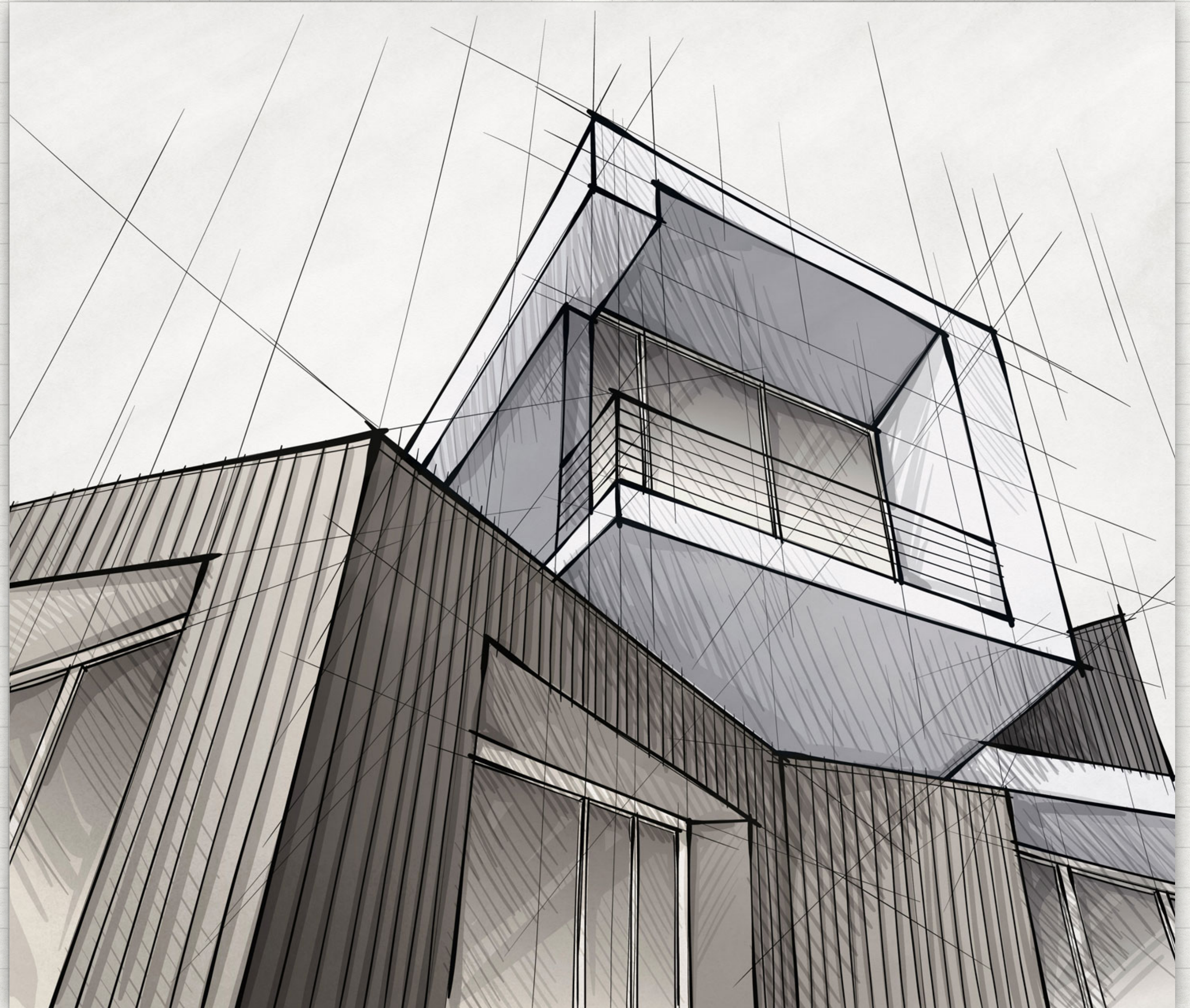


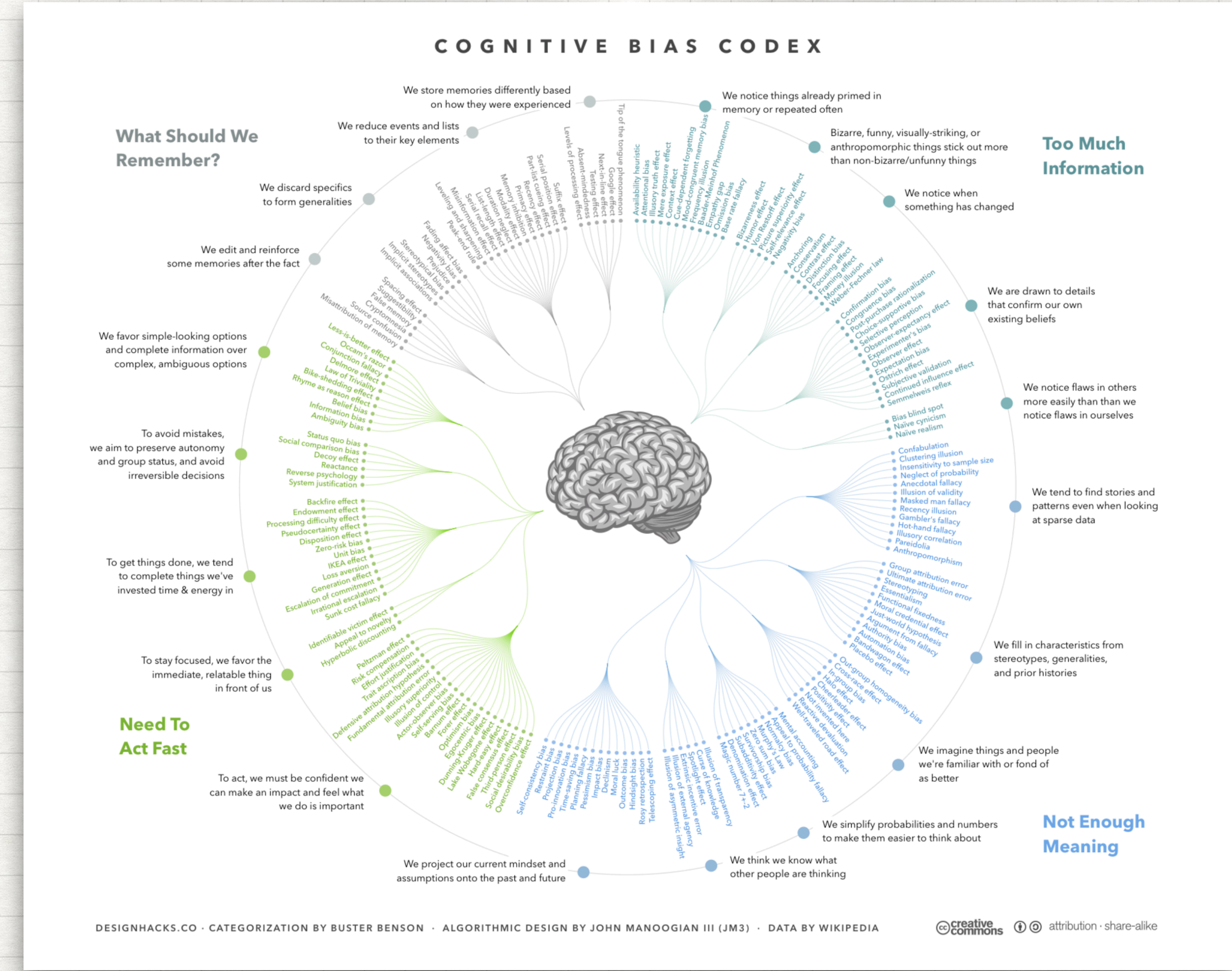
CS 007: SESSION 2

PERSONAL FINANCE FOR ENGINEERS



CS 007

PREDICTABLY IRRATIONAL



*"Predictably Irrational" is the title of a book by Dan Ariely

* [DesignHacks.co](https://designhacks.co): 188 Known Cognitive Biases

BEHAVIORAL FINANCE

How many of you think you are
rational with your money?

