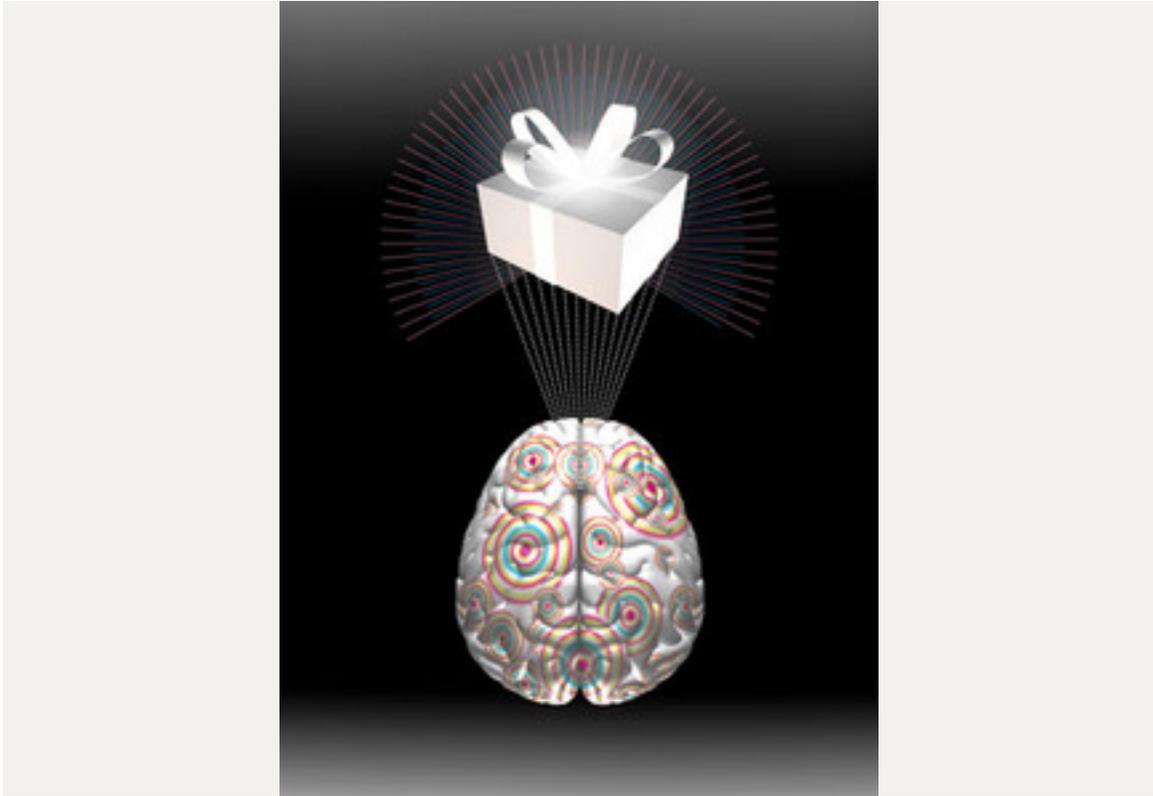


This Is Your Brain on Bargains

Psychologists and marketers are learning what happens when we get and spend. Does this mean compulsive shoppers will end up deeper in the red?



[View photo album >>](#)

By Joan O'C. Hamilton

Scientific inspiration can derive from the most mundane experience. Archimedes was said to have figured out how to compute volume in his bathtub. When Uzma Khan had her eureka moment, she was sprawled on her couch, just back from a shopping mall where she had gone to avoid working on her dissertation.

Khan—then at Yale, now an assistant professor of marketing at the Graduate School of Business—knew all about the supposed levers of consumer behavior: supply, demand, advertising, discounting. Traditionally, business theorists described consumer behavior as being based on rational decisions about value and price. But as Khan looked at the shopping bags strewn around her apartment she realized that the conventional wisdom was, well, bankrupt. She was sure that her buying decisions had much less to do with price than they did her frayed nerves. She had gone shopping to feel better. Once home, the thrill was gone. “I looked at all that stuff, all those bags, and I thought, 'I don't need this stuff. I'm going to take most of it back. What was I thinking?’”

Khan's professional focus today is answering that question—what are we thinking when we go shopping? She is one of a growing number of researchers at Stanford and elsewhere working on consumer mysteries: Why are our needs and wants so disconnected? Why do people dig themselves into debt from foolish spending? Why do our brains perceive expensive products as

superior? And what are the biological bases for the pleasures that shopping or even the anticipation of shopping can unleash?

Business school profs set aside supply-and-demand curves to focus on the emotional experience of shopping; psychologists wield sophisticated scanners that watch the brain ponder decisions to spend money in real time. Such a scan might someday predict whether a given product will be attractive to consumers, and at what price. Other findings could overturn decades of marketing dogma, such as retail-store design.

But the field is not without a little controversy. Physicians and therapists who work with patients whose shopping is so out of control that it ruins their marriages, careers and finances are questioning the propriety of peering into our brains to give marketers even more ammunition. “We’re working at totally cross purposes,” observes New York psychologist April Lane Benson, author of *To Buy or Not to Buy: Why We Overshop and How to Stop*. “We’re both looking at triggers, but marketers want people to buy mindlessly, and we want people to buy mindfully.”

