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Thinking, Fast and Slow

by Daniel Kahneman

Farrar, Strauss and Giroux, 2011 ISBN 978-0-474-27563-1

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“Amos and I”

“This book presents my current understanding of judgment and decision making” (p. 4), states Daniel Kahneman, and immediately expresses his indebtedness to Amos Tversky (deceased 1996) to whom the book is dedicated, recalling a “lucky day in 1969” (ibid.) when the latter had been a guest speaker at the Hebrew University of Jerusalem. Today, their co-operation is widely recognized to have provided a cornerstone of social psychology, and laid the foundations for behavioral economics. Besides Herbert Simon, Kahneman is the other psychologist who, in 2002, received a Nobel Prize—in economics no less.

Organized into an introduction followed by five parts, conclusions, two appended journal articles (*Judgment under uncertainty: Heuristics and biases*, 1974; *Choices, Values, and Frames*, 1984), 34 pages of notes, acknowledgements, and a 15 page index, the book sports a total of 500 pages, each at around 350 words. Its main message—apparently being as much Kahneman’s as Tversky’s—is two-fold, consisting of a methodologically well-hardened fact paired with a call to action. Though the latter can be described in fewer words, it is perhaps the more important, and also the more contested, part. His book aims at:

improv[ing] the ability to identify and understand errors of judgment and choice, in others and eventually ourselves, by providing a richer and more precise language to discuss them. In at least some cases, an accurate diagnosis may suggest an intervention to limit the damage that bad judgments and choices often cause (p. 4).

The recent nudging approach—discussed in part four (see below)—is a prime example of such interventionism. The hope is that an improved vocabulary helps agents extend the ability of discerning errors in others’ judgments and decisions to their own. Notably, Kahneman admits he still finds it much harder to detect his own errors. In fact, his research supports doubting that humans are very good at self-identification or self-correction of such errors. Presumably, one strategy to overcome inertia consists in personally addressing the reader, which Kahneman does throughout. His presentation is largely non-technical, has popular appeal, and delights with occasional anecdotes. Moreover, the message is served in well-digestible portions, 10 pages being the typical length of its 38 chapters, each followed by a brief list of expressions-in-use featured therein. Roughly a month of bed-time reading, then, which—to anticipate the evaluation—is time well spent.

The methodologically well-hardened fact mentioned earlier is that, under controlled experimental conditions, humans *not* trained in ‘rational decision making’ are unlikely to arrive at choices which qualify as economically rational, insofar as they remain unlikely to reason, explicitly or implicitly, as required. This is the trivial aspect. Rather, humans appear to be systematically prone to pre-conceptions (“biases”) and reasoning short-cuts (“heuristics”) in ways that, by and large, remain

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ill-understood. The details make for the interesting aspect. Importantly, biases and the like do not so much interfere with one's ability to come to rational decisions in the way that, say, having to overhear a conversation in a busy train compartment may interfere with remaining focused on reading a book. Rather, in that metaphor, the overheard conversation replaces the book's content, nothing odd being noticed. In Kahneman's terms, that part, or faculty of the mind which *should* be employed remains "offline," and its potential output is replaced with one delivered by the faculty which remained "online." His general take is that easier forms of reasoning (e.g., guessing) replace a harder variant (e.g., calculating) which, normatively speaking, should occur in order to get it right.

Many scholars of reasoning, Kahneman included, have come to follow Stanovich (1999) and describe such situations as those in which a quick and dirty System 1 keeps engaging in a task which, to be solved properly, would require engaging System 2 (Evans, 2003 provides a brief review of such dual-process accounts of reasoning). Roughly, System 1 is fast, always on, closed to reflective access, likes to associate rather than analyze, is contextual, seeks to squeeze causality out of correlation, ignores evidence not immediately available, and prefers shortcuts over going the distance. In contrast, System 2 is slow and deliberate, seeks evidence not already in sight, is open to reflective access, learns new things slowly, and mostly prefers to hang lazy. This at least is taken to hold for *most* humans. The exception constitute those who, after years of training and successful praxis (read: *true* experts), are able to make hard decisions on the fly, i.e., get things right by intuition (see below) whenever lesser mortals should think hard—but, again, mostly don't.