(show of hands)



ANCHORING



MENTAL ACCOUNTING



CONFIRMATION &
HINDSIGHT BIAS



GAMBLER'S FALLACY

YOU ARE NOT RATIONAL



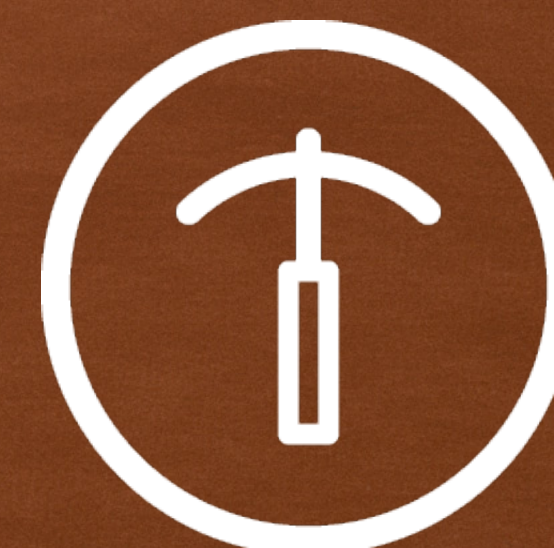
HERD BEHAVIOR



OVERCONFIDENCE



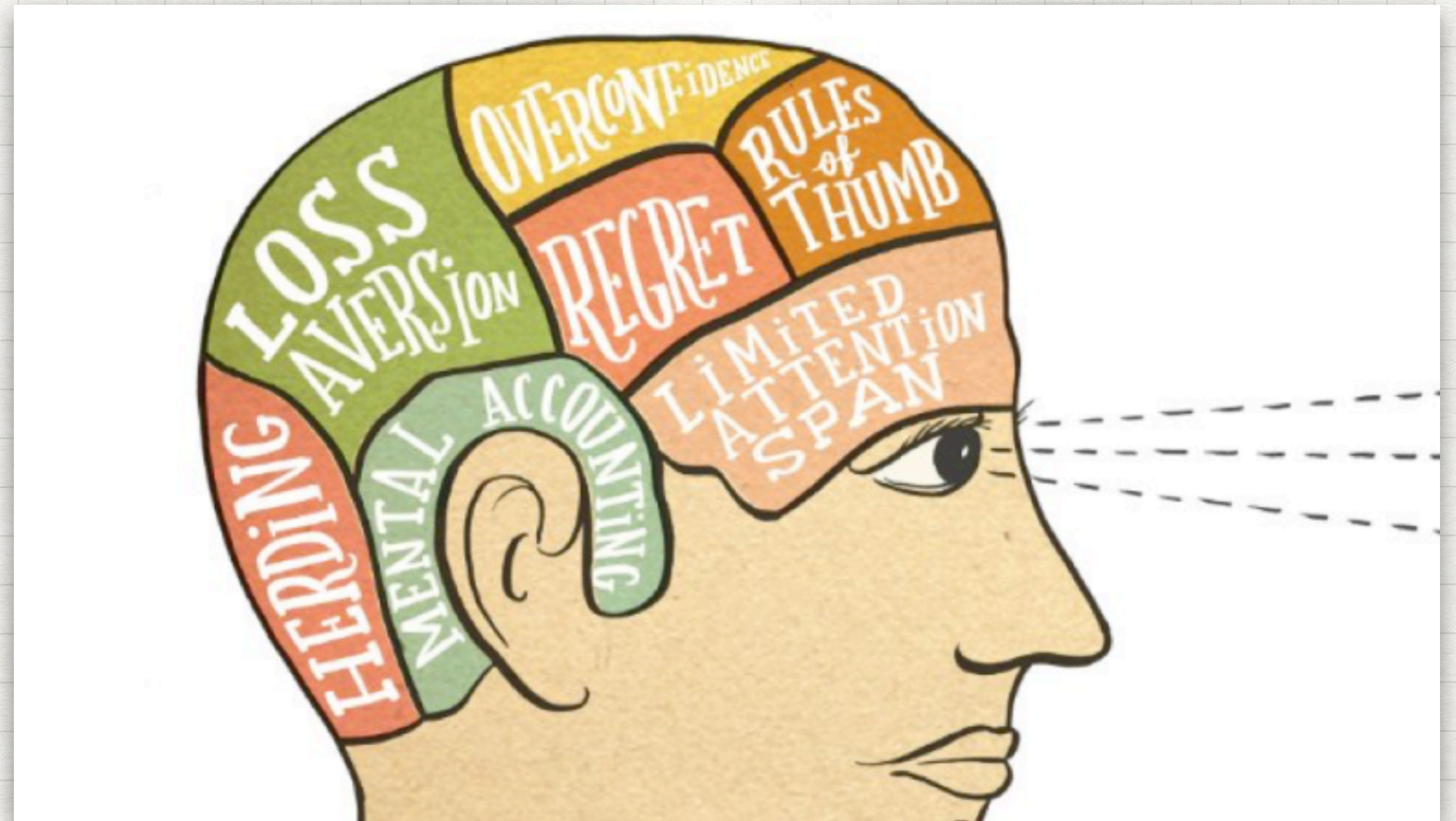
OVERREACTION &
AVAILABILITY BIAS



LOSS AVERSION

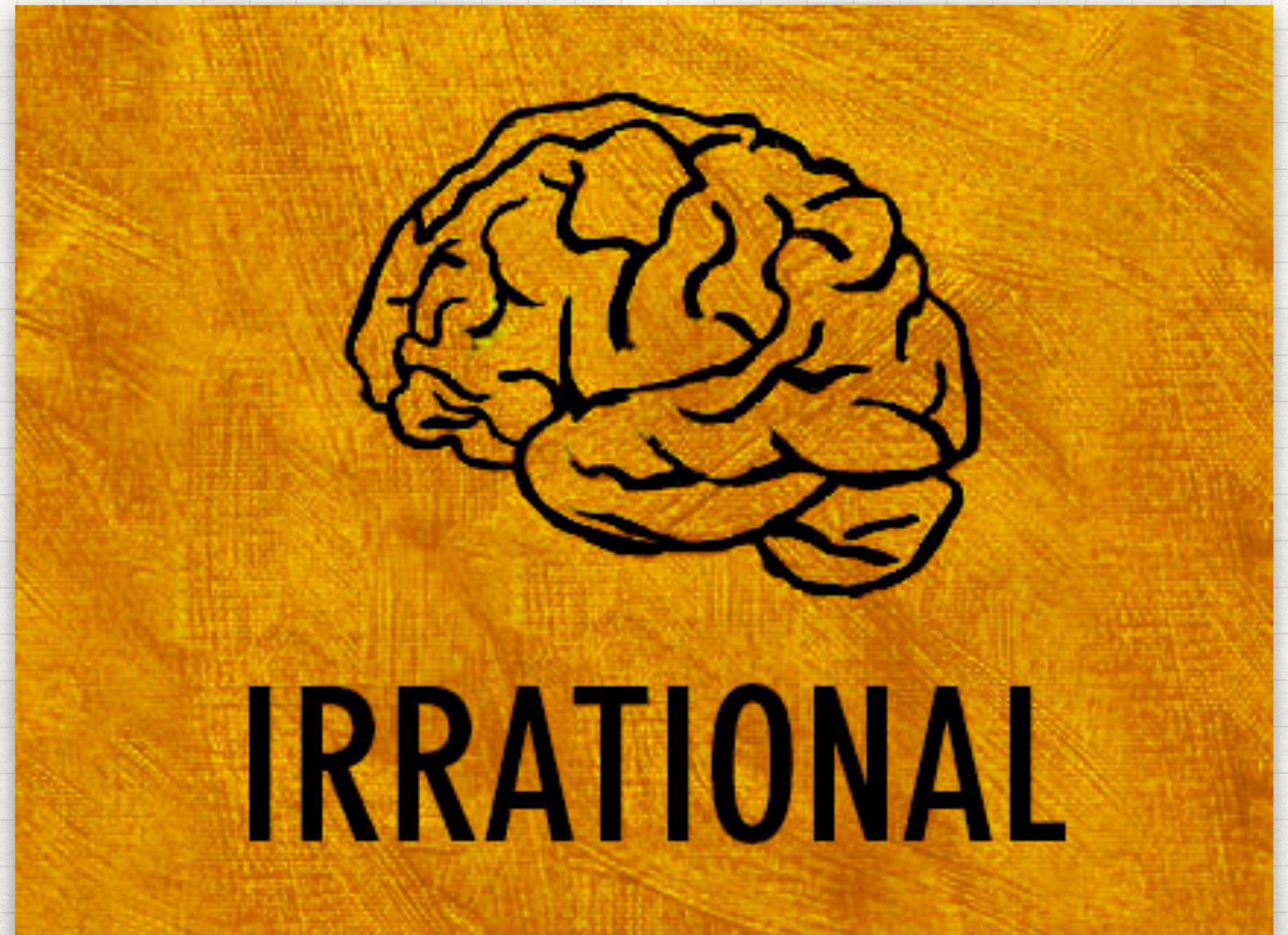
WHY BEHAVIORAL ECONOMICS?

