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THINKING, FAST AND SLOW

DANIEL KAHNEMAN

WINNER OF THE NOBEL PRIZE IN ECONOMICS

"[A] masterpiece . . . This is one of the greatest and most engaging collections of insights into the human mind I have read." —WILLIAM EASTERLY, *Financial Times*

Thinking Fast And Slow

TWO SYSTEMS

HEURISTICS AND BIASES

OVERCONFIDENCE

CHOICES

TWO SELVES

Two Systems

SYSTEM 1: FAST

- Each of us performs feats of intuitive expertise many times each day.
- Two systems in the mind: System 1 - operates automatically and quickly with little or no effort and with no sense of voluntary control.
- Intuition is nothing more and nothing less than recognition.
- Situations provide a queue, this queue gives access to information stored in memory, and the information provides the answer.
- Intuitive heuristic: when faced with a difficult question we often answer an easier one instead, usually without noticing the substitution.
- Fast thinking includes both variants of intuitive thought (the expert and the heuristic) as well as the entirely automatic mental activities of perception and memory.
- System 1 provides the impressions that often turn into your beliefs and is the source of the impulses that often become your choices and your actions.

SYSTEM 2: SLOW

- System 2 - allocates attention to the effortful and mental activities that demand it including complex computations.
- When we think of ourselves we identify with system 2, the conscious reasoning self that has beliefs, makes choices, and decides what to think about and what to do.
- System 2 is activated when an event is detected that violates the model of the world that system 1 maintains.
- System 2's operations are effortful and one of its main characteristics is laziness, a reluctance to invest more effort than is strictly necessary.

Two Systems

THE EMOTIONAL TAIL WAGS THE RATIONAL DOG

- System 1 is effortlessly originating impressions and feelings that are the main sources of the explicit beliefs and deliberate choices of system 2.
- Too much concern with how well one is doing in a task sometimes disrupts performance by loading short-term memory with pointless, anxious thoughts.
- Individuals who uncritically follow their intuitions are impulsive, impatient, and keen to receive immediate gratification. This is lazy thinking.

APPLIED COGNITION

- The mental work that produces impressions, intuitions and many decisions goes on undetected and in silence in our mind.
- Those that avoid the sin of intellectual sloth could be called engaged. They are more alert, active, less willing to be satisfied with superficially attractive answers, more skeptical about their intuitions, and more rational.
- Questioning what we believe and what is difficult at the best of times and especially difficult when we most need to do it.
- Efficiency in the control of attention predicts performance beyond the effects of intelligence.
- The most effortful forms of slow thinking are those that require you to think fast.
- We normally avoid mental overload by dividing our tasks into multiple easy steps committing intermediate results to long term memory or paper rather than to an easily overloaded working memory.
- We cover long distances by taking our time and conduct our mental lives by the law of least effort.
- Mild physical arousal from exercise spills over into greater mental alertness.
- Creativity is associative memory that works exceptionally well.

Heuristics and Biases

JUDGEMENTS UNDER CERTAINTY

- Systematic errors people make are known as biases and they reoccur in particular circumstances.
- Leaders who are lucky are never punished for having taken too much risk. Instead they are believed to have the flare and foresight to anticipate success, and the sensible people who doubted them are seen in hindsight as mediocre, timid, and weak.
- It is easier to recognize other people's mistakes than our own.
- A reliable way to make people believe in falsehoods is repetition, because familiarity is not easily distinguished from truth.
- Heuristic: substituting a less difficult question for a difficult one.

THE WORSE THE CONSEQUENCE THE GREATER THE HINDSIGHT BIAS

- The tendency to revise the history of one's beliefs in light of what actually happened that produces a robust cognitive illusion.
- It leads observers to asses the quality of a decision not by whether the process was sound but by whether its outcome was good or bad.
- Actions that seem prudent in foresight can look irresponsibly negligent in hindsight.
- When an unpredicted event occurs, we immediately adjust our view of the world to accommodate the surprise.
- Maintaining one's vigilance against biases is a chore but the chance to avoid a costly mistake is worth the effort.
- Awareness of your biases can contribute to peace in joint projects and marriages.
- Both spouses remember their own individual efforts and contributions much more clearly than those of the other and the differences in availability leads to differences in judged frequency.
- Many members of a collaborative team feel they have done more than their share and also feel others are not adequately grateful for their individual contributions.

Overconfidence

A MACHINE FOR JUMPING TO CONCLUSIONS

- We are prone to overestimate how much we understand about the world and to underestimate the role of chance in events.
- Overconfidence is fed by the illusory certainty of hindsight.
- We are often confident even when we are wrong and an objective observer is more likely to detect our errors than we are.
- Many people are overconfident, prone to place too much faith in their intuition.
- When people believe a conclusion is true, they are very likely to believe arguments that appear to support it, even when the arguments are unsound.
- Associative activation: ideas that have been invoked trigger many other ideas in a spreading cascade of activity in your brain.
- “The three principles of association: resemblance, contiguity in time/place, and causality.” - David Hume
- Simple common gestures can unconsciously influence our thoughts and feelings.
- Studies of priming affects have yielded discoveries that threaten our self-image as conscious and autonomous authors of our judgements and our choices.
- System one will produce a representation of reality that makes too much sense. The associative machinery seeks causes.

