

The image features a blue grid background with various hand-drawn elements. At the top center is a blue cloud-like speech bubble containing the word "Exploiting". To its left are two green speech bubbles, one with a question mark and one with an exclamation mark. Below the "Exploiting" bubble is a large, multi-colored lightning bolt (yellow, orange, red) with the text "& Slow" in the center. To the right of the lightning bolt is a yellow speech bubble and a red one. Below the lightning bolt is a green rectangular speech bubble containing the word "Thinking". In the bottom left, there is a black, a blue, and a red speech bubble. At the bottom center is a dark blue speech bubble. In the bottom right is a grey speech bubble containing the name "Rebecca Wirfs-Brock".

Exploiting

Fast

& Slow

Thinking

Rebecca
Wirfs-Brock

Who Am I?

Writer and sw designer...two design books, blog, IEEE Software design column, patterns...

Inventor of Responsibility-Driven Design and the xDD meme

First female principal engineer at Tektronix, started in QA

Runner

Agile Experience Report Program Director

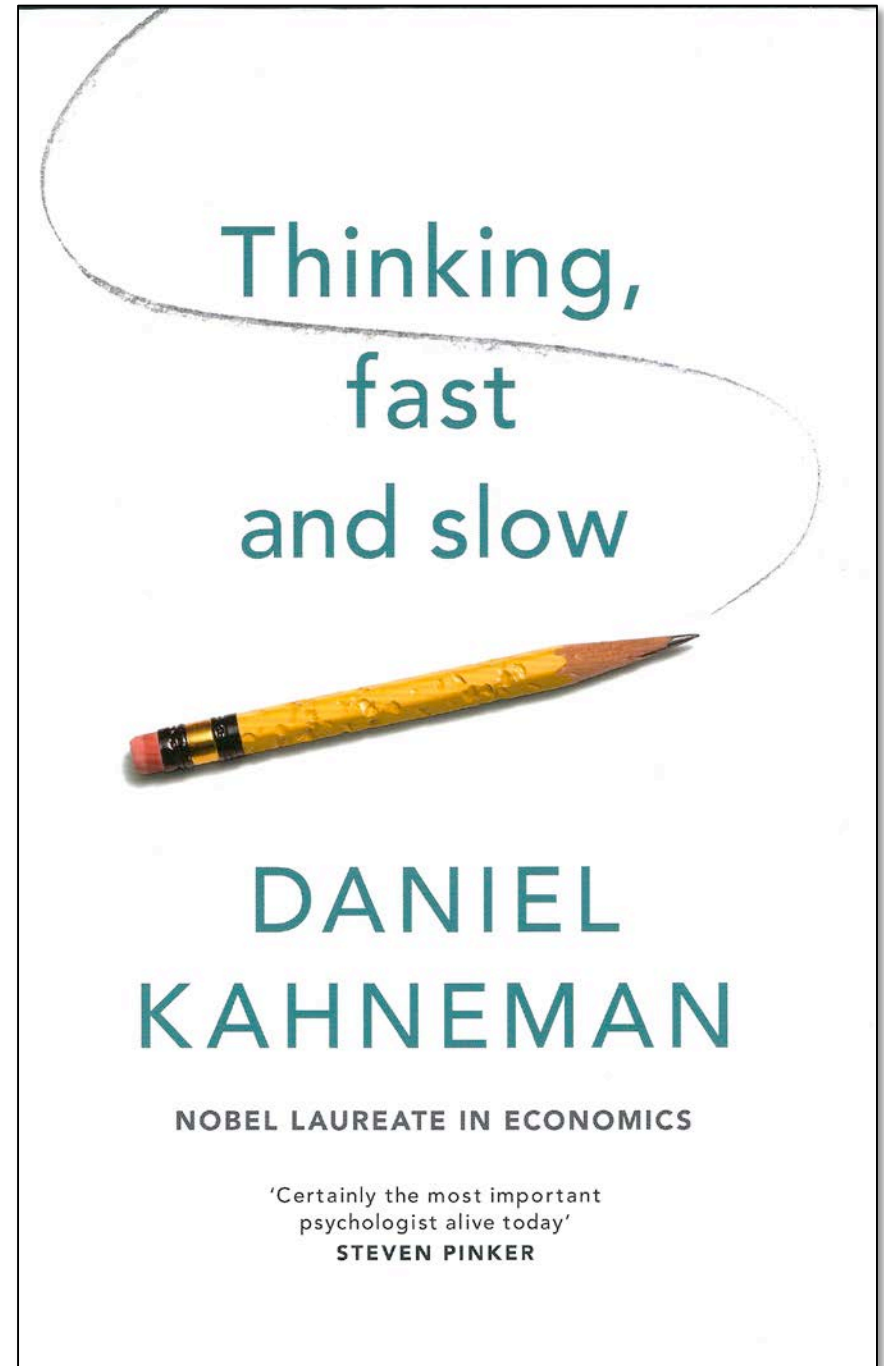
email: rebecca@wirfs-brock.com

twitter: [@rebeccawb](https://twitter.com/rebeccawb)



Agenda

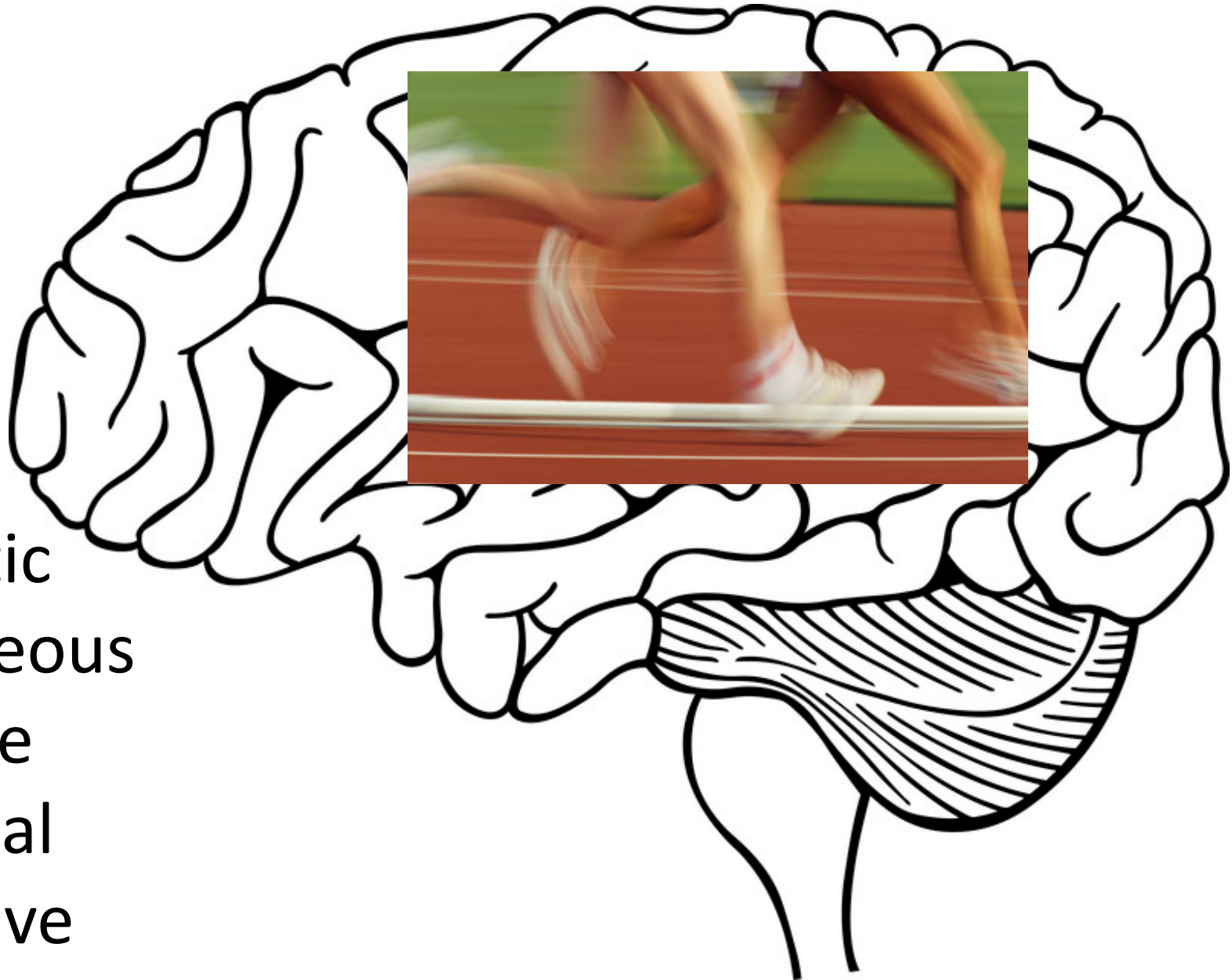
- Fast and slow thinking
- The tasks we do and their thinking impacts
- Fast thinking drawbacks and exploits
- Decision-making challenges
- Reframing thoughts