- A number of economic frameworks assume that humans evaluate financial decisions consistently & rationally
- Daniel Kahneman & Amos Tversky (1960s)
- 2002 Nobel Memorial Prize in Economic Sciences
- Prospect Theory



THREE THEMES IN BEHAVIORAL ECONOMICS

- **Heuristics**
Humans make a vast majority of their decisions using mental shortcuts or rules of thumb.
- **Framing**
Humans use anecdotes & stereotypes to understand & respond to events
- **Market Inefficiencies**
Mis-pricing or non-rational decision making



ANCHORING

- People estimate answers to new & novel problems with a bias towards reference points
- **Tversky & Kahneman (1974)**
(quick multiplication)
- **Dan Ariely**
(social security numbers & prices)
- Common examples:
 - Price you bought a stock at
 - High point for a stock



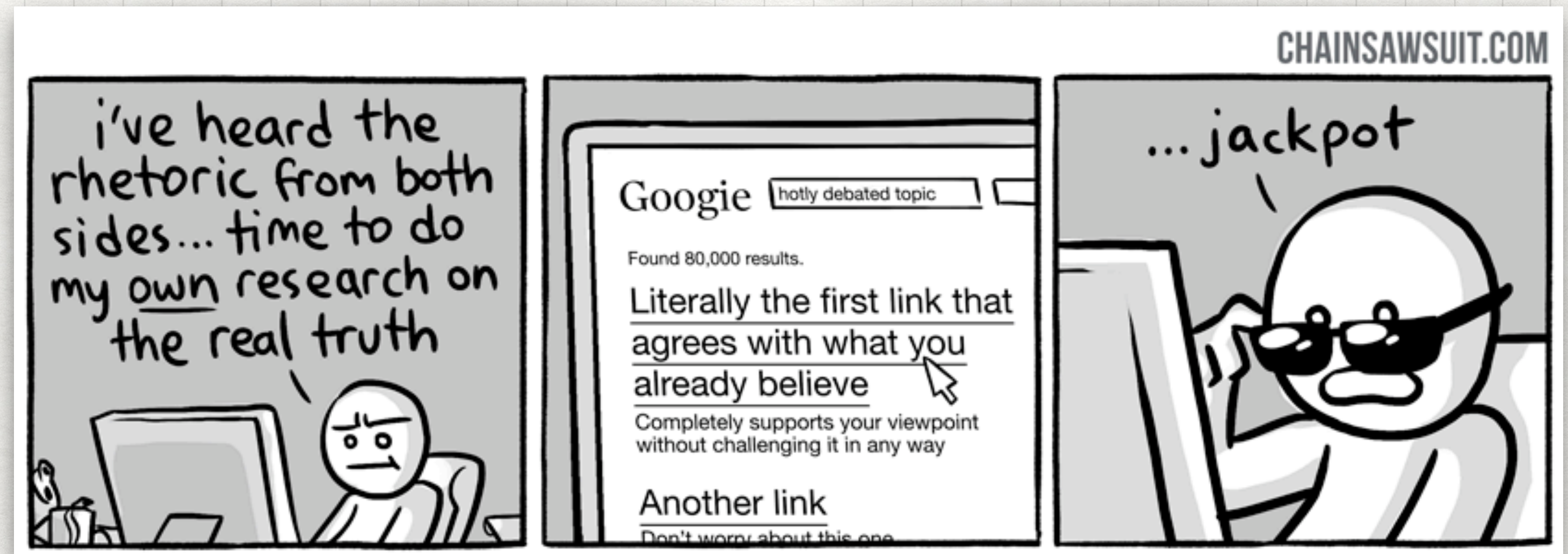
MENTAL ACCOUNTING

- Money is fungible, but people put it into separate “mental accounts”
- Also known as “bucketing”
- Example: Lost Movie Tickets
- Example: “Found Money”
- Real world problems:
Vacation Fund & Credit Card Debt



CONFIRMATION & HINDSIGHT BIAS

- Very different biases, but often conflated with each other.
- **Confirmation Bias**
We selectively seek information that supports pre-existing theories, and we ignore / dispute information that challenges or disproves them.
