

### 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

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### Agenda

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

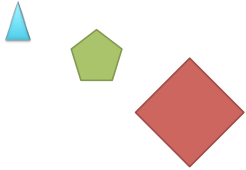


### Fast Thinking (System 1)

automatic  
spontaneous  
impulsive  
emotional  
associative



More System 1 Thinking



$2 + 2 = ?$



I need it in green.

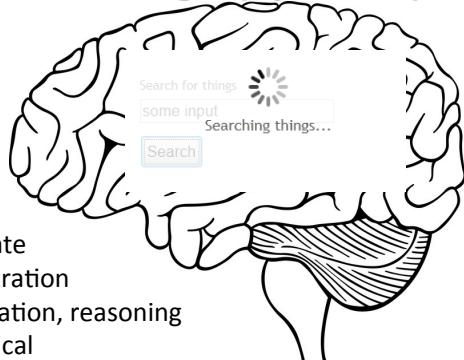
Hi, how are you?

I want that one.

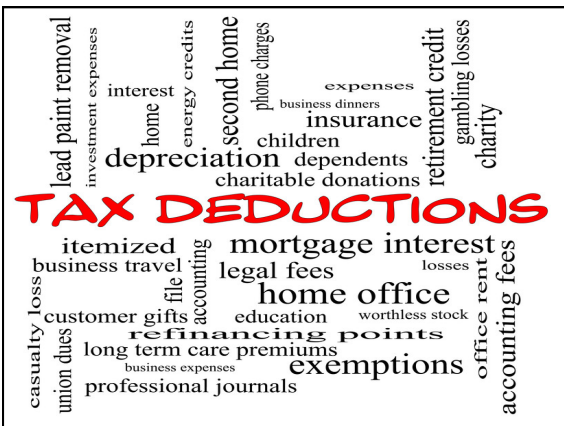
I'm hungry.

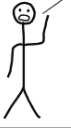
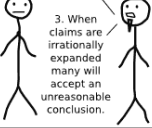

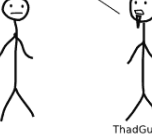
“self motivated and can work independently, but also is a team player”

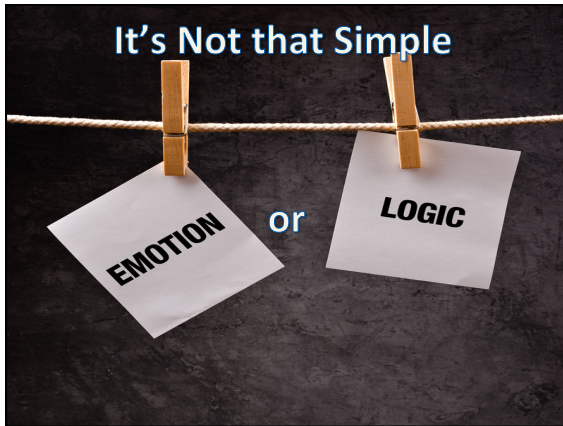
**Slow Thinking... (System 2)**



effort  
logical  
deliberate  
concentration  
computation, reasoning  
self-critical



<p>Modal logic is special because it uses statements that are qualified with expressions like "necessarily", "possibly", or "sometimes."</p> 	<p>1. Modal logic solves some problems. 2. In a complex modal argument many will naturally expand at least one claim beyond reason.</p> 
<p>4. Therefore, numerous people are likely to accept the conclusion of a complex modal argument.</p> 	<p>3. When claims are irrationally expanded many will accept an unreasonable conclusion. 5. Convincing people is the largest obstacle to solving problems. 6. Therefore, modal logic can solve all problems.</p>  <p>ThadGuy.com</p>



