Daniel Kahneman on the Two Kinds of Thinking Fast and Slow

By Laurence B. Siegel
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When advisors want to understand why their clients make seemingly irrational financial choices, odds are they will find answers in the research of Nobel-winning behavioral economist Daniel Kahneman. But guiding clients toward a better financial future is only one way to apply behavioral finance. Kahneman says we solve virtually all problems, not just financial ones, with two distinct types of thinking.

His recent book, *Thinking, Fast and Slow*, was a 2011 bestseller. It summarizes his lifetime of work on how the mind works, covering many topics familiar to those who follow behavioral economics and finance: prospect theory, overconfidence, loss aversion, anchoring, separate mental accounting, the representativeness bias and the availability bias.

Kahneman, who, at 78, is still teaching at Princeton, recently discussed these and other discoveries at the 2012 CFA Institute Annual Conference, which took place in Chicago on May 6-9.

I'll look at how Kahneman's research can be applied in the context of investing, but first let's examine the central subject of his book: our two ways of thinking.

Think fast! Or think slowly?

Try this experiment: Just before making a left turn in a busy intersection, begin to multiply 17 by 24. I'm kidding; please don't. You'll either quickly abandon the arithmetic problem or wreck your car. But I'll bet you can add two plus two while making a left turn without any problem whatsoever.

What is the difference between the two tasks?

Most people would say that one of the tasks is easy and the other is hard. But Kahneman, who won the 2002 Nobel Prize in economics for work relating economic decision-making to psychology, says that there's more to it – a substantive difference, not merely one of degree.

Adding two and two is done using what Kahneman calls System 1 thinking, the kind of fast thinking that feels like it is done on autopilot. The product of 17 and 24 is arrived at using

System 2 thinking – slow, deliberate thinking that involves an entirely different physiological process, one that (for example) interferes with driving a car.

When you engage in intense System 2 thinking, Kahneman says, something happens to your body. Your pupils dilate. Your heart rate increases. Your blood glucose level drops. You become irritable if someone or something interrupts your focus. You become partially deaf and partially blind to stimuli that ordinarily command your attention. Kahneman writes that "intense focusing on a task can make people effectively blind."

My grown son recently reported an occurrence of a related phenomenon, blindness caused by having made up one's mind. While he was preparing to perform in a concert, his girlfriend paid him a surprise visit, hundreds of miles from either his home or hers. Despite increasing efforts to recognize the strangely familiar person approaching him from a distance, he couldn't figure out who she was until she was quite close. There is nothing wrong with my son's eyesight. Having decided, using System 1 thinking, that his girlfriend was far away, it was physically impossible for him to see her until she was right under his nose. He was unable to invoke System 2 thinking to figure out that maybe she had taken an unplanned trip. He was temporarily blinded by an idea.

A young boy's puzzlement about human nature

Kahneman, who was born in Tel Aviv but grew up in pre-war France, recalls that he first became interested in psychology when, as a young child, a German police officer asked to talk to him. Rightly terrified of the officer, young Danny Kahneman, a Jew, discovered that the officer was interested in him because he reminded the officer of his own son, who had died. The officer became very emotional when conversing with Danny, gave him money, and kept him safe.

From that point forward, Danny decided to figure out what made people tick.

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Thinking, Fast and Slow reads like a primer, romping through familiar territory, but that is because Kahneman was instrumental in discovering much of what he discusses. Younger scholars such as Richard Thaler, Shlomo Benartzi, Hersh Shefrin, and Meir Statman may have gotten to the reader first, but Kahneman and his deceased collaborator, Amos Tversky, are the true source of most of these insights.

Systems 1 and 2 in focus

The phrase "what you see is all there is," a play on the old adage "what you see is what you get," runs through the book like a mantra to describe System 1 thinking. System 1 takes visible evidence as the only source of knowledge, and ignores hidden evidence. Centered in the brain's amygdala (a part of the limbic system or "reptile brain"), System 1 evolved in response to the need to obtain quick answers. Over here is a tiger: danger!

