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Embargoed until
12 p.m. Jan. 3, 2007

Researchers Use Brain Scans To Predict When People Will Buy Products

Study From Carnegie Mellon, Stanford, MIT Could Explain Why Consumers Overspend, Under Save

PITTSBURGH—For the first time, researchers have used functional magnetic resonance imaging (fMRI) to determine what parts of the brain are active when people consider whether to purchase a product and to predict whether or not they ultimately choose to buy the product. The study appears in the journal Neuron and was co-authored by scientists at Carnegie Mellon University, Stanford University and the MIT Sloan School of Management.

This paper is the latest from the emerging field of neuroeconomics, which investigates the mental and neural processes that drive economic decision-making. The results could have a profound impact on economic theory, because the decision of whether to purchase a product is the most basic and pervasive economic behavior.

Previous imaging studies have found that separate parts of the brain are activated when people are confronted with financial gains versus financial losses. The authors of this latest study believed that distinct brain regions would be activated when people were presented with products they wish to purchase (representing a potential gain) and when they were presented with those products' prices (representing a potential loss). The researchers wanted to see if they could then use this information to predict when a person would decide to buy a product, and when they would pass it up.

Twenty-six adults participated in the study, in which they were given $20 to spend on a series of products that would be shipped to them. If they made no purchases, they would be able to keep the money. The products and their prices appeared on a computer screen that the participants viewed while lying in an fMRI scanner. The researchers found that when the participants were presented with the products, a subcortal brain region known as the nucleus accumbens that is associated with the anticipation of pleasure was activated. When the subjects were presented with prices that were excessive, two things happened: the brain region known as the insula was activated and a part of the brain associated with balancing gains versus losses — the medial prefrontal cortex — was deactivated.

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Furthermore, by studying which regions were activated, the authors were able to successfully predict whether the study participants would decide to purchase each item. Activations of the regions associated with product preference and with weighing gains and losses indicated that a person would decide to purchase a product. In contrast, when the region associated with excessive prices was activated participants chose not to buy a product.

This study challenges the conventional economic account of consumer purchases, which views consumers as deciding between the immediate pleasure of making a purchase and the delayed pleasures of alternative things for which the same money could be used. The results of this paper support an alternative perspective that views consumers as trading off the immediate pleasure of making a purchase against an immediate pain: the pain of forking out the money for the item. The results can explain the growing tendency of consumers to overspend when purchasing items with credit cards instead of cash, because consumers do not immediately pay for items charged to credit cards and the "pain" of the potential loss is minimized. Economic policies designed to promote savings would thus need to take this into account. It also suggests that differences in how much people spend and save may be partly explained by differences in the degree to which they find spending money painful.

The Neuron paper was authored by Scott Rick and George Loewenstein of the Department of Social and Decisions Sciences at Carnegie Mellon; Brian Knutson and G. Elliott Wimmer of the Department of Psychology at Stanford; and Drazen Prelec at MIT's Sloan School of Management.

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