Fast Thinking (System 1)



automatic
spontaneous
impulsive
emotional
associative

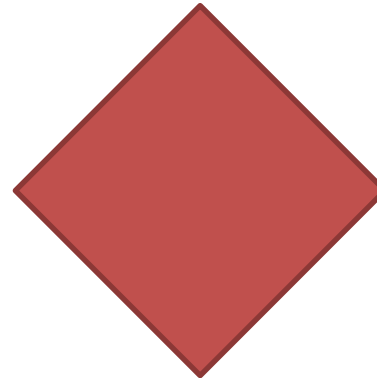
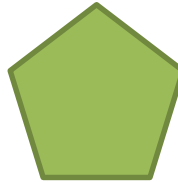


BOOM

A vibrant comic book-style graphic featuring the word "BOOM" in large, bold, red letters with a thick white outline and a black drop shadow. The text is centered against a blue background with a pattern of lighter blue circles. Surrounding the word are several black, jagged, starburst shapes, some with white outlines, and white, curved, motion-line-like shapes that radiate outwards, creating a sense of explosive energy.



More System 1 Thinking



$$2 + 2 = ?$$







I need it in green.

Hi, how are you?

I want that one.

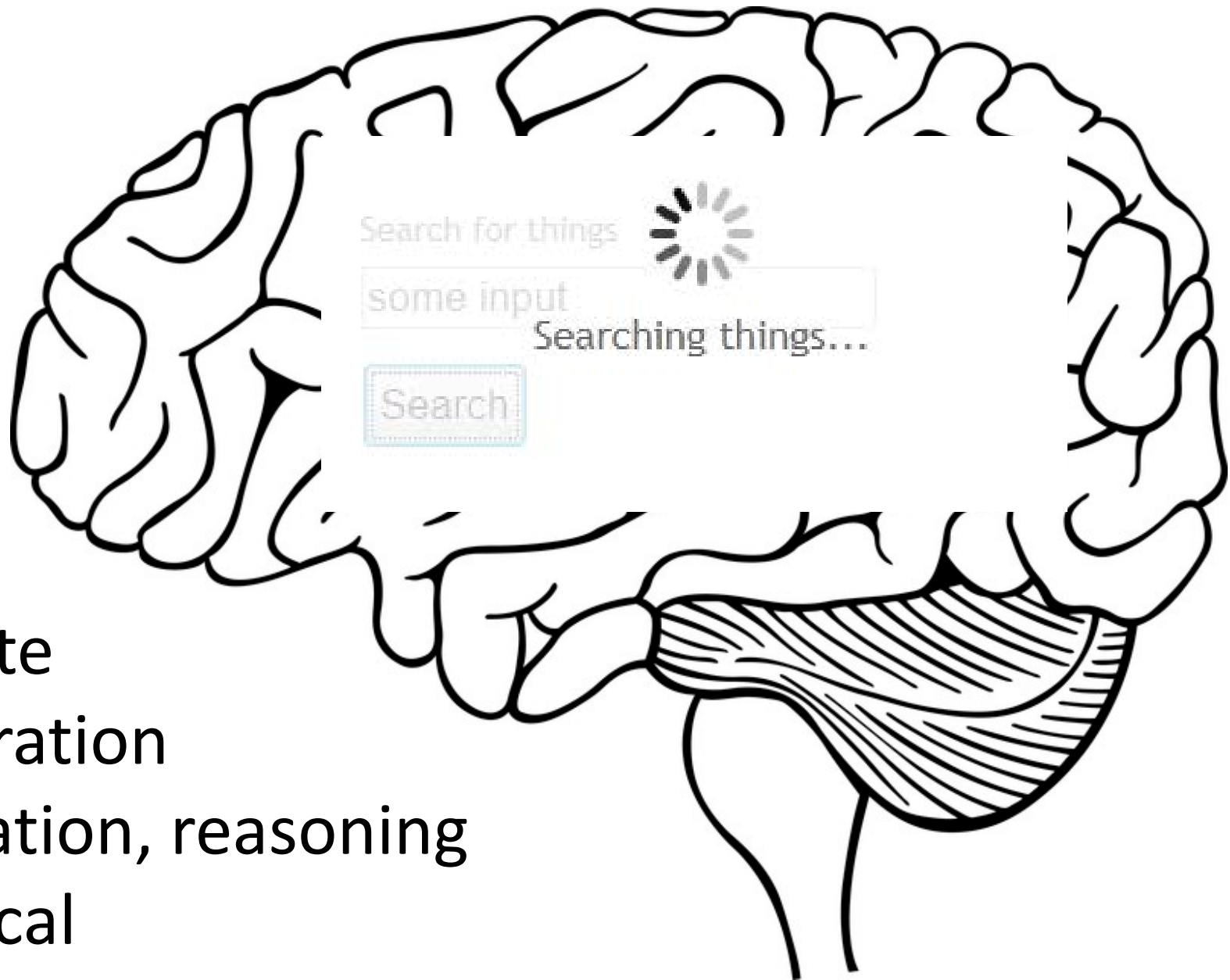
I'm hungry.



“self motivated and
can work
independently, but
also is a team player”



Slow Thinking... (System 2)



effort
logical
deliberate
concentration
computation, reasoning
self-critical











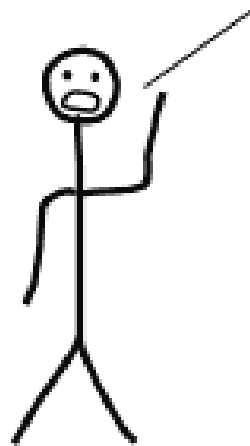
lead paint removal
investment expenses
interest
home
energy credits
second home
phone charges
business dinners
expenses
insurance
children
dependents
charitable donations
retirement credit
gambling losses
charity
depreciation

TAX DEDUCTIONS

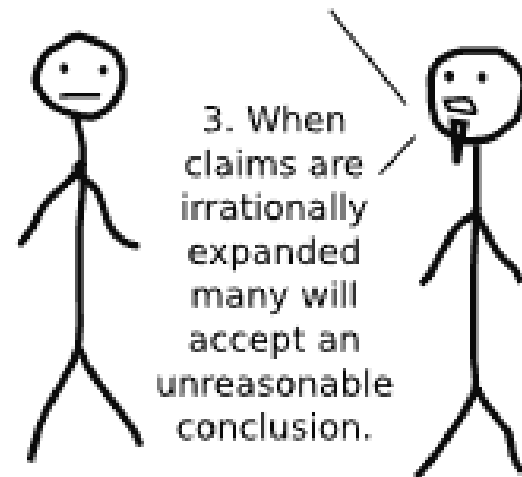
itemized
business travel
casualty loss
union dues
customer gifts
file
accounting
mortgage interest
legal fees
losses
home office
education
worthless stock
refinancing points
long term care premiums
business expenses
exemptions
professional journals
office rent
accounting fees



