

“Thinking, Fast and Slow”

Evolutionarily Old and New Modes of “Thinking”

Book: Daniel Kahneman
Colloquium: Chris Comiskey

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Introduction

Kahneman, Evolution, the Brain...

- If you don't "believe" in evolution...
- Kahneman: Behavioral Economics, behavioral psychology, decision making
- Modular theory of mind
 - ▶ *Kind of* like apps
 - ▶ Apps that interact, compete, interrelate, self-manage(?)
 - ▶ Not a physical partition of brain
 - ▶ e.g. small heat robot
 - ▶ Different parts of the brain evolved at different times, with new functions added on later, melding with existing ones...

Old and New, Fast and Slow

System 1 and System 2

- Evolutionarily old and new
 - ▶ Old: amygdala (?) — fast circuitry; closer to the stock exchange
 - ▶ New: prefrontal cortex — reflection, abstract thinking, etc.
- Fast and Slow, e.g.
 - ▶ Fast: “I can’t believe that f****r cut me off!! I’ll club him!!”
 - ▶ Slow: “Then again, maybe he really needed to get over; plus, I don’t want to go to jail.”
- Fast and Slow, e.g.2
 - ▶ Fast: Recognizing emotions in facial expressions
 - ▶ Slow: $17 \times 34 = ?$
- Not exactly the same thing—equating amygdala/prefrontal to fast/slow—but that’s the idea behind the more complex underlying brain reality.

What's the point?

- Cognitive biases.
- Systematic errors of thinking.
- We're irrational in systematic ways.
- Middle three sections of book:
 - ▶ Heuristics and Biases
 - ▶ Overconfidence (personal favorite)
 - ▶ Choices
- Heuristic — rule of thumb

Heuristics and Biases

Statistical Thinking

- “A study of new diagnoses of kidney cancer in the 3,141 counties of the United States reveals a remarkable pattern. The counties in which the incidence of kidney cancer is lowest are mostly rural, sparsely populated, and located in traditionally Republican states in the Midwest, the South, and the West. What do you make of this?”

Heuristics and Biases

Statistical Thinking

What about the counties with highest incidence of kidney cancer?

- “...mostly rural, sparsely populated, and located in traditionally Republican states in the Midwest, the South, and the West.”

Heuristics and Biases

Statistical Thinking

What about the counties with highest incidence of kidney cancer?

- “...mostly rural, sparsely populated, and located in traditionally Republican states in the Midwest, the South, and the West.”
- Associative, causal-relationship-seeking, story-telling System 1 goes crazy, but...
- Answer: small samples yield extreme results more frequently.

Heuristics and Biases

Availability, Substitution

- The brain is lazy, and using System 1 and a heuristic is easier than calling on System 2.
- Substitution heuristic: if a question is too hard, answer an easier one!
- Substitution heuristic, e.g. availability bias
 - ▶ How likely is your plane to crash?
 - ▶ How likely is a school shooting at the local school?
- Media coverage makes crashes and shootings easy to recall; ease of recall replaces actual likelihood estimation (substitution), instantiating the “availability bias”
- Which is more likely cause of death, and by what ratio?
 - ▶ Strokes or accidents?
 - ▶ Accidents or diabetes?
 - ▶ Disease or accident?

Heuristics and Biases

Availability, Substitution, Affect

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- Which is more likely cause of death, and by what ratio?
 - ▶ Lightning or botulism? lightning:botulism = 52:1
 - ▶ Accidents or diabetes? diabetes:accident = 4:1
 - ▶ Disease or accident? disease:accident = 18:1

Overconfidence

Understanding (causality) and Chance

- People systematically overestimate their understanding of events, and underestimate the role of chance.
- e.g. wealth (pet peeve of mine)
- Hindsight bias

Choices

The Prospect of Losses and Gains

- Prospect theory (Nobel Prize)
 - ▶ The *prospect* of losses, gains → irrationality
- Losses loom larger than gains
- People are risk averse at the prospect of a loss
- e.g. Fill in the blank to make the wager worth it to you:
 - ▶ 10% chance losing \$100, 90% chance winning...

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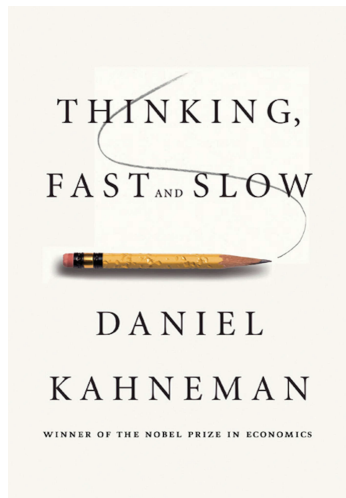
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Thinking, Fast and Slow

- Awesome book
- Some takeaways:
 - ▶ We're not quite as rational as we think we are
 - ▶ Beware of overconfidence; illusion of understanding, hindsight bias
 - ▶ We're associative, causality seeing machines
 - ▶ Emotional creatures, emotions influence thinking more than we're consciously aware of; heuristics, substitution
- Thumbtack anecdote



Live Well and Prosper