Similar metaphors rule much of Part I of the book (pp. 19-107), titled "Two Systems." As Kahneman mentions (p. 13), the terms System 1 and System 2 remain metaphors. What precisely happens in human judgment and decision-making is a matter of ongoing research. Readers come to understand that the normal condition appears *normatively odd*, and that—based on robust evidence of a range of cognitive illusions and heuristics to do with effort and attention—this being so is so well enough established to assume that the same regularly happens outside the laboratory and across the entire population.

Part II (pp. 108-195), titled "Heuristics and Biases," informs readers of the variety of empirical evidence on heuristics and biases, as well as of the kinds of tests that make such evidence robust. Amongst others included are anchoring and availability effects, the well-worn Linda problem, as well as the tendencies to draw (causal) inferences from sketchy evidence ("jumping to conclusions") and to disregard base rates or sample sizes. (Readers of this review not familiar with such terms may want to consult a recent social psychology handbook.) Kahneman ends with a modest proposal on "Taming intuitive predictions" (chapter 18), namely: factor in 'regression to the mean' when forecasting on the basis of evidence, e.g., when deciding on an investment, hiring a new colleague, etc. Those having kept up with popular science journalism—which, over the years, has witnessed social-psychology's tendency to demonstrate man's deviation from economic rationality to be mirrored by the editors' tendencies to deem this news-worthy—should find little that might be new.

[Insert Illustration No. 1 here]

The next part of the book, as well as passages of the conclusions (esp. pp. 411-415), show Kahneman's political side, which is organizational-technocratic (aka "liberal paternalistic," see below). Titled "Overconfidence," Part III is a Socratic reminder that man's epistemological position is regularly overestimated.

“Considering how little we know, the confidence we have in our beliefs is preposterous—and it is also essential” (p. 209). When humans turn out to be good at something, Kahneman argues, they and their environments tend to forget how much they owe to luck—a good portion of which Kahneman has self-reportedly enjoyed throughout his career.

The illusion of skill is not only an individual aberration; it is deeply ingrained in the culture and the industry. Facts that challenge such basic assumptions—and thereby threaten people’s livelihood and self-esteem—are simply not absorbed. The mind does not digest them. This is particularly true of statistical information that people generally ignore when it clashes with the personal impressions from experience. (p. 216)

His diagnosis implicates various well-paid professionals such as business analysts, investment bankers, medical doctors, and anyone else who maintains belief in an ability to get things right from gut. After all, successful intuitive decision-making *not* owed to sheer luck—here, Kahneman quotes Herbert Simon—is based on unconscious pattern recognition, and so reflects a form of knowing as an instance of what epistemologists call “first-order knowledge.” “[T]he mystery of knowing without knowing [*that one knows*] is not a distinctive feature of intuition; it is the norm of mental life” (p. 237). If there is time to consider evidence, Kahneman advises, intuition may be given some weight, but should not be trusted *tout court* (p. 232). Moreover, whenever algorithms can inform decisions, their outputs should be considered. Importantly, on this view, intuitions can have epistemic value only *vis-à-vis* stable regularities in the environment (p. 241). For the most part, then, subjective confidence can, and should, be subtracted from decision making contexts. As for remedying human over-confidence and the illusion of understanding, Kahneman advises adopting an outside-view, rather than sticking to the in-group perspective. For any planned project, academic ones included, the former likely leads to a more accurate (i.e., a less optimistic) estimate of reality. Yet, as the next chapter (titled “The engine of capitalism”) points out, optimists—though often wrong in the strict sense—also tend to persist in the face of failure, start successful businesses where others have failed, etc. Optimism being a mixed blessing, then, Kahneman reckons organizations to probably be better at taming overconfidence than individuals are “because they naturally think more slowly and have the power to impose orderly procedures” (p. 418). Clearly, Kahneman sees few reasons to assume that *laissez-faire* liberalism can improve the human condition.