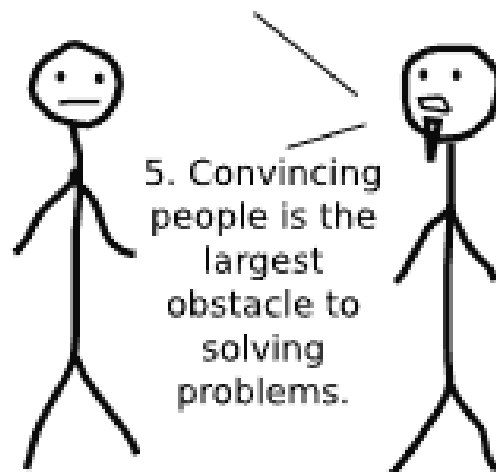
Modal logic is special because it uses statements that are qualified with expressions like "necessarily", "possibly", or "sometimes."



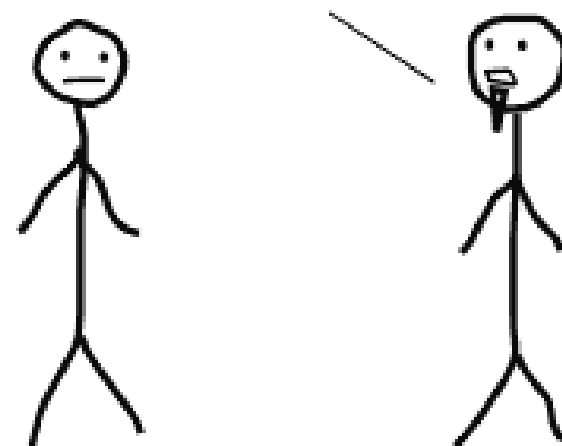
1. Modal logic solves some problems.
2. In a complex modal argument many will naturally expand at least one claim beyond reason.



4. Therefore, numerous people are likely to accept the conclusion of a complex modal argument.



6. Therefore, modal logic can solve all problems.





It's Not that Simple

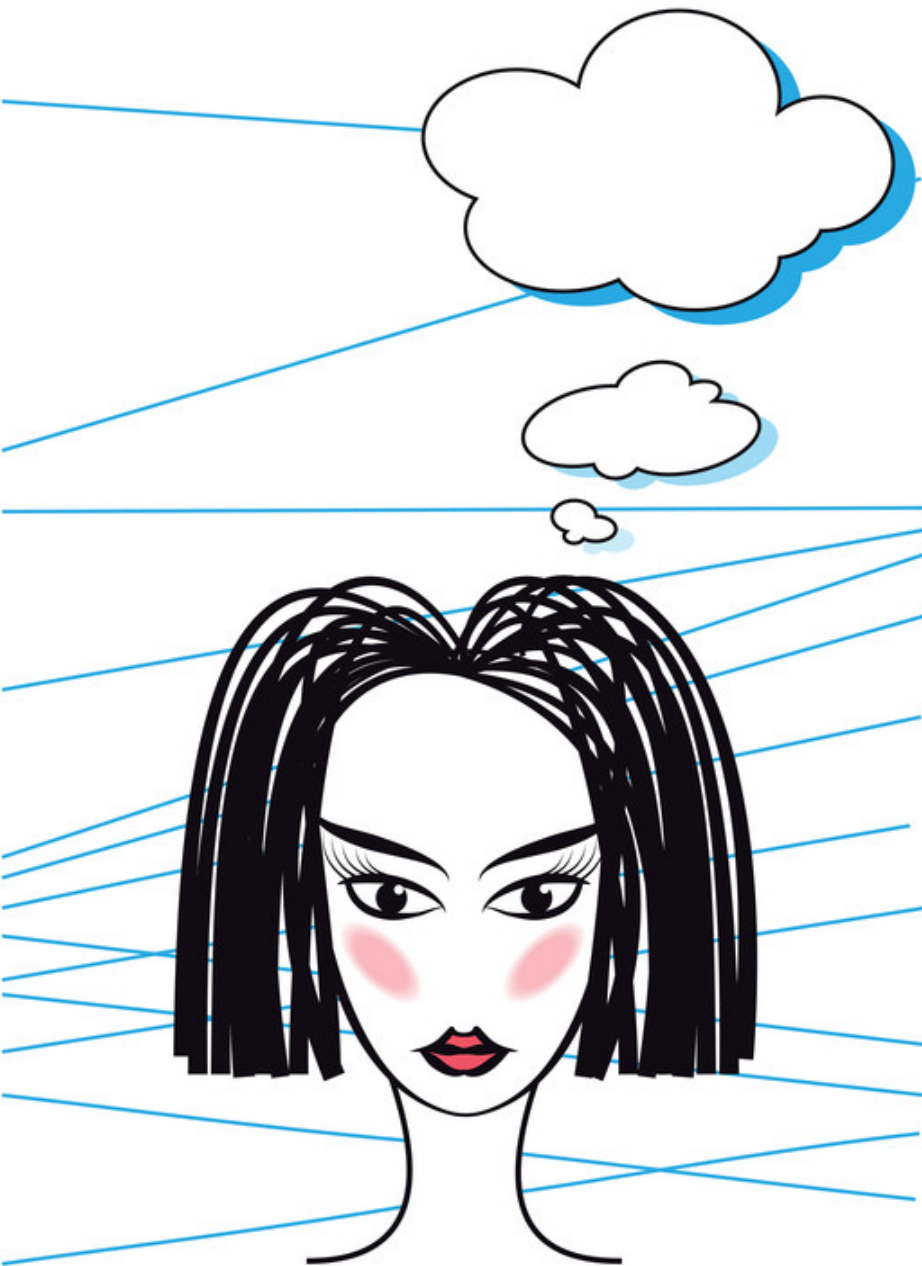


EMOTION

or



LOGIC



System 1 runs automatically

System 2 runs normally in a comfortable, low-effort mode

System 2 often adopts suggestions from System 1 with little modification

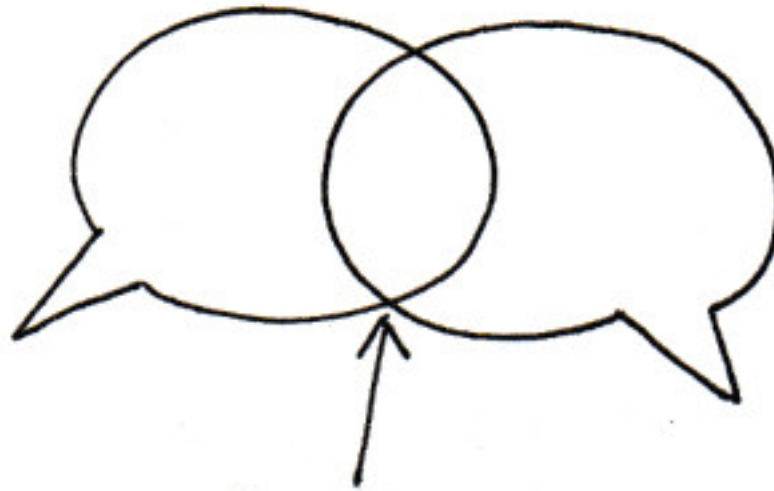
...except when System 1 runs into difficulty.

