Rebecca Wirfs-Brock
Exploiting Fast and Slow Thinking

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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

ex-Smalltalker

Runner

Agile Experience Report Program Director & Experience Reports Track co-chair
Agenda

• Fast and slow thinking
• Agile practices and thinking impacts
• Fast thinking drawbacks and exploits
• Decision-making challenges
• Reframing thoughts

Thinking, fast and slow

DANIEL KAHNEMAN
NOBEL LAUREATE IN ECONOMICS

‘Certainly the most important psychologist alive today’
STEVEN PINKER
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
TAX DEDUCTIONS

- lead paint removal
- investment expenses
- interest
- home energy credits
- second home expenses
- business dinners
- insurance
- children dependents
- charitable donations
- depreciation
- office rent accounting fees
- mortgage interest losses
- itemized
- mortgage interest
- legal fees
- home office
- customer gifts
- education
- worthless stock
- refinancing points
- long term care premiums
- exemptions
- payroll taxes}

- casualty loss
- union dues
- business expenses
- professional journals
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.
3. When claims are irrationally expanded many will accept an unreasonable conclusion.
4. Therefore, numerous people are likely to accept the conclusion of a complex modal argument.
5. Convincing people is the largest obstacle to solving problems.
6. Therefore, modal logic can solve all problems.
It’s Not that Simple
or
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
Identify agile 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
SOME FACTS ABOUT SYSTEM 1 AND 2

I get along with my cognitive bias...
System 1 cognitive Illusions...
“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
  ...
Framing Effects

• Different ways of presenting the same information evoke different emotions.
Confirmation Bias

Let’s begin the meeting, but be aware that I am documenting all of your bullying behavior.

Um... I'm not even close to being a bully, but now your confirmation bias will make everything I say sound like bullying to you.

Can you repeat the part after you implied that I’m a delusional witch?
Money Priming Effects

- Reluctance to be involved with or depend on others
- Persevere longer on difficult tasks
- More selfish, less willing to help
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

Curse you....... low blood sugar......
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.
“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?”
7 minute conversation

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

- Repeated Experience
- Clear Display
- Primed Idea
- Good Mood

- Feels Familiar
- Feels True
- Feels Good
- Feels Effortless

Feels Effortless
Feels Good
Feels True
Feels Familiar

Ease

Repeated Experience
Clear Display
Primed Idea
Good Mood
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
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
Pain from loss
Pleasure from gain
Pre-Retrospectives Can Surface Risks
Recipe: Pre-Mortem Retrospective

Ingredients:
knowledgeable group

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


Serves: legitimize doubts
From: Gary Klein
REFRAME
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.”
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