Novelty drives choice behavior in humans

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New research suggests that novelty drives choice behavior , even when the degree of familiarity with an option is completely unrelated to choice outcome. The research, published by Cell Press in the June 26th issue of the journal *Neuron*, reveals fascinating insights into the brain mechanisms that underlie the tendency to explore, and even value, unfamiliar options.

Novelty seeking can be strongly adaptive because unfamiliarity tends to be associated with uncertainty and the potential for valuable outcomes. "It can be advantageous for an animal to explore new parts of its environment because it might find valuable sources of food there," says study author Dr. Bianca C. Wittmann from University College London. In humans, this tendency is often exploited by manufacturers of everyday goods when they remarket identical products with novel packaging or advertising,

Previous research has suggested that novel stimuli may engage parts of the brain's reward system. However, no functional link to choice had yet been demonstrated. Dr. Wittmann and colleagues used functional magnetic resonance imaging (fMRI) to investigate the brain activity associated with novelty-related decision making. "We sought to test a computational hypothesis that brain systems associated with choice behavior use novelty bonuses to encourage exploration of unfamiliar options," explains co-author Dr. Nathaniel Daw.

Adult subjects performed a carefully designed choice task during which they had the opportunity to win money by selecting from four

simultaneously presented images, some of which they were familiarized with before the study. Importantly, the task could be used to specifically examine a mechanism of exploration directed at perceptual novelty as the payoff for novel options was no more uncertain or valuable than for familiarized options.

The researchers found that participants preferred novel stimuli to prefamiliarized stimuli and that choosing novelty was associated with activation of the ventral striatum, a region of the brain associated with reward anticipation. These results suggest that humans are motivated to use novelty as a substitute for true choice uncertainty, even in instances where the degree of unfamiliarity has no actual bearing on the favorableness of choice outcome.

"The substitution of perceptual novelty for choice uncertainty represents a distinct, albeit slight, departure from rational choice that, as in our task, introduces the danger of being sold old wine in a new skin," concludes Dr. Wittmann.

Source: Cell Press