It calls on System 2 for more detailed, specific processing

System 2 continuously monitors behavior (self-control)

System 2 kicks in when it detects an error about to be made

5 minute conversation



This is the good stuff.

Identify practices and tasks you do and the kind of thinking they demand.


Agile Tasks

- Specifying acceptance criteria
- Programming
- Writing tests
- A design spike
- UI design
- Schema design
- Performance tuning
- Checking in code
- Conversations about functionality and features
- Estimating
- Identifying tasks
- Identifying risks
- Exploratory testing
- Prioritizing work
- Fixing a bug
- Refactoring code
- Splitting a story
- Getting customer feedback
- Running tests
- Analyzing trends

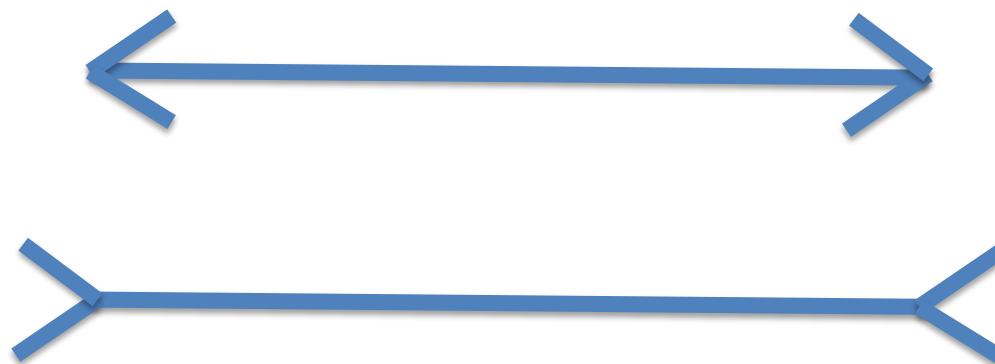
Architecture Tasks

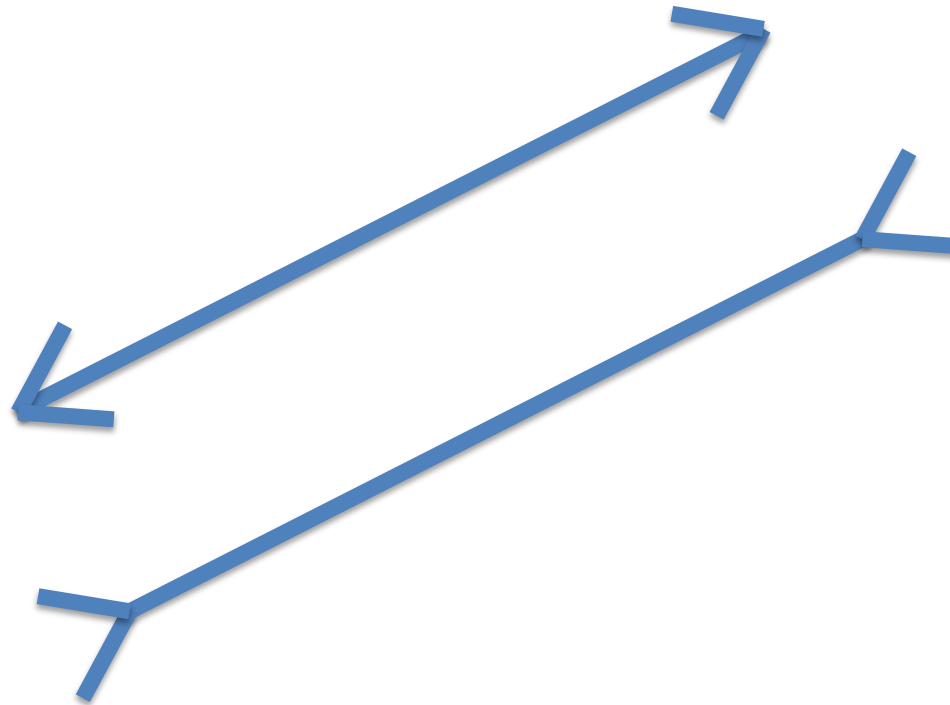
- Define architecture:
components/interfaces/services/characteristics
- Establish standards
- Prototype
- Competitive assessments
- Benchmark
- Review documents, designs, code, configurations...
- Conversations about architecture concerns
- Make tradeoffs
- Gather evidence
- Identify architecture tasks
- Communicate decisions
- Resolve disputes
- Identify risks
- Resolve technical problems
- Vet new technology
- Explain tradeoffs
- Examine architecturally critical code
- Recommend tools, environments, frameworks...

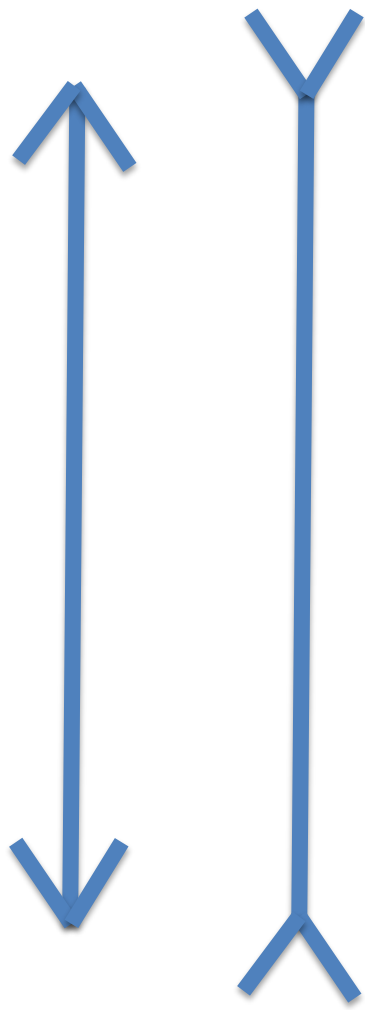
**SOME FACTS
ABOUT
SYSTEM 1
AND 2**

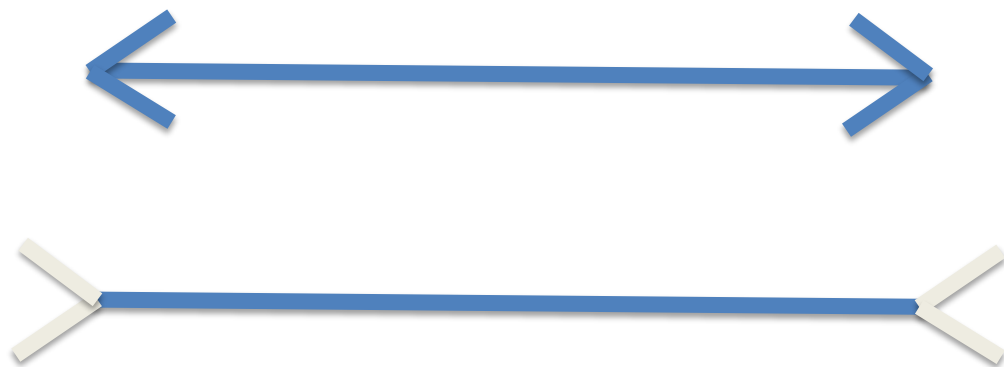
A man is shown from the chest up, wearing a white t-shirt. The t-shirt has red text printed on it. The text is arranged in two lines. The man's arms are visible, and he is wearing a black wristband on his left wrist. The background is plain white.

I get along with my
cognitive bias...











System 1
cognitive
Illusions...



W Y S I A T I



“They made the decision on based on the report from that one consultant. WYSIATI! They did not realize how little information they had.”