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

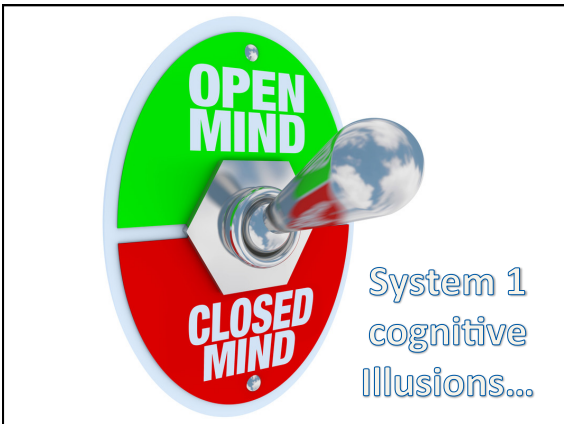
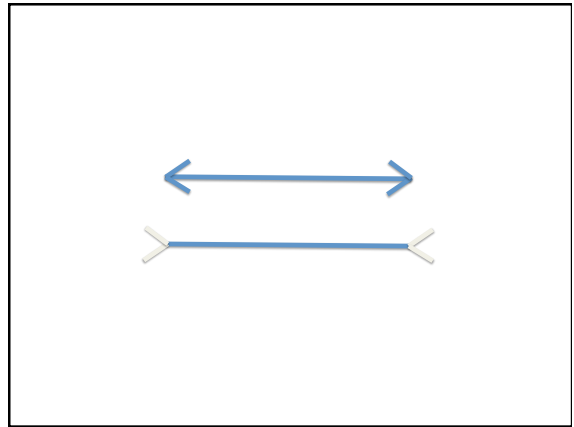
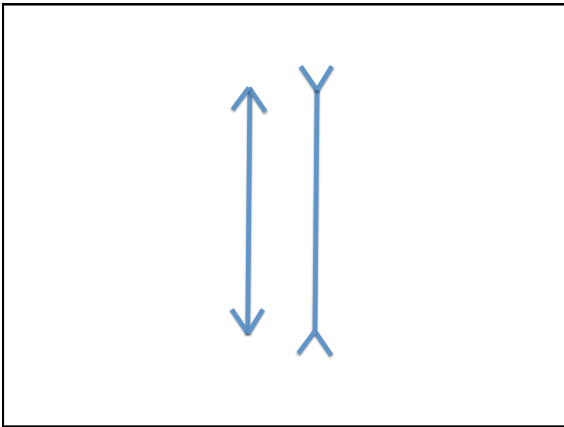
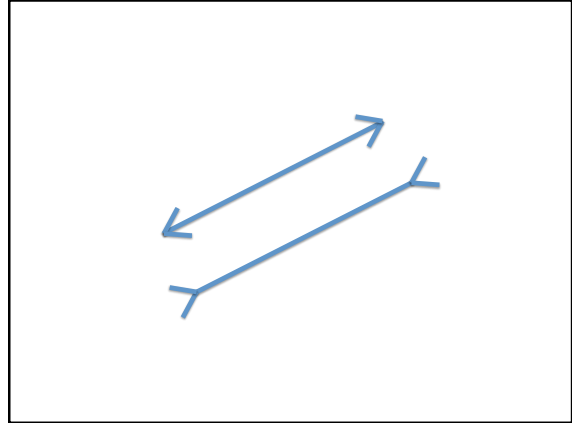
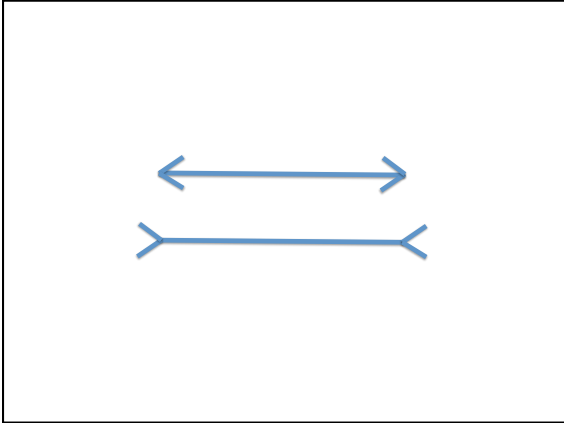
- Specifying acceptance criteria
- Programming
- Writing tests
- A design spike
- UI design
- Schema design
- Performance tuning
- Checking in code
- Conversations about functionality and features
- Estimating
- Identifying tasks
- Identifying risks
- Exploratory testing
- Prioritizing work
- Fixing 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**

I get along with my cognitive bias...



“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  
 ...