Part IV (pp. 269-474), titled “Choices,” reports on two of Kahneman and Tversky’s most influential ideas, *prospect theory* and *framing effects* (the topics of the appended articles). Stated briefly, prospect theory is a descriptive account of the ways in which humans tend to deviate when it comes to the kinds of choices normatively informed by economics. “[T]he Humans [in contrast to the Econs postulated by economics] described by prospect theory are guided by their immediate emotional impact of gains and losses [...], not by long term prospects of wealth and global utility” (p. 286f.). Kahneman is careful to point out some of their own theory’s defects, calling them blind spots (e.g., the reference point from which prospects are evaluated is always assigned a utility value of zero which, in some contexts, is implausible; the influence of the feeling of regret on a choice cannot be properly modeled). He goes on to detail some of the observable effects not predicted by standard economic models in contexts varying from the law, via the lottery, to insurance purchases. Insofar as humans tend to act in loss aversive ways, their choice actions will need to be modeled mathematically by assigning to the event of losing, say, 100 dollars a number that represents the disutility of a loss outcome. And, to remain empirically adequate, this number will have to be *greater than* the

assigned number representing the utility of a gain outcome (winning 100 dollars). However, such models contradict assumptions commonly made in economics, where both outcomes tend towards an equilibrium, i.e., are normally assigned *the same* number. Generally, “people attach values to gains and losses rather than to wealth, and the decision weights that they assign to outcomes are different from probabilities” (p. 316f.). Consequently, messages which present a *loss-framed* choice option do on empirical grounds compare asymmetrically with their *gain-framed* counterparts, although the messages report the same objective information. For instance, ‘treatment T has a ten percent mortality rate’ is more likely to lead to rejecting T than ‘treatment T has a 90 percent survival rate’. Since “losses evoke stronger negative feelings than costs,” Kahneman can suggest that “[c]hoices are not reality bound because System 1 is not reality bound” (p. 364). In fact, he goes as far as claiming that, for certain real-world problems:

moral feelings are attached to frames, to descriptions of reality rather than to reality itself. [...] [F]raming should not be viewed as an intervention that masks or distorts an underlying preference [...]. [In certain cases] [o]ur preferences are about framed problems, and our moral intuitions are about descriptions, not about substance. (p. 370)

It is here that his work connects to the nudging approach that has developed out of behavioral economics (see Thaler & Sunstein 2008), insofar as there are better or worse frames relative to a purpose. For instance, rather than reporting a car’s fuel efficiency only in miles-per-gallon (mpg), it should be (and, as of 2013, will in the US also be) reported in gallons-per-mile (gpm). The latter unit is less prone to mislead when comparing the reduction in fuel-consumption achieved by switching in Case (i) from a 12 mpg to 14 mpg car *vis-à-vis* switching in Case (ii) from a 30 mpg to a 40 mpg car. Assuming the same annual mileage of 10,000 miles, Case (i) saves a greater amount of fuel, *contrary to the intuition* commonly arrived at when information is presented in the mpg frame. To see as much takes some math (see table 1). In absolute terms, of course, Case (i) remains one of high fuel consumption. Kahneman (p. 372) borrows this example from Larrick & Soll (2008).

[INSERT TABLE 1 ABOUT HERE]

Part V (pp. 377-407), titled “Two Selves,” introduces an experiencing self and a remembering self, and reports on *the peak-end-rule* and *duration neglect*. These phenomena suggest that from the perspective of economic rationality there is an imbalance between the contributions of experience and memory to human preferences and decisions. According to Kahneman, a fairly accurate model of how humans tend to recall episodes—thus judge them, and hence form preferences for future actions—involves taking the average between the greatest intensity of some experienced quality (“peak”), and the experienced intensity of that quality at the end of this episode. For instance, a rather eventless boxing match featuring an extremely boring seventh round, yet ending in a spectacular knock-out in the twelfth might be remembered as a good fight. This greatly underweights in memory the experience of ten rounds of near-inaction. Similarly, the novel or movie that kept one spell-bound, but then ended oddly may be recalled as mediocre, again underweighting most of the experience. Duration neglect on the other hand can show in assigning in memory a much greater value to a highly exciting, but relatively short experience (such as sky-diving), than to a moderately exciting but longer lasting one (such as hiking). Similarly, one may fear an intense, but rather short episode of pain much more than a moderate, but long lasting one. Insofar as such seemingly strange phenomena make for dominant human regularities, they bear out implications for policies implemented, or not, on social scales that extend well beyond a visit to the dentist. Because “[m]emories are all we get to keep from our experience of living, and the

only perspective that we can adopt as we think about our lives is therefore that of the remembering self” (p. 381), Kahneman can suggest in his conclusions that “Humans, more than Econs [see the quote from p. 286 under part four, above], also need protection from others who deliberately exploit their weaknesses—and especially the quirks of System 1 and the laziness of System 2” (p. 413). So, we *should* let ourselves be nudged to better decisions, and arrange our institutions in ways that provide a counterweight to the apparent strangeness of our natural, i.e., non-economics-trained, behavior.