Story: Account Holder withdraws cash

Scenario 1: Account has sufficient funds

Given the account balance is \ \$100

And the card is valid

And the machine contains enough money

When the Account Holder requests \ \$20

Then the ATM should dispense \ \$20

And the account balance should be \ \$80

And the card should be returned

Scenario 2: Account has insufficient funds

Given the account balance is \ \$10

And the card is valid

And the machine contains enough money

When the Account Holder requests \ \$20

Then the ATM should not dispense any money

And the ATM should say there are insufficient funds

And the account balance should be \ \$20

And the card should be returned

Scenario 3: Card has been disabled

Given the card is disabled

When the Account Holder requests \ \$20

Then the ATM should retain the card

And the ATM should say the card has been retained

Scenario 4: The ATM has insufficient funds

...

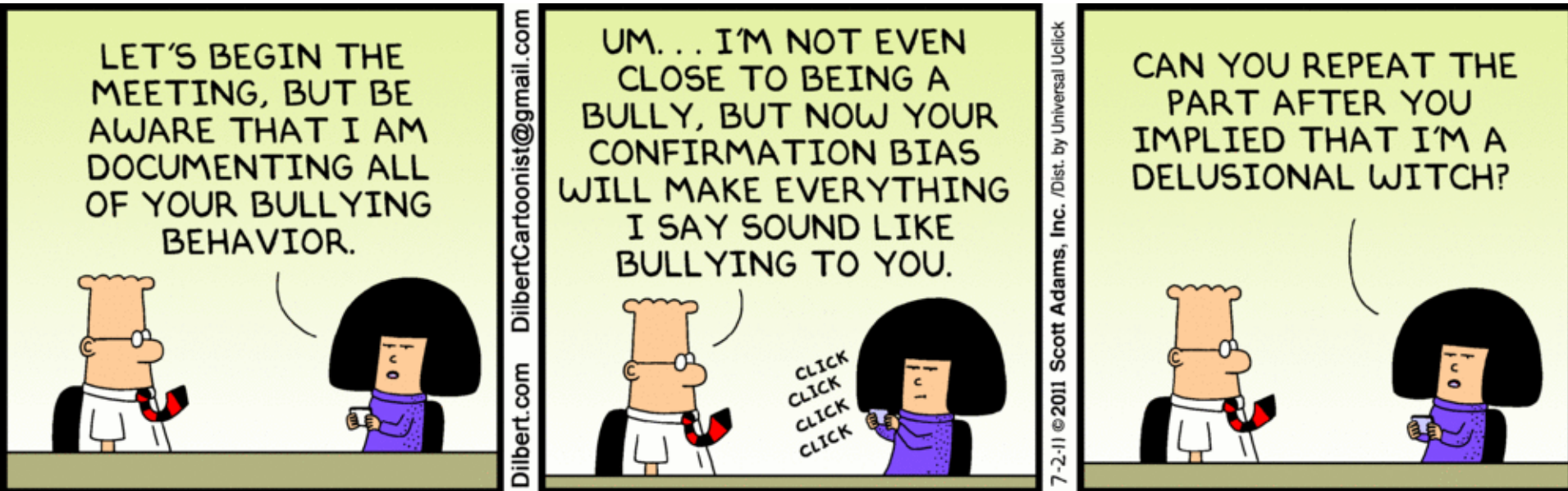
I T A T I ?

Framing Effects

- Different ways of presenting the same information evoke different emotions.



Confirmation Bias





EAT



S O _ P



priming





priming





Money Priming Effects



Reluctance to be involved with or depend on others

Persevere longer on difficult tasks

More selfish, less willing to help

System 2 Easily Tires

I'm not lazy...

I just rest
before I get
tired.





**Skill lessens cognitive energy
required**

ACTIVITIES THAT IMPOSE HIGH DEMANDS ON SYSTEM 2 WEAR US OUT





NOT YOUR MOTHER'S KITCHEN TIMER

25 minutes to get it done.



WHEN COGNITIVELY BUSY WE ARE MORE LIKELY TO...

make selfish choices

make superficial judgments

We unconsciously
replace hard questions
with simpler ones

As a beer and alcohol and website, we're
prohibited from advertising to minors.
Please verify your age to enter.

How old are you?

Enter Site

“The question we face is whether this candidate will succeed. The question we seem to be answering is whether she interviews well. Let’s not substitute.”

A Remedy

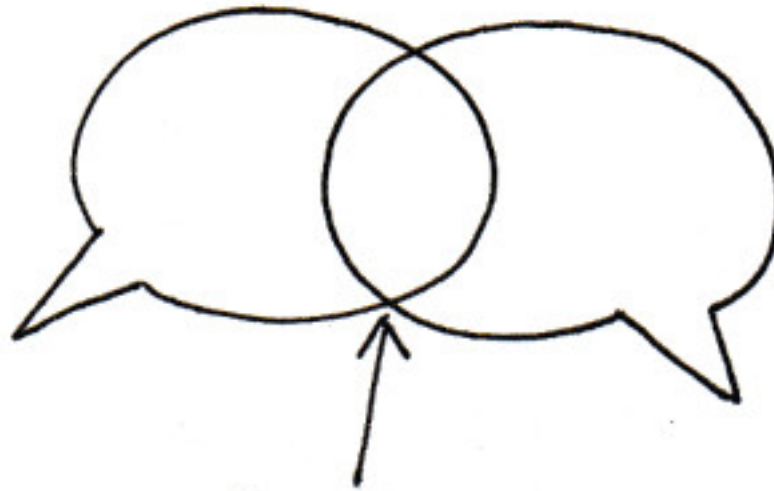
Keep asking:

“Do we remember the question we are trying to answer?

Have we substituted an easier question?”



5 minute conversation



This is the good stuff.

Share a story about your fast and slow thinking exploits.

Where did the right type of thinking work really well?

WRONG
and
DANGEROUS!