- **Hindsight Bias**
We overestimate our ability to predict the future based on the “obviousness” of the past.
- Combination of the two is particularly bad.



GAMBLER'S FALLACY

- We see patterns in independent, random chains of events.
- We believe that, based on a series of previous events, an outcome is more likely than odds actually suggest.
- Example: Dinner Party & Coin Flips
- Real odds might be 51/49, but we tend to jump to 80/20.
- Likely cause: the rarity of "independent events" in day-to-day experience.



HERD BEHAVIOR

- We have a tendency to mimic the actions of the larger group
- Example: Building Psych Experiment
- Example: Empty Supermarket
- Crowd psychology may be a contributor to bubbles.
- Bucking the crowd creates stress & fatigue. It gets harder, not easier.
- Easier to be "wrong with everyone" than "right and alone"
- No gets fired for buying IBM?



OVERCONFIDENCE

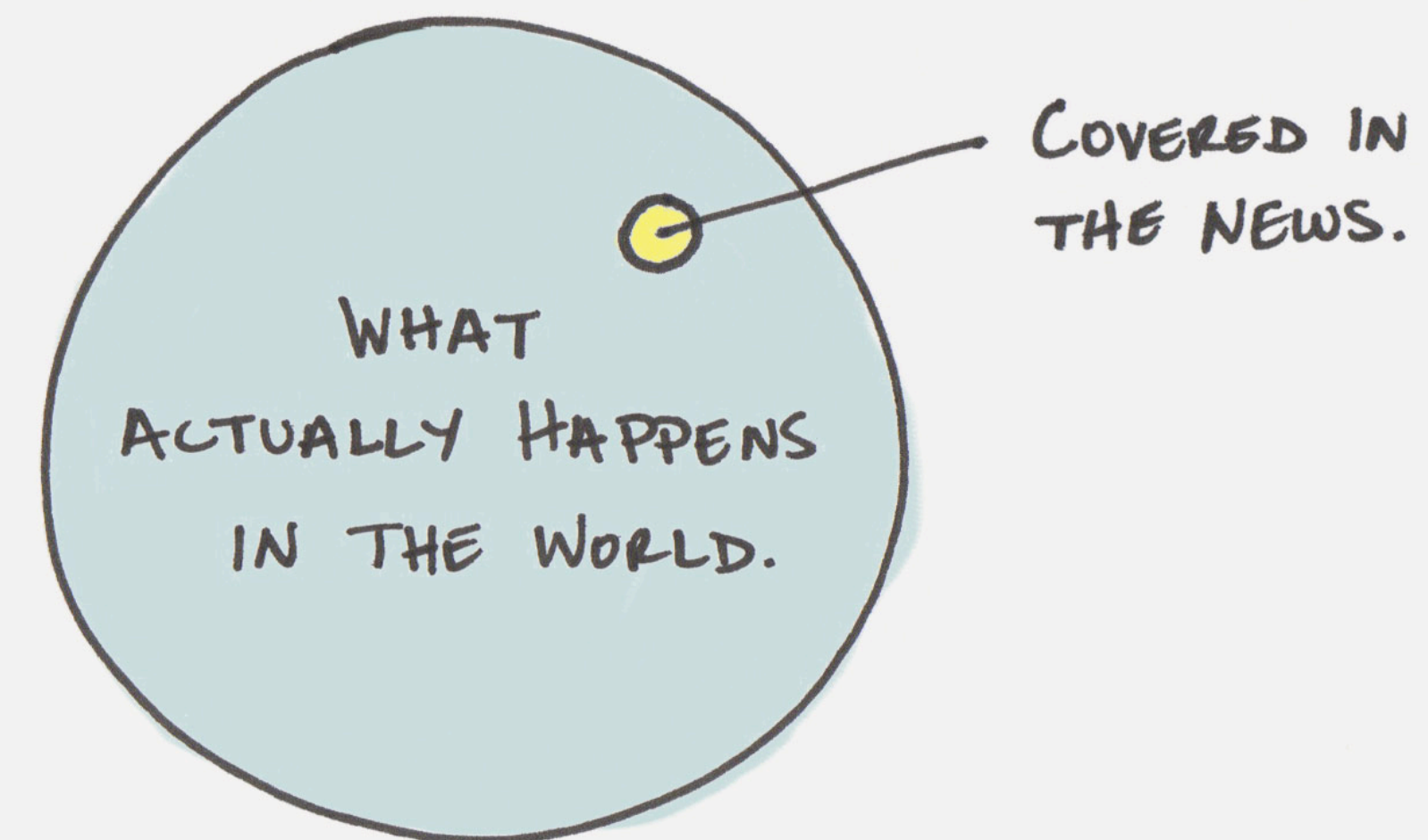
- In “Behaving Badly” (2016), 74% of investment managers believed that they deliver above-average performance.
- Dunning-Kruger Effect. The more poorly you perform, the more you over-estimate your performance.
- Capability in one domain can lead to overconfidence in others.
- Humility is a virtue.



