

Science/Technology [\[/category/science-technology/\]](#)

# Irrationality May Be the Result of Mental ‘Noise’



by **Suzanne Wu** [\[/author](#)

[/suzannsw/\]](#)

December 14, 2011

Humans systematically make irrational decisions and poor estimates, but new research shows that real-world biases such as prejudice and self-aggrandizement may be explained by simple “noisy” deviation in our mental processes.

In a forthcoming paper, USC researcher Martin Hilbert offers an important synthesis of decades of research into human decision-making, proposing a model of memory and recall that explains many examples of irrationality and also may help artificially predict and replicate other forms of human bias.

“The information-processing system we employ is imperfect and sloppy; for psychologists this is old news. Thus the future challenge shifts from describing and blindly replicating human irrationality in empirical experiments, to deepening our understanding of the processes that create these biases,” said Hilbert, a USC Provost’s fellow at the USC Annenberg School for Communication & Journalism.

For the paper in the journal *Psychological Bulletin*, scheduled for publication in February, Hilbert received support from colleagues at the USC Viterbi School of Engineering and the Department of Psychology at the USC Dornsife College of Letters, Arts and Sciences to show how introducing computer-modeled “noise” to models of mental processes can explain a range of seemingly unconnected biases shown in past psychology experiments.

Indeed, simply assuming mathematical deviation from input (observations) to output (beliefs) can account for at least eight human decision-making biases observed experimentally – including a tendency to conservatism, stereotyping of minority groups and exaggeration of our own position



USC researcher Martin Hilbert

relative to others, according to the study.

“How are biases related? The hope is that a better understanding of the relations between biases will not only clarify their existence but also eventually enhance the search for coherent strategies to moderate our irrationalities,” Hilbert said.

As Hilbert explained, our biases may be the natural byproduct of millions of years of often-accidental biological evolution and mechanical flaws in the resulting information processing system: the human mind. His model of a “noisy memory channel” provides a first step toward an unambiguous mathematical definition for verbal concepts used in psychology to describe irrationality in human decision-making.

Hilbert has applied information theory to larger human experience in past work. Earlier this year, in a widely cited study published in the journal *Science*, Hilbert provided the first quantification of worldwide computing capacity and how it has grown in the last two decades.

“Information theory, and other achievements of communication engineers and computer scientists, turn out to be very useful to understanding the inner workings of social and human systems, which also process information,” Hilbert said. “One of the strengths of USC is that the programs not only allow for multidisciplinary research of this kind, but that faculty and researchers from other departments and schools are open-minded and supportive when you knock on their door and confront them with unconventional questions.”

---

[About This Site](#) [Contact Us](#)