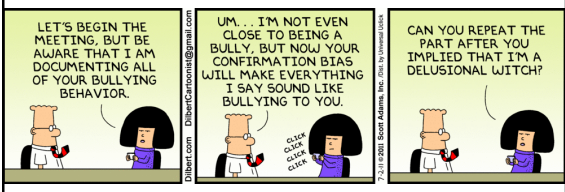
**I T A T I ?**

**Framing Effects**

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

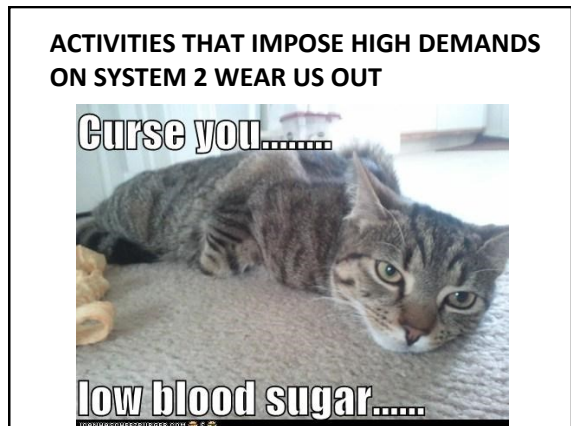
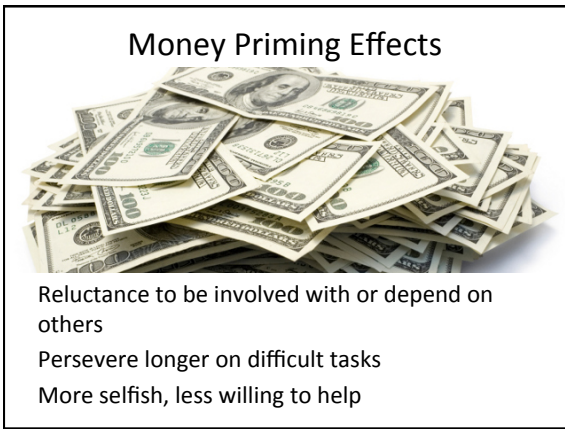


**Confirmation Bias**



**EAT**

**SO\_P**





**WHEN COGNITIVELY BUSY WE ARE MORE LIKELY TO...**

make selfish choices

make superficial judgments

We unconsciously  
replace hard questions  
with simpler ones



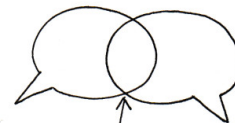
"The question we face is whether this candidate will succeed. The question we seem to be answering is whether she interviews well. Let's not substitute."

**A Remedy**

**Keep asking:**

"Do we remember the question we are trying to answer?  
Have we substituted an easier question?"

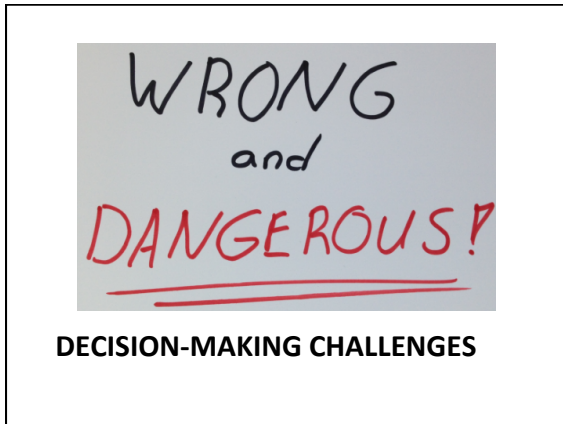
**5 minute conversation**



**Share a story about your fast and slow thinking exploits.**

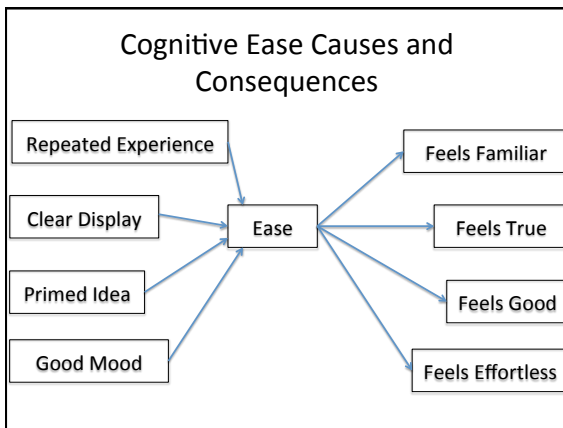
**Where did the right type of thinking work really well?**