Almost everyone has felt that tug of war, that debate of shoulder devils that can erupt when you’re window shopping or looking at an ad. “Wow, that is cool. It would make you happy,” the buy demon whispers in your ear. Meanwhile, your thrift muse harrumphs, “Let’s talk about Little Sally’s tuition before we even think about a new iPod or a Cabo timeshare, shall we?”

Well, according to Brian Knutson, PhD '93, associate professor of psychology and neuroscience at Stanford, that conversation is not so very far from the biological throw-down that goes on in your brain in real time. In fact, he’s got photos.

Knutson and his team have been putting subjects inside the big loud machine we usually associate with examinations for brain tumors or torn ligaments: a magnetic resonance imaging scanner. However, Knutson isn’t diagnosing illness or injury. This technique is called functional MRI, and it’s about watching the brain in action. In an important paper published last year in *Neuron*, Knutson’s team identified by fMRI what he called a “hedonic competition between the immediate pleasure of acquisition and an equally immediate pain of paying.”

The experiment went like this: Subjects were rolled inside the scanner, where they could see a small video screen that displayed products available for purchase—DVDs, books, games, small electronic devices. After a short interval, the price of the product was displayed, and subjects could choose whether to make a purchase. The scanner was activated during three distinct times: product presentation, price display and decision.

The scanner works by measuring the blood oxygen level dependent (or BOLD) signal. When we think, ponder, evaluate, giddily anticipate or even fret, oxygen-carrying blood flows to particular brain regions doing the work. When the subjects thought about whether they wanted the product, the scanner showed that blood flow was increased to an area called the nucleus accumbens (NAcc), an area of the brain particularly receptive to dopamine, a chemical that promotes desire. When the subject was evaluating the price, the medial prefrontal cortex (MPFC) became active; that’s where humans tend to process value judgments, goals and other “executive function” information. In addition, greater activity in an area called the insula, a region associated with unpleasant emotions and the anticipation of loss, was seen in the brains of subjects who decided not to make a purchase.

The significance of Knutson’s finding is that, for the first time, this sort of experiment reliably predicted whether an individual would purchase a given product. If the NAcc and MPFC fired up, for example, and the insula didn’t, it seemed to mean the brain had calculated that the pleasure from the purchase would exceed the pain from the cost. “I don’t need to know you,”

Knutson explains. “I just need to see how the three areas of your brain are responding to predict with a high probability whether you'll make a purchase.”

Knutson is testing other triggers related to what may make people spend money or take financial risks. In April, he and Camelia Kuhnen, PhD '06, a Northwestern University finance professor, released the results of an experiment in which 15 heterosexual young men were shown erotic images while in a scanner. In the journal *NeuroReport*, the scientists said that when the NAcc was activated by the erotic images, the men were far more likely to bet high on a random-chance game—a quantifiable stand-in for spending freely or courting risk. It didn't matter that the images were unrelated to the game.

It's not much of a leap to imagine marketers paying close attention to all this work. Given the results of the erotic-image study, Abercrombie & Fitch has got to be feeling pretty good about wallpapering its stores with sexy shots of barely clad models, and Las Vegas casinos won't be cutting back on topless showgirls.

Companies have deeper questions, too. In fact, Baba Shiv, professor of marketing and an expert in the field of “decision neuroscience,” says his burgeoning field evolved, in part, because companies thought business research “had borrowed too much from economics and statistics” and not embraced psychology enough. “Companies were complaining, ‘You guys are not coming to us with any actionable findings about advertising effects.’” Decision neuroscience, Shiv says, is a new branch of inquiry based on “predictable irrationality, or coming up with different reasons for why consumers may be going outside the prediction.”

For example, last August, professor of organizational behavior Chip Heath, PhD '91, and Jonah Berger, '02, PhD '07, now an assistant professor of marketing at Wharton, published a paper exploring what makes a product desirable. In one study, they asked a group of students to select their favorite brands of cars, clothing, dish soap and bike lights. Later, the students were given information suggesting that many other students had the same preferences.

Apparently, herd acceptance was disquieting. When the students later were asked to choose again, many abandoned their original preferences in those domains, such as cars or clothing, that signify social identity. Where there was no cool factor—as with soap or bike lights—students' selections didn't change. Berger concluded, “Companies need to manage meaning,” and work to ensure that brands signify their firm's desired values.

The high-energy Shiv was once a marketing executive for products as diverse as ice cream and earth-moving equipment in India. He is one of the Graduate School of Business's most engaging professors: it's hard to resist a course called *The Frinky Science of the Human Mind*—frinky being a term Shiv's son coined to combine the ideas of funky and counterintuitive.

Shiv has published a slew of frinky findings. Shiv and collaborators at the California Institute of Technology have reported a novel study about how the price of a product can influence “experienced pleasantness.” Subjects were told that they'd be tasting different wines, one priced at \$5 and one at \$45. They then were given the exact same wine to sip through a tube while they lay in an fMRI scanner. The study showed that another region of the brain linked to pleasure, the medial orbitