driving and judgement above average (a mathematical impossibility). The 1999 study is famous, but heavily debated.

The Safe Lesson: Feeling certain is not evidence.

Social Forces & Echo Chambers.

[¶ 4.15]

$$f(x) = f(x) + \text{preference}$$



We copy what people around us believe and trust what others accept.
Algorithms feed us what we already like.

Comfort is not the same as proof.

The Remedies.

[¶ 4.16]

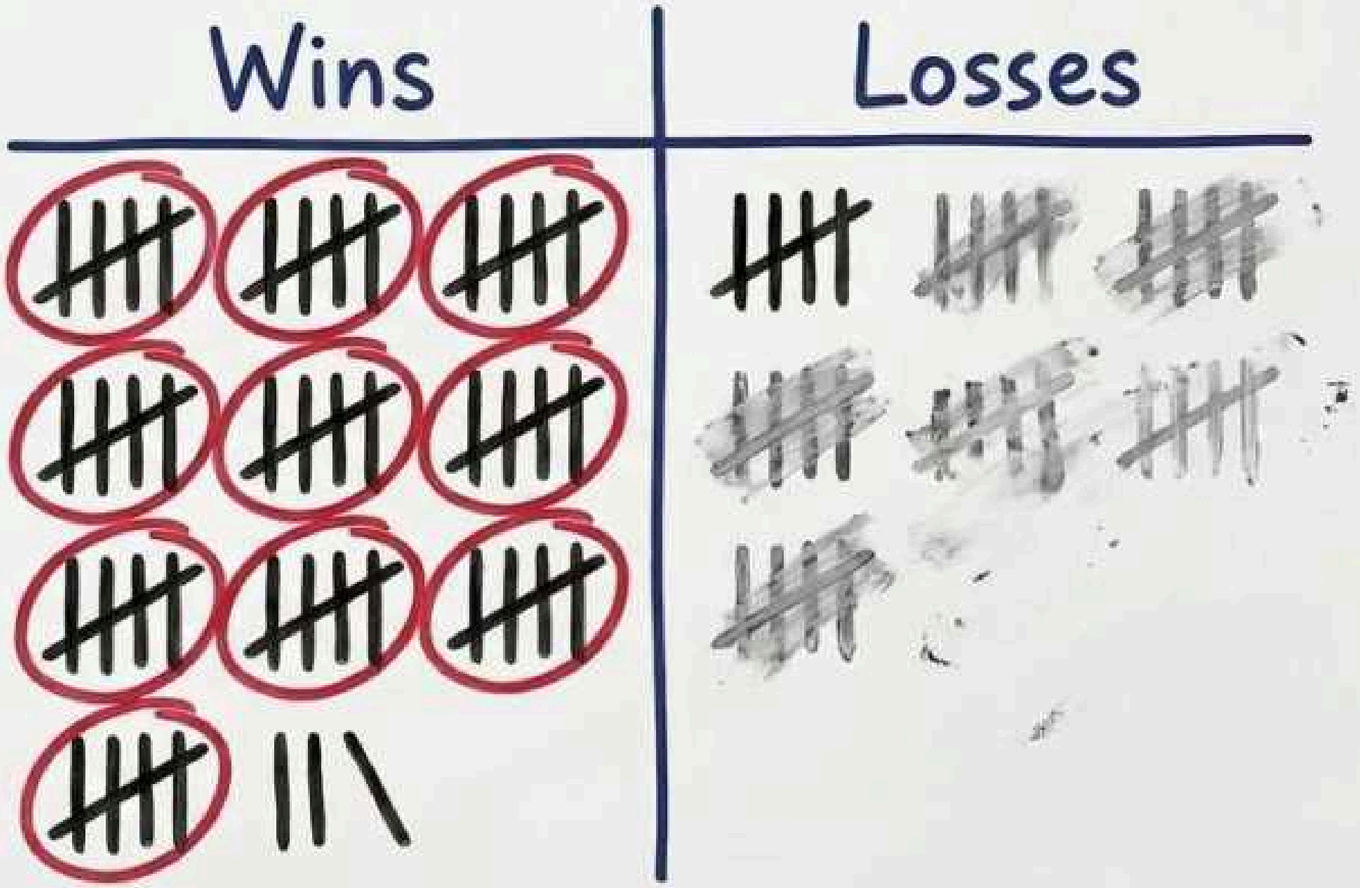


None remove bias entirely, but together they catch errors before they cost us.

The Sports Illusion (Superstition).

[¶ 4.17]

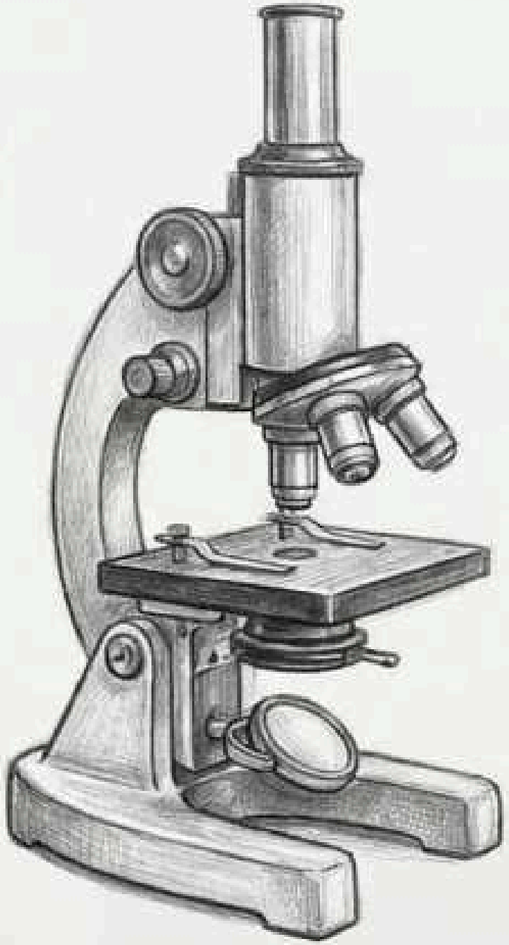




Superstition feeds on selective memory. We remember the wins in the lucky socks and explain away the losses. It is a harmless example of how we build false rules.

The Good News.

[¶ 4.18]



Cleverness + Bias = Stronger Rationalizations

Biases are not a sign of stupidity.
Clever people are simply better at inventing reasons for what they already believe.

Science = External Habits + Procedures

The cure is not to try harder at thinking. It is to build procedures that check our thinking from the outside.

[¶ 4.19]

Think of the last time you changed your mind about something important.

What made you change it?

What does that tell you about the kind of evidence that works on you?

[¶4.20]

⇨ Next up: Lecture 5



Numbers, Chance, and Statistics.

Where intuition fails badly.