DECISION-MAKING CHALLENGES

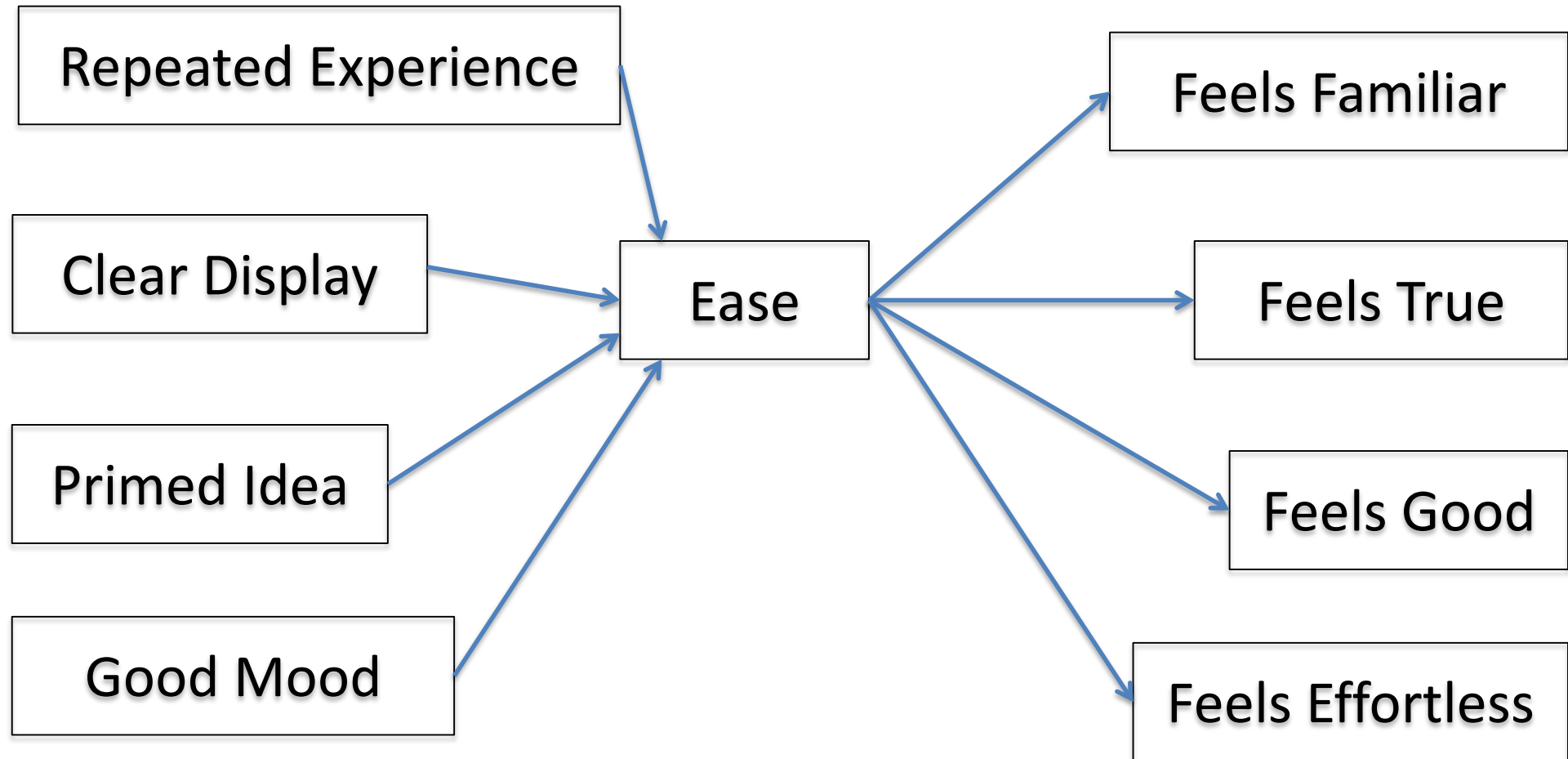


Shortcomings in Decision-Making

- overconfident when at ease
- overestimate likelihood of rare events
- overreact to potential losses
- frame problems too narrowly
- inappropriately trust our intuitions



Cognitive Ease Causes and Consequences



We Judge Probability based on Representativeness

Intuitions can be better than guesses:

- Most people who act friendly are friendly
- A tall athlete is more likely to play basketball than football
- Young men are more likely than elderly women to drive aggressively
- People with PhDs are more likely to subscribe to the New York Times than those who only completed high school



Which is more likely?

- She has a PhD
- She does not have a college degree



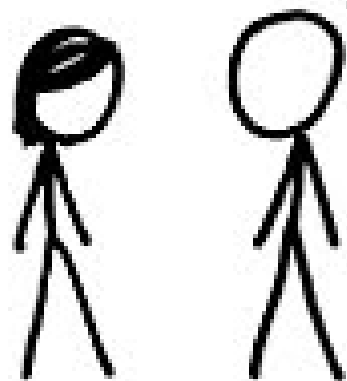
Photo courtesy Ed Yourdon flickr.com
Used courtesy of creative commons license
<https://creativecommons.org/licenses/by-nc-sa/2.0/>

Julie is a senior at a state university. She read fluently when she was 4 years old. What's her Grade Point Average?

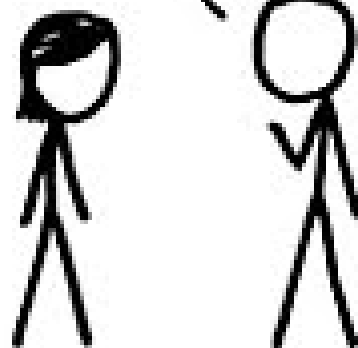
How *do* you come up with an answer?

1. Look for causal link between evidence (reading) and a prediction (her GPA)
2. Evaluate evidence relative to the norm. (How precocious was Julie at 4?)
3. Substitute (Julie's quite a precious reader!) and intensity match (Smart reader = High GPA). Voila!

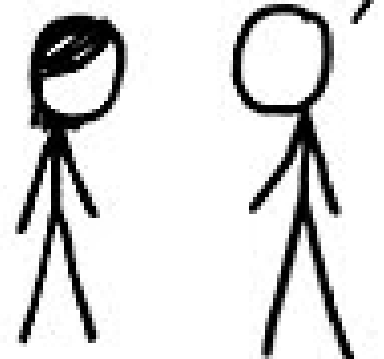
I USED TO THINK
CORRELATION IMPLIED
CAUSATION.



THEN I TOOK A
STATISTICS CLASS.
NOW I DON'T.