Over there is a pheasant: delicious! Those who needed to think slowly and carefully to arrive at these conclusions did not survive to become our ancestors.

System 2 is more complex, and resides in the brain's prefrontal lobes, which are well developed in humans but not in other animals. System 2 recognizes that what you see is not all there is. Is Steve, "a meek and tidy soul, with a need for order and structure, and a passion for detail" a businessman or a librarian? While System 1, spotting the resemblance between the description and the librarian stereotype, shouts out "librarian," System 2 recognizes that the number of librarians, relative to businessmen, is tiny and that Steve is actually more likely to be a businessman, despite personality traits that might have made library work a better fit.

In Kahneman's telling, System 2 clearly produces the superior answers, at least in most situations. A great deal of *Thinking, Fast and Slow* is devoted to demonstrating, through psychological experiments, how System 1 gets it wrong. "How many animals of each kind did Moses take into the Ark?" "Two," says System 1. "You're trying to fool me," says System 2. "It was Noah."

These two conflicting brain functions behave differently in noteworthy ways. System 1 doesn't mind working all the time, for example, because its work is not that hard. When System 2 is put to work, it requires so much effort that it takes over the whole body, so it goes to work only reluctantly. People do not shy away from solving problems requiring a quick, automatic reaction but, perhaps because they anticipate the physical strain described earlier, they procrastinate in working on questions that require careful thought. No wonder young kids hate word problems in math class: word problems test the ability to puzzle out what math problem the questioner wants solved, a task much harder than doing the underlying arithmetic.

Malcolm Gladwell's beautifully written *Blink* is essentially an argument that System 1 thinking produces the superior answers. When Kahneman catalogs the errors of System 1 thinking, some laughable and some tragic, it becomes obvious that Gladwell's celebration of snap judgment is terribly flawed. I am being a bit unfair to Gladwell because he does expend some effort identifying when quick thinking goes awry. But his antagonist, David Adler, whose book, *Snap Judgment*, is a response to Gladwell, makes the far better case that judgments rendered in the blink of an eye are usually wrong, and that it is necessary to apply System 2 thinking if one is serious about coming to sensible answers to most questions.

Does economics really depend on perfect rationality?

If there is a weakness in *Thinking, Fast and Slow,* it is in Kahneman's critique of standard economics as relying on unrealistic assumptions. He writes,

> [An] essay by a Swiss economist named Bruno Frey, which discussed the psychological assumptions of economic theory, [begins]: "The agent of economic theory is rational, selfish, and his tastes do not change."
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> I was astonished. My economist colleagues worked in the building next door, but I had not appreciated the profound difference between our intellectual worlds. To a psychologist, it is self-evident that people are neither fully rational nor completely selfish. … Our two disciplines seem to be studying different species, which the behavioral economist Richard Thaler dubbed Econs and Humans.

But economics is *supposed* to rely on unrealistic, simplifying assumptions! Otherwise it would be mathematically intractable. In this respect, it is like physics, which assumes a frictionless world to get the first-order solutions to problems. You would never get to the second-order solutions, which include the effects of friction and other imperfections, without the first-order ones.

Most economists don't really believe that people are perfectly rational and completely selfish – at least I hope they don't – but such simplifications are necessary for getting started in economic analysis, and the simplified approach predicts the operation of supply and demand, which are the heart of economics, quite well. Most economists have long acknowledged that a more sophisticated analysis, one that takes into account the psychological factors that Kahneman stresses, is needed for certain types of problem solving.

The success of an economic theory is determined by how well it explains and predicts phenomena, not by the realism of its assumptions. Milton Friedman's classic essay "The Logic of Positive Economics," a foundational work of economic methodology, explains this principle in beautiful detail, so I don't need to.

Confused about Bayesian statistics?