RECENCY & AVAILABILITY BIAS

- **Recency Bias**
We overreact to recent events
- Example: Celebrity Illness
- **Availability Bias**
We assume that the data we have been provided is representative of the entire data set.
- The combination is particularly bad.
- Studies show checking stock prices daily leads to more trading & worse results on average.
- Worse for engineers, because we are immersed in "game changers" & "it is different this time"

THE AVAILABILITY HEURISTIC



JamesClear.com

YOU HAVE **\$1,000** AND YOU MUST PICK
ONE OF THE FOLLOWING GAMES

A

You have a 50% chance of gaining \$1,000, and
a 50% chance of gaining \$0.

OR

B

You have a 100% chance of gaining \$500.

NOW, YOU HAVE **\$2,000** AND YOU MUST
PICK ONE OF THE FOLLOWING GAMES

A

You have a 50% chance of losing \$1,000, and
a 50% chance of losing \$0.

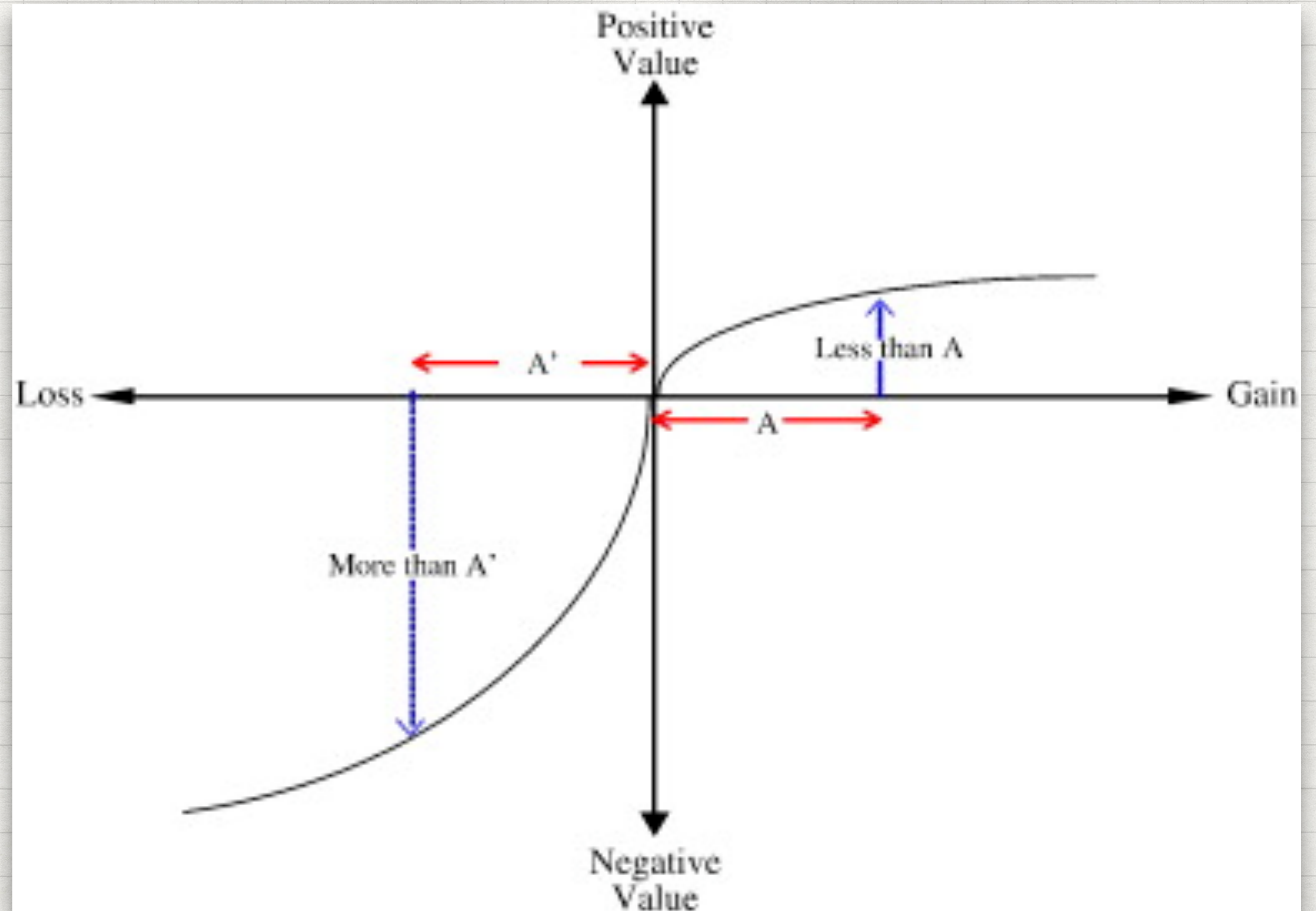
OR

B

You have a 100% chance of losing \$500.

LOSS AVERSION (PROSPECT THEORY)

- We hate losses more than we love winning
- Average loss aversion across multiple studies is between 2:1 and 3:1
- Affects our views on a wide range of situations, including career decisions, dating, purchasing, investing and taxes.
- We even hate being responsible for decisions that could result in a loss
- Example: "Sunk Cost" mistakes with investments
- Currently under debate!*



IT'S OK TO NOT BE RATIONAL

IT'S OK TO NOT BE RATIONAL

- As Dan Ariely beautifully put it, the key is that humans are **predictably irrational**
- Know your own flaws, and you can set up systems to help account for them
- Self awareness is key
(yes, my Mom is a psychologist)



ADDITIONAL COURSES & MATERIAL

- Econ 178: Behavioral Economics
- Econ 278: Behavioral & Experimental Economics
- ACCT 618 (GSB): Market Efficiency & Informational Arbitrage
- Coursera / Duke: Behavioral Finance
<https://www.coursera.org/learn/duke-behavioral-finance>



CS 007

QUESTIONS



NEXT WEEK: GETTING PAID

- Compensation
- Different models & methods
- Public vs. Private Companies
- Stock Options vs. Restricted Stock
- Understanding Equity Compensation
- Taxes