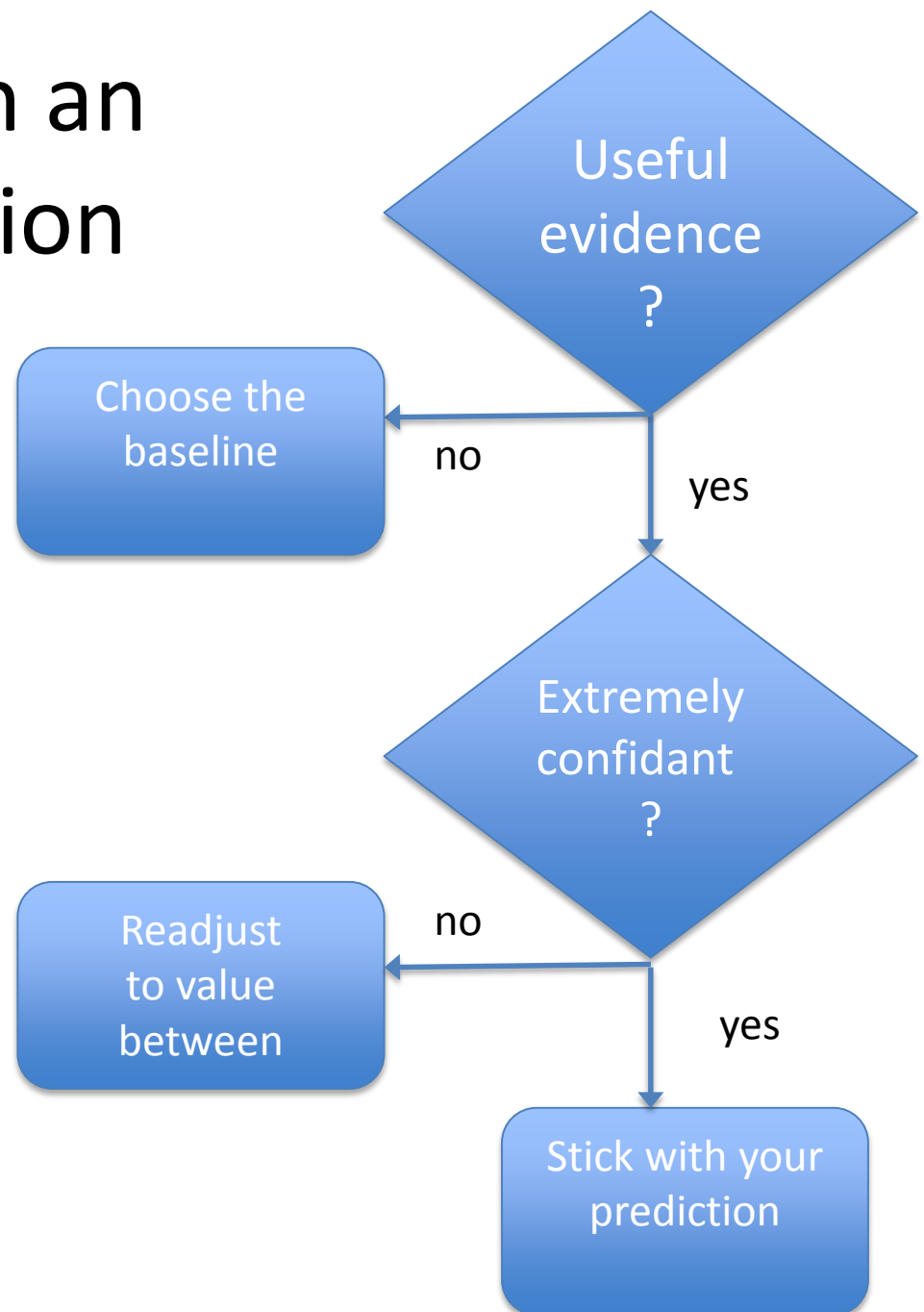


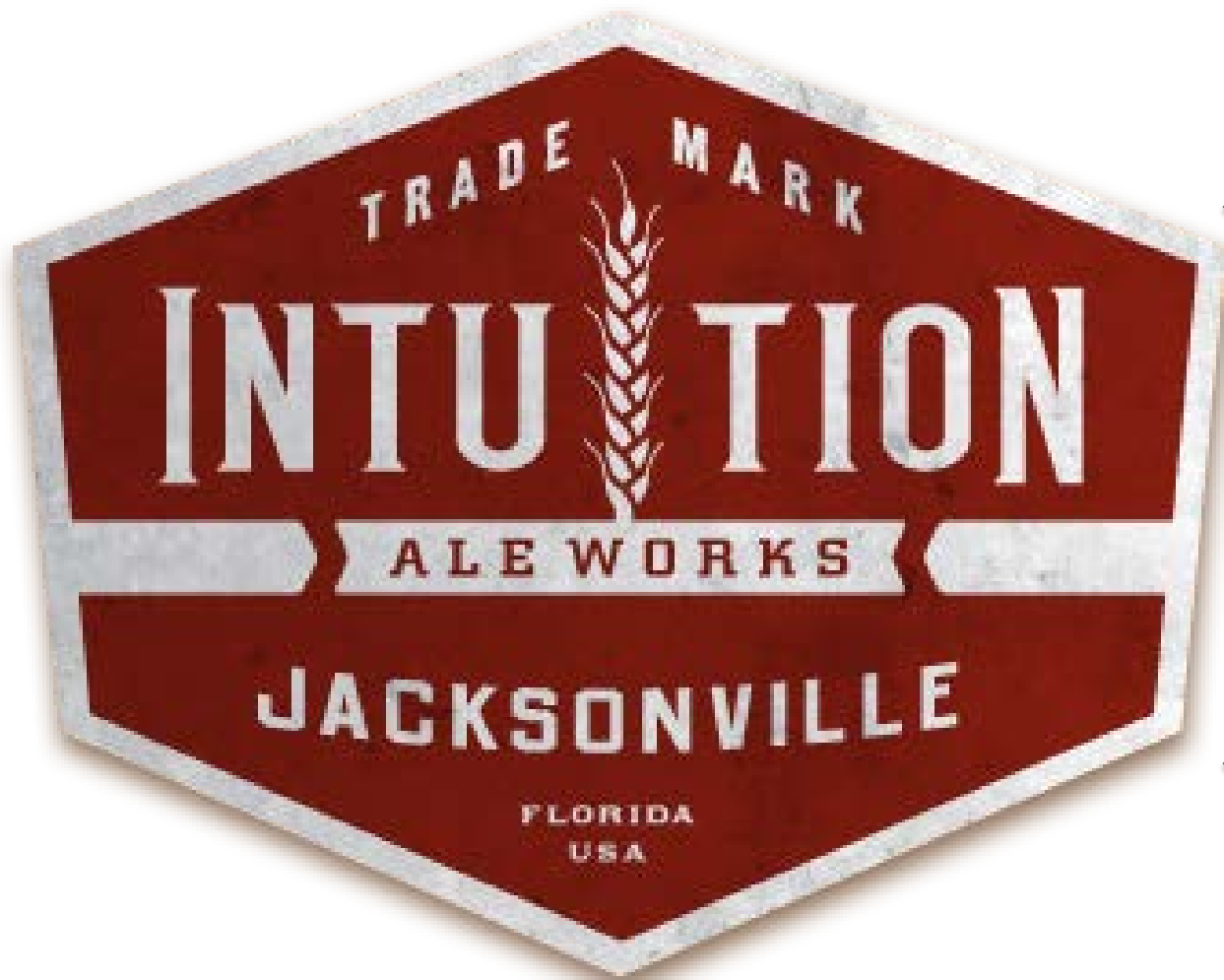
SOUNDS LIKE THE
CLASS HELPED.
WELL, MAYBE.



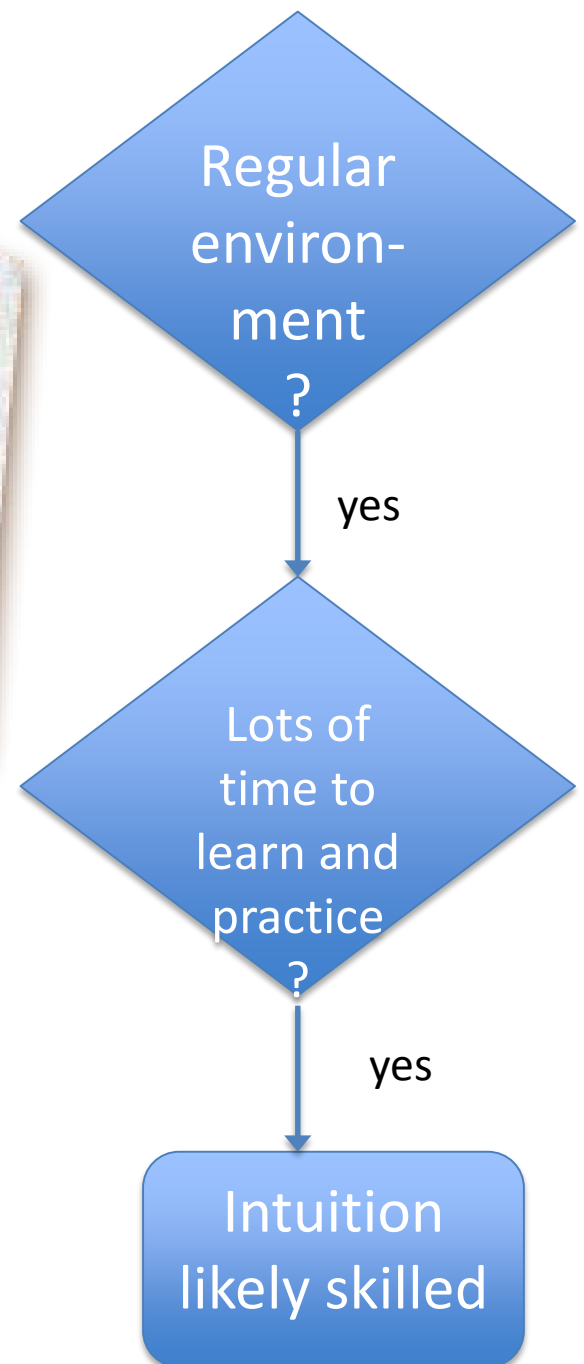
correcting bias in an extreme prediction

- determine **baseline** or **base rate**
- readjust based on probability towards baseline





