

What Was I Thinking?

Kahneman explains how intuition leads us astray.

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This is a story without an ending. And that's not the only thing wrong with it.

In fact, there were a number of flaws in Nobel Laureate Daniel Kahneman's lecture "A Perspective of Flawed Thought," in March 2004 at the National Institutes of Health. Quite purposefully, the entire talk was full of them.

"I specialize in flaws," Kahneman said.

However appropriate that self-deprecating remark was to the topic, it hardly applied to the speaker's celebrated accomplishments. In addition to the 2002 Nobel Prize, which he received for his work applying psychologically realistic models to economic theory, APS Fellow Kahneman, Princeton University, has received most every award possible to a psychologist, including the 1990 APS William James Fellow Award.

Part of Kahneman's intent was to show that flawed thinking plays no favorites. Sure enough, despite his vast understanding of the subject, Kahneman himself claimed to be susceptible to misleading intuition, a realization he made while looking at the latest gallop poll, in which President George W. Bush's approval rating had shifted a statistically insignificant 2 percent from the previous week.

"I was influenced by this completely irrelevant data," he said. "I could not help myself from drawing inferences like, 'What happened this week?' or 'What's the explanation?' I was working on this intuitively and contrary to my better statistical judgment."

According to Kahneman, some human intuition is good, and some is erroneous. And like the incorrigible habit of the knuckle cracker, the bad ones are very difficult to correct.

One reason flawed intuition is allowed to permeate human thinking is its accessibility. For example, if the multiplication problem 17 times 24 is shown for only a moment before its answer, 408, is revealed, few solve it without a formal, lengthy act of computation. On the contrary, if the word "vomit" is displayed and immediately followed by the word "disgusting," it seems the accessible, almost instantaneous extension of the viewer's thinking.

"Intuitive impressions come to mind without explicit intention, and without any confrontation, and this is one of their distinctive aspects," he said.

To better understand the reasons for this accessibility, Kahneman has focused much of his research on expert intuitions. Expert intuitions are able to deal swiftly and decisively with a difficult matter—such as making a quick chess move or fighting a fire—that would seem to require extensive deliberation. Most of the time, a person with expert intuition is not really conscious of making a decision, but rather acts as though their instinctive choice is the only natural outcome of a circumstance.

"You can have a master chess player walking by a complicated chess position and, without slowing down, this player will say, 'White mates in three,'" Kahneman said. In the case of firefighters making perhaps life or death decisions, "something that is very close to the best solution came to mind, and nothing else."

APS Fellow Daniel Kahneman received the Nobel Prize in 2002 for his work applying psychologically realistic models to economic theory.

However, unless certain conditions of expertise—namely, prolonged practice and rapid, unequivocal feedback—are fulfilled, what develops is little more than the exigent knowledge of experience. This can lead to false impressions and overconfident experts, a subject explored by Kahneman and his longtime research partner, the late Amos Tversky.

"People jump to statistical conclusions on the basis of very weak evidence. We form powerful intuitions about trends and about the replicability of results on the basis of information that is truly inadequate," Kahneman said. For this reason, a person who is not an expert, even if thoroughly versed in a field of study, might make an intuitive mistake.

Kahneman leaned heavily on the closely related argument made by another, prominent psychologist, the late Paul Meehl. In the mid-1950s, Meehl gave clinicians personality information about individuals and asked that they predict behavioral outcomes. For example, the clinician might have been asked to

decide whether a released prisoner would violate parole. The predictions were then compared to statistical models based on the subset of information available to the clinician.

In a study that still holds up over 50 years later, Meehl found that when the clinician competed with the statistical formula, the formula won almost every time. This finding has served as the basis for Kahneman's theory about overconfident experts.

"What you find is a great deal of confidence in the presence of very poor accuracy," Kahneman explained. "So the confidence people have is not a good indication of how accurate they are."

Overconfidence is accentuated by the failure of people to, in general, learn from their mistakes. "When something happens that a person has not anticipated, . . . they remain convinced that what they had predicted, although it didn't happen, almost happened," he said. The overconfidence is then propagated while the accuracy remains the same, and the cycle begins again.

In order to trace the roots of flawed intuition, Kahneman divided all thought into a two-system model, intuition and deliberate computation, whose particular attributes are almost completely opposite. Intuition is fast, uncontrolled, and, most importantly, effortless. Computation, on the other hand, is slow, governed by strict rules, and effortful.