### 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



### 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?

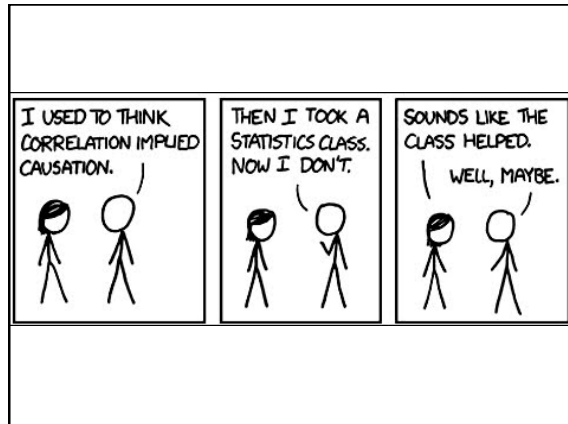
- She has a PhD
- She does not have a college degree

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

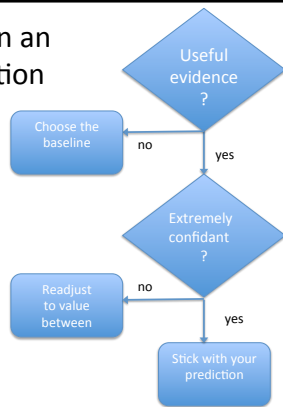
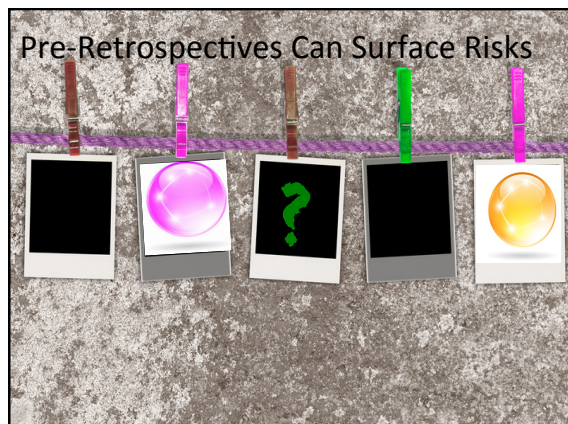
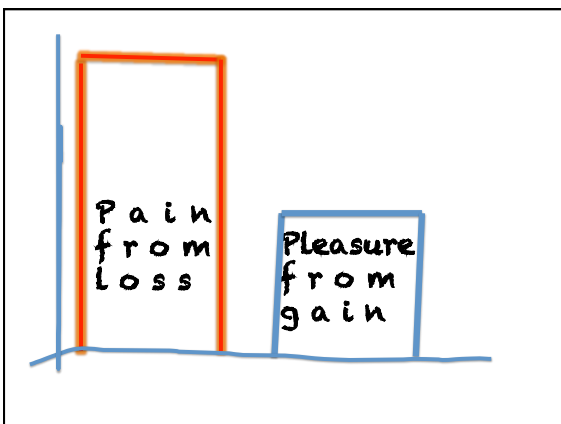
### How *do* you come up with an answer?

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!



### correcting bias in an extreme prediction

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

**Recipe: Pre-Mortem Retrospective**

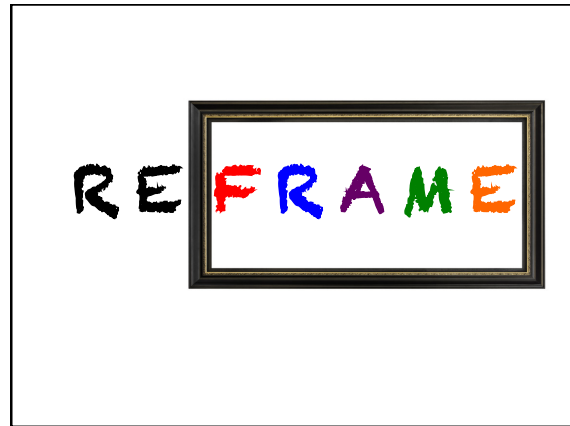
**Ingredients:**  
knowledgeable group

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



**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