Read as an organizational-technocratic manifesto, the book’s weakness is the imbalance between the robustness of evidence cited in support of the diagnosis, and the remedies offered. This holds independently of the cogency of the System 1 vs. System 2 distinction being a matter of ongoing academic debate. (Note that the distinction does not explain, but recapitulates data in handy terms.) This weakness is also independent of the rivalry with proponents of *ecological rationality* models (e.g., Todd & Gigerenzer 2012) who seek to explain (away) much of what in this book appears to be strange behavior as forms of adaptation to context—an alternative which Kahneman mentions in a few footnotes, but does not treat. So, having spent vast amounts of time and research money—notably implicating those who copied Tversky’s and Kahneman’s ideas—social psychological research has successfully established *as a methodologically hardened fact* that, rather than being *irrational* (whatever this mean precisely) “Humans are not well described by the rational agent model” (p. 411). Recall that, in his *Essays* dating to 1601, Francis Bacon had carried a similar thought over into the modern age:

Doth any man doubt that, if there were taken out of men’s minds vain opinions, flattering hopes, false valuations, imaginations as one would, and the like, but it would leave the minds of a number of men poor shrunken things, full of melancholy and indisposition, and unpleasing to themselves? (Bacon, “Of Truth”)

Of course, one now has systematic knowledge, and more terms than the basic four in which Bacon, in his 1620 *Novum Organon*, delivered his idols (*tribe, cave, marketplace, theater*). *But where is the evidence of—or an equally thriving research program on—strategies at the individual, the organizational, or another level which reliably avoid or correct errors in judgment and decision making?* The nudging approach included, what evidence there is for ways to avoid these errors appears to be merely anecdotal.

This being so is hardly Kahneman’s fault, and so does not subtract anything from this very valuable book, but puts its value in perspective. *Thinking, Fast and Slow* presents Kahneman’s and Tversky’s research at its best, and makes important insights into human judgment and decision making available to a general audience. It should be read carefully, and slowly. Meanwhile, those searching for a *critical* treatment continue searching elsewhere.

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[Illustration No. 1]

The Linda Problem

The Linda-problem is notorious in the literature, and provides a good example of the kind of tasks studied. Subjects—normally undergraduate students—are provided with the following description, and are asked to choose between alternative answers to the below question:

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

Which of the following two alternatives is more probable?

1. Linda is a bank teller.
2. Linda is a bank teller and active in the feminist movement.

A vast majority of subjects—a figure of 85% being expectable—regularly prefer alternative 2 over alternative 1. However, according to standard probability theory, the conjunction of two statements (alternative 2) cannot be objectively more probable than one of its conjuncts (alternative 1). So, if standard probability theory is the right normative standard, subjects systematically fail to adhere to it. To explain such deviation, subjects may be assumed to judge not the objective probability of the alternatives, but their representativeness, i.e., the extent to which the data (here: the description) resemble, or are typical of, the hypotheses (here: the alternatives). Thus, alternative 2 may better represent (what is thought to be typical of) Linda *vis-à-vis* the description provided. Subjects might also be assumed to have adopted an interpretation of the term ‘probable’ that is different from the reading intended by the experimenter, and then judge not the objective probability of, but the subjective probability assigned to—i.e., their comparative degrees of belief in—the two alternatives. See Cohen (1981) for the issues arising in the interpretation of such tasks and their results.

[Chart 1]

<i>Magnitudes</i>	Case (i)		Case (ii)	
	<i>old car</i>	<i>new car</i>	<i>old car</i>	<i>new car</i>
annual mileage	10,000	10,000	10,000	10,000
miles per gallon (mpg)	12	14	30	40
gallons used per year	833	714	333	250
mpg gained		2		10
gallons saved per year		119		83
gallons per mile (gpm)	0.083	0.071	0.033	0.025
gpm saved		0.012		0.008

Table 1. Two frames: miles-per-gallon vs. gallons-per-mile
(some figures rounded)