"Most judgments in actions are governed by [intuitive thought]," he said. "Most of our mental life is relatively effortless." This is why effortful work, such as trying to remember a phone number of five years ago, is more susceptible to interference, and therefore less accessible.

A bat and a ball together costs \$1.10. The bat costs a dollar more than the ball. How much does the ball cost?

Interference is often enabled by poor monitoring, a shortcoming that results from our normally unconditional acceptance of intuition. Not surprisingly, according to Kahneman, **50 percent of Princeton students** incorrectly answered 10 cents when given this problem. "What happens to Princeton students is they don't check," said Kahneman. "It happens to MIT students too, though at a slightly lower rate," he joked (The answer for Princeton readers, is five cents.)

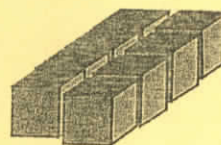
Interference is often enabled by poor monitoring, a shortcoming that results from our normally unconditional acceptance of intuition. In one study, Kahneman ran the following scenario past Princeton students: A bat and a ball together cost \$1.10. The bat costs a dollar more than the ball. How much does the ball cost? Not surprisingly to Kahneman, 50 percent of Princeton students incorrectly answered 10 cents when given this problem in writing, because they unconditionally accepted their intuitions.

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One-dimensional Thinking



Most people compute height from the tower and surface area from the spread, even though the information to make both computations is available in both sets.



"A fully rational agent would find it possible to answer both questions equally easily, regardless of the display," Kahneman said. "We do not use all the information that is actually available."

Take another common question eliciting intuitive flaw: When people were asked to guess how many murders there were in Michigan in a given year, and how many there were in Detroit, the median answers were 100 and 200, respectively.

"This by itself is not an error, but something is going on here that is not quite right," he said, referring to the presence of intuitive flaw. Occasionally someone asked about Michigan remembered Detroit is in Michigan, and their answer tended more toward 200, a meta-analytic process that reveals to Kahneman the ability of flawed thinking to mend itself if it recognizes all aspects of a situation.

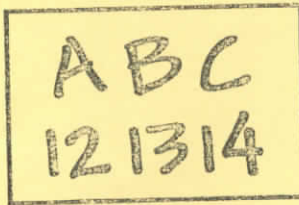
"Accessibility, or the ease with which thoughts come to mind, has an influence not only on the operation of intuition—it almost defines intuition—but on the operations of computation," he said. "Our ability to avoid errors depends on what comes to mind, and whether the corrected thought comes to mind adequately."

But "what comes to mind" might actually be what does *not* come to mind. When looking at two sets of an equal number of cubes, one arranged vertically into a tower and the other spread flat, most people compute height from the tower and surface area from the spread, even though the information to make both computations is available in both sets.

"A fully rational agent would find it possible to answer both questions equally easily, regardless of the display," he said. "That's not what happens. We don't compute everything we could compute. We do not use all the information that is actually available."

For this reason, Kahneman argued that intuitive activities are very similar to perceptual activities, such as seeing and hearing. "These processes of perception are going to guide us

in understanding intuition," he said. Take, for example, the following display sets, which are actually less defined than they appear:



Even though the B and the 13 are physically composed of the same elements, they are given context by association, and are rarely considered outside of this context. Though at the time this single-minded assessment doesn't seem wrong, it is in truth about as rational as peeking through the keyhole of a glass door, and grossly limits our understanding of the world. Flawed intuition occurs with similar blinders.

"When people make decisions, they tend to suppress alternative interpretations," Kahneman said. "We become aware only

of a single solution—this is a fundamental rule in perceptual processing. All the other solutions that might have been considered by the system—and sometimes we know that alternative solutions have been considered and rejected—we do not become aware of. So consciousness is at the level of a choice that has already been made."

But despite all this understanding, Kahneman steered clear of offering a direct solution to flawed thinking—after all, he remained flummoxed by the gallop poll despite his 35 years studying flawed intuition. Besides, relying on computation instead of intuition would, according to Kahneman, create a slow, laborious, difficult, and costly world. What he did advocate is paying closer attention to the onset of faulty intuition.

"The alternative to thinking intuitively is mental paralysis," he said. "Most of the time, we just have to go with our intuition, [but] we can recognize situations in which our intuition is likely to lead us astray. It's an unfinished story." He paused. "So, it's an unfinished story, so . . ." Kahneman hesitated for words. Something made a succinct peroration inaccessible, but the audience intuited the talk was over, and was correct—most likely.

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