

Inconsistent choice-making a normal part of how the brain evaluates options, new study finds

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Ryan Webb is an Assistant Professor at the Rotman School of Management. His research integrates the disciplines of Neuroscience, Psychology, and Economics to provide insight into consumer behaviour. His recent research includes developing tools to predict consumer choices from measurements of neural activity (fMRI and EEG), and modelling consumer behaviour from the principles of information coding in the human brain. He has received a Ph.D. in

Economics from Queens University and research fellowships from New York University and the California Institute of Technology. Credit: Rotman School of Management

Economists have noticed that people can behave inconsistently when making choices. According to economic theory, people should choose the same things every time, under the same circumstances, because they are recognized as holding the same value as before. But people don't always do that. Sometimes consumers will switch their preferences, known in industry terms as "customer churn." While economists have previously called that an error in rationality, a new study says an important part of inconsistent choice-making is due to idiosyncratic activity in the brain areas that assess value.

"If the value of a Coke is higher to you than a Pepsi, then you should choose the Coke every single time," explains study co-author Ryan Webb, an assistant professor at the University of Toronto's Rotman School of Management. "But because of these 'noisy' fluctuations in neural activity, every so often, the Pepsi is better than the Coke."

Prof. Webb, Vered Kurtz-David, and Profs. Dotan Persitz, and Dino Levy from Tel Aviv University were able to observe the phenomenon by getting research volunteers to play a series of lotteries while lying inside a [functional magnetic resonance](#) imaging (fMRI) scanner. The fMRI monitors [neural activity](#) by detecting changes in blood flow to different parts of the [brain](#).

The volunteers had to choose between different combinations of tokens directed towards two simultaneous lotteries, each with a 50% chance of being the winner. Each volunteer played the lotteries multiple times in quick succession while inside the fMRI.

The fMRI studies showed that the areas of the brain that were most active during the most inconsistent choices were the same areas responsible for evaluating value. In other words, the [brain areas](#) that usually make rational choices sometimes make irrational ones too. This contradicts previous theories that have suggested rational and irrational decision-making are influenced by activity in separate parts of the brain, or by different thinking processes, an idea popularized in Daniel Kahneman's book, *Thinking Fast and Slow*.

The results suggest that occasional inconsistent choices are fundamental to how a typical brain works, regardless of efforts to ensure people stick religiously to their usual preferences.

"Sometimes people are going to choose another product," says Prof. Webb, who brings together neuroscience, psychology and economics in his research. "Every so often, they're going to switch."

The study was published last month in *Nature Communications*.

More information: Vered Kurtz-David et al, The neural computation of inconsistent choice behavior, *Nature Communications* (2019). [DOI: 10.1038/s41467-019-09343-2](https://doi.org/10.1038/s41467-019-09343-2)

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