Don't trust
when no stable regularities to learn
from

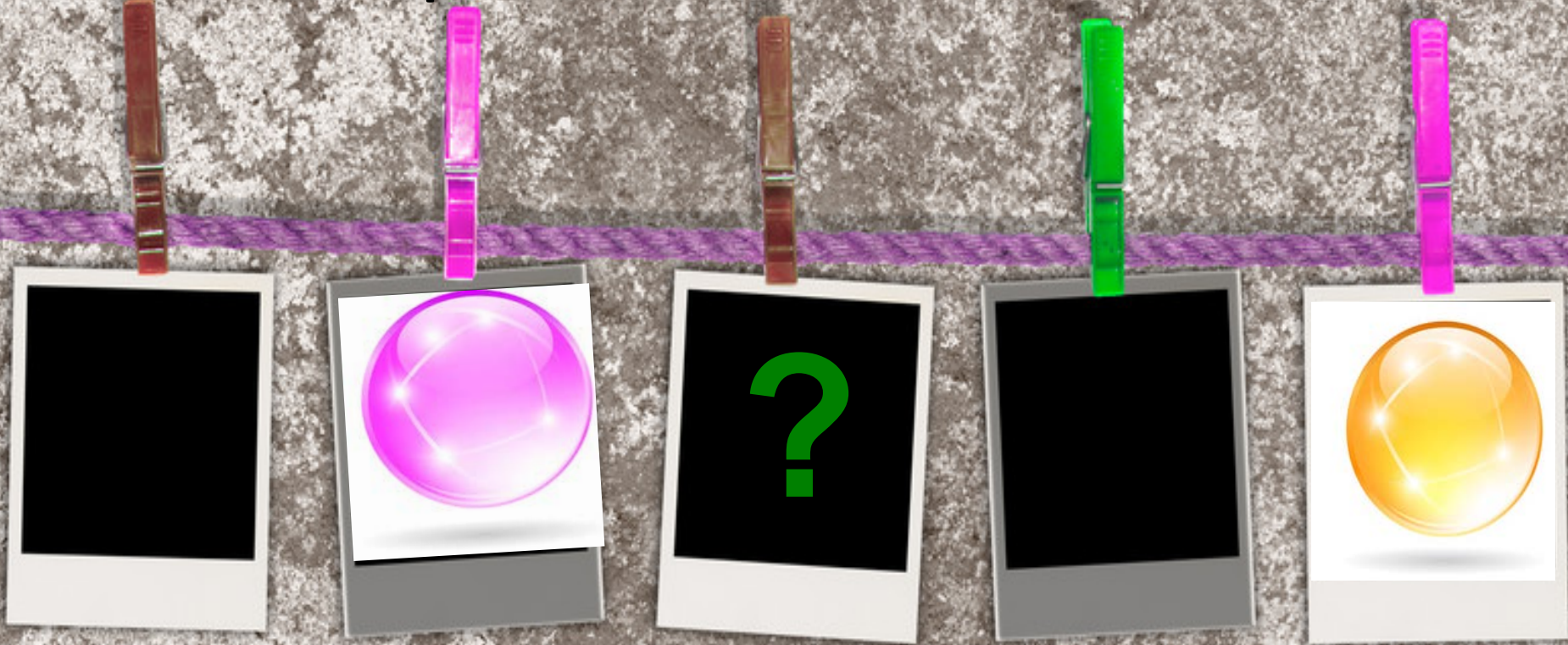




**P a i n
f r o m
l o s s**

**Pleasure
f r o m
g a i n**

Pre-Retrospectives Can Surface Risks



Recipe: ~~Pre-Mortem~~ Retrospective

Ingredients:

knowledgeable group

imagine a year from now that we implemented our plan (made that big decision) and it was a disaster

Directions:

take 5 – 10 minutes to privately write your history of the past year...why we failed

use stories to overcome groupthink,

unleash imagination, and

search for /counteract possible threats

<http://hbr.org/2007/09/performing-a-project-premortem>

Serves: legitimize doubts

From: Gary Klein

RE



FRAME

Recipe: A Reframing Recipe

Ingredients:

situation you want to revisit/rethink

time to pause and reconsider

Directions:

step back, then ask a question about what happened

consider the 'lens'/frame you are currently using

state unspoken assumptions and beliefs

restate what you believe using what you know about system 1 and 2 thinking

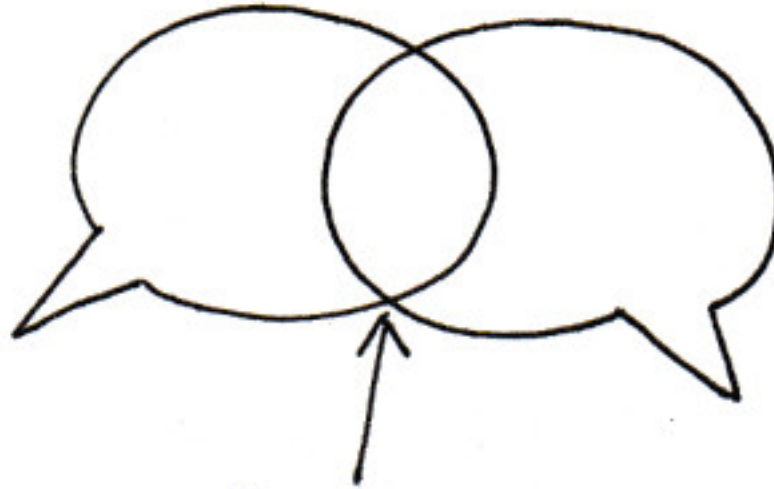
Serves:

From: Daniel Kahneman

Reframing a (Wildly) Optimistic Prediction

- **Step back:** “Why did we make that low of an estimate?”
- **Consider your frame:** “We have a can-do attitude. We have also read a positive review of that new framework on (Your Favorite Authority’s) blog.”
- **Assumptions:** “We want to believe we can do this more quickly using the new framework.”
- **Restate:** “We’re probably too optimistic. Let’s consider our lack of experience and revisit our estimate.”

5 minute conversation

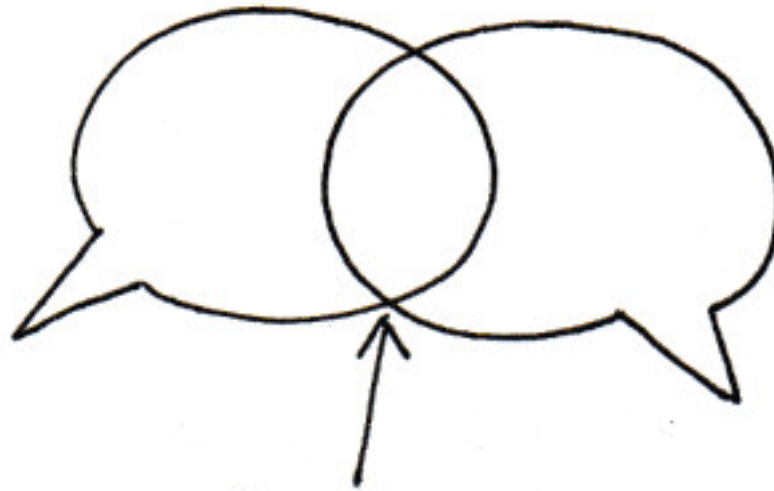


This is the good stuff.

Share a story about how faulty thinking led you or your team astray when making a decision.



Wrap up



This is the good stuff.

Phrase your thoughts about a situation in terms of what you know about fast and slow thinking and cognitive bias.



FAST and SLOW, not FAST versus SLOW

Exploit both types
of thinking

Counteract fast
thinking quirks

Strengthen and
support necessary
slow thinking

Ex-ploit – verb
to make the best use of

to take advantage of (a person, situation, etc.), especially unethically or unjustly for one's own ends