MANY CONFUSE MERE CORRELATION WITH CAUSATION

- Our mind is strongly biased toward causal explanation and it does not deal well with mere statistics.
- Regression to the mean is an explanation but does not have a cause. Extreme groups regress to the norm over time.
- We often fail to allow for the possibility of evidence that should be critical for our decision is missing.
- We are prone to exaggerate the consistency and coherence of what we see.
- Our predilection for causal thinking exposes us to serious mistakes in evaluating the randomness of truly random events.

Overconfidence

THE OUTSIDE VIEW

- Anchoring: estimates stay close to the number people consider. Was Gandhi over or under 114 years old when he died? Was Gandhi over or under 35 years old when he died? People will answer somewhere close to the number given to each question.
- Suggestion is a priming effect which selectively evokes compatible evidence.
- People forced to lie in a test study via email are more likely to purchase soap after the experiment and those forced to lie via a phone conversation are more likely to purchase mouthwash.
- People are more likely to donate when a poster of eyes is above a charity box vs a poster of flowers.
- Consumers have a hunger for a clear message about the determinants of success and failure in business and they need stories that offer a sense of understanding, however illusory.

THE ILLUSION OF UNDERSTANDING

- Fallacy: when people fail to apply a logical rule that is obviously relevant.
- Neglecting valid stereotypes inevitably results in suboptimal judgments. The costs are worth paying to achieve a better society but denying the costs exist, while satisfying to soul and political correct, is not scientifically defensible.
- It is natural for system 1 to generate overconfident judgements because confidence is determined by the coherence of the best story you can tell from the evidence at hand.
- Your intuitions will deliver predictions that are too extreme and you will be inclined to put far too much faith in them.
- The core of the illusion is that we believe that we understand the past which implies that the future also should also be knowable, but in fact we understand the past far less than we believe we do.
- The ultimate test of an explanation is whether it would have made the event predictable in advance.

Choices

SELF-CONTROL REQUIRES ATTENTION AND EFFORT

- Activities that require the exertion of self-control deplete ego and motivation. After exerting self-control in one task you do not feel like making an effort in another.
- Intelligence is not only the ability to reason, it is also the ability to find relevant material in memory and to deploy attention when needed.
- Students can solve much more difficult problems when they are not tempted to accept a superficially plausible answer that comes readily to mind.
- Training attention not only improves executive mental control but also reduces the urge to uncheck intuitions.

FRAMES AND REALITY

- When you are in a state of cognitive ease you are probably: in a good mood, like what you see, believe what you hear, trust your intuitions, and feel that the current situation is comfortably familiar. You are also likely to be casual and superficial in your thinking.
- When you are in a state of cognitive strain, you are more likely to: be vigilant and suspicious, invest more effort in what you are doing, and make fewer errors. But you also are less intuitive and less creative than usual.
- A subject's unwillingness to deduce the particular from the general, is matched only by the willingness to infer the general from the particular.
- The proof that you truly understand a pattern of behavior is that you know how to reverse it.
- We pay more attention to the content of messages than to the information about their reliability, and as a result end up with a view of the world around us that is simpler and more coherent than the data justify.

Two Selves

EXPERIENCED WELL-BEING

- We all have two selves: the experiencing self and the remembering self. These do not have the same interests.
- A puzzling limitation to our mind: what we believe we know and our apparent inability to acknowledge the full extent of our ignorance and the uncertainty of the world we live in.
- When we are uncomfortable and unhappy we lose touch with our intuition.
- Success equals talent plus luck. Great success equals a little more talent and a lot of luck.
- You are more likely to learn something by finding some vices in your own behavior then by hearing surprising facts about people in general.

THINKING ABOUT LIFE

- People tend to assess the relative importance of issues by the ease with which they are retrieved from memory and this is largely determined by the extent of coverage in the media.
- In contrast, there is little coverage of critical yet unexciting issues that provide less drama, such as declining educational standards or over investment of medical resources in the last year of life.
- Long stemmed view: people are generally rational and emotions (fear, affection, hatred, etc) typically cause us to depart from rationality. Research is actually traced to cognition rather than the corruption of thought by emotion.
- The world in our heads is not a precise replica of reality. Our expectations about the frequency of events are distorted by the prevalence and emotional intensity of the messages to which we are exposed.
- The test of learning psychology is whether your understanding of situation you encounter has changed not that you have learned a new fact.