Some of the pleasures of reading Kahneman's book are off the main track of his arguments. Maybe I wasn't the best statistics student 35 years ago, but Bayesian inference has always seemed to me like guesswork – or, worse, deliberate obfuscation. (Thomas Bayes, a leading 18th century statistician, presented a formula by which one's "prior belief" about the likelihood of an event could be combined with observed data to arrive at the correct likelihood.) The idea that one could have a meaningful "prior belief" is what bothered me; but no more.

Kahneman is the *only person ever* to explain Bayesian statistics so I could understand it. To paraphrase his example, consider a cab involved in a hypothetical late-night hit-and-run. There was an eyewitness to the crime, who identified the cab as blue. We learn from

further research that 85% of cabs in the area are green and 15% are blue, and we learn that the witness can correctly distinguish the two colors at night 80% of the time.

Kahneman explains how Bayesian statistics helps us in this case:

> In the absence of a witness, the probability of the guilty cab being blue is 15%, which is the base rate of that outcome. If the two cab companies had been equally large, the base rate would be uninformative and you would consider only the reliability of the witness, concluding that the probability is 80%. The two sources can be combined by Bayes' rule. The correct answer is 41%.

In other words, the prior expectation comes from a different empirical (and very real) source: the number of taxicabs of each color. It is not a mysterious "belief" or prejudice, but an independent source of information that would be the only source if there were no witness to the accident. The fact that the witness identified the guilty cab as blue does not mean that it was blue, because he has been shown to be imperfect (but nonetheless pretty good). The witness' report means the likelihood that the guilty cab is blue is much higher than suggested by the fact that only 15% of the cabs are blue.

Thank you, Dr. Kahneman. And phooey on those statistics professors who didn't explain what they meant by "prior belief," making it sound like a feeling or thought, not an independent piece of data. Maybe sometimes the Bayesian prior is just a feeling, but that is almost certainly not what Thomas Bayes had in mind.

Behavior and investing

Kahneman's insights are valuable to the investment management process. If investors make predictable errors, such as paying too much for popular growth companies or extrapolating recent returns into long-term asset-class forecasts, then one can trade against these errors and make money. (By "make money" I mean earn true alpha, the economic profit that remains after all market-related or beta returns have been subtracted, and after accounting for all costs.)

But while many proponents of behavioral finance are confident that their insights can be turned to making money, Kahneman is not. When asked at the CFA conference what can be accomplished by knowing the many errors to which behavioral finance says investors are prone, he was blunt. "Very little," he told his audience. "I have 40 years of experience with this, and I still commit these errors. Knowing the errors is not the recipe [for] avoiding them." Kahneman is more optimistic about using his insights to improve the decision-making processes of organizations than he is about providing actionable insights to individuals.

Investors should understand all sides of the behavioral debate. Behavioral economics and finance have recently become so popular that many investors do not realize there is another side to the question. Perhaps it is more productive to analyze securities and markets *as if* investors were making rational decisions based on all the information available to them – even if we know they're not.

Certainly behaviorism cannot help us *all* become better investors; if about half of all active managers underperform the relevant market index, those investors would be better off recognizing their limitations and improving their performance by indexing. But then the alpha source for the other half of the investor population, the winning half, would disappear! Recognizing that humans err in processing information is not a panacea.

Sentiment and science

I am baffled as to what people get out of most psychology books, which I place in two unhelpful categories: "Don't worry, be happy" and "You want to kill your father and marry your mother." Kahneman's work is a delightful exception.

His approach to psychology is real science, involving testable (and falsifiable) hypotheses, controlled experiments, and appropriately modest findings. The investment manager and behavioral finance expert Arnold Wood compares Kahneman's achievements favorably to those of Sigmund Freud. While there is room for both approaches, psychology – at least as the public understands it – has long suffered from an excess of sentiment. The injection of scientific discipline in the spirit of Daniel Kahneman's work is long overdue.

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