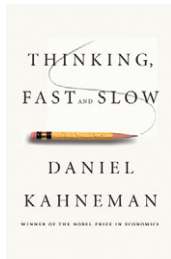


Environments for fast and slow thinking

Thinking, Fast and Slow by Daniel Kahneman. Farrar, Straus and Giroux, 2011. \$30.00 (hbk) (512 pp.) ISBN 978-0-374-27563-1

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This is the book that cognitive scientists have been waiting for – and it is the book that the public should have been waiting for (if the public could ever know in advance what it needs). The heuristics and biases tradition – one of the most productive and important research traditions in all of cognitive science – is here laid out in all its glory. With history and humor and nuanced discussion of practical implications,

Daniel Kahneman gives us a very personal walk through the famous work that justly garnered the Nobel.

But the book is much, much more than a retrospective. It is a fully contextualized setting of the history of heuristics and biases work within a dual-process framework. Kahneman has noted before that ‘Tversky and I always thought of the heuristics and biases approach as a two-process theory’ ([1], p. 682). However, it was not until 2002 [2] that the connection and Kahneman’s view of it were explicitly drawn out. *Thinking, Fast and Slow* (*TFS*) fleshes out much more completely a dual-process contextualization of the classic heuristics and biases research program. Using vivid examples, Kahneman describes how a plethora of effects and biases in the literature are comprehensible from within the dual-process view in which System 1 has an overall strategy of attribute substitution that is often not overridden by a lazy System 2 (‘an endorser rather than an enforcer’, p. 103).

I have long argued that the rise of dual-process theory should have ended the Great Rationality Debate in cognitive science [3,4]. The question of whether humans are inherently rational or irrational is ill framed in a variety of ways, but most notably because it does not acknowledge the multiple minds in the brain. Systems 1 and 2 both have the capability to support rational behavior, but both have characteristic weaknesses that Kahneman so ably describes. The bias of System 2 is laziness. The bias of System 1 is that of attribute substitution: it emits an answer from within its capabilities when it is asked a question that it cannot strictly answer. An attribute-substituting System 1 and a lazy System 2 can combine to yield rational behavior in benign environments but can yield seriously suboptimal behavior in hostile environments.

A benign environment is an environment that contains useful cues that, through practice, have been well represented in System 1. Additionally, for an environment to be classified as benign, it must not contain other individuals

who will adjust their behavior to exploit those relying only on System 1 heuristics. By contrast, a hostile environment for heuristics is one in which there are no cues that are usable by System 1 (causing the substitution of an attribute only weakly correlated with the true target). Another way that an environment can turn hostile is if other agents discern the simple cues that are triggering the cognitive miser’s System 1; and the other agents start to arrange the cues for their own advantage (for example, advertisements, or the deliberate design of supermarket floorspace to maximize revenue).

As many previous reviewers have noted (e.g. [5]), the writing in the book is not only elegant but also humane and modest. Kahneman gives many humorous examples of how he himself falls prey to the various biases that he discusses. The point is that we are all prone to the biases inherent in the way that System 1 operates. Nevertheless, there is variation in the monitoring done by System 2, which means that there will be variation in the degree of rationality displayed in a particular situation [6,7].

Although Kahneman gives numerous examples of ‘nudge’-type interventions [8] in the environment to ameliorate cognitive bias, he is less sanguine about the possibility of purely cognitive change. Even if the latter is a low-yield effort, however, it will be worth it, given some of the implications described in *TFS*. One of the most telling (and horrifying) is that extreme cognitive misers (those with extremely lazy System 2s) do not have ‘a mind of their own’. What their mind will process is determined by the most vivid stimulus at hand, the most readily assimilated fact or the most salient cue available. The cognitive miser is easily exploited by those who control the labeling, who control what is vivid, or who control the anchor.

It is also not assuaging to be told that many more situations in life are benign than are hostile. We cannot dismiss System 2 thinking by saying that heuristics will get a ‘close enough’ answer 98 percent of the time, because the 2 percent of the instances where heuristics lead us seriously astray may be crucial to our lives. This point is captured in an interview in *Money Magazine* with Ralph Wanger, a leading mutual fund manager. Wanger says: ‘The point is, 99 percent of what you do in life I classify as laundry. It’s stuff that has to be done, but you don’t do it better than anybody else, and it’s not worth much. Once in a while, though, you do something that changes your life dramatically. You decide to get married, you have a baby ... these rare events tend to dominate things’ ([9], p. 102).

Yet, in terms of raw numbers, these might represent only 20–30 decisions out of thousands that we have made throughout our lives. But the thousands are just

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the 'laundry of life', to use Wanger's phrase. The 20 'non-laundry' decisions are small in number and nonrecurring, and thus require System 2. An otherwise confusing and inconsistent review of *TFS* in the *New York Times Book Review* got one thing right: 'If you've had 10,000 hours of training in a predictable, rapid-feedback environment – chess, firefighting, anesthesiology – then blink. In all other cases, think' ([10], p. 17). No one has stated as elegantly as Kahneman does in *TFS* the balanced view that humans have rational capabilities, but that the logic of the two systems can be costly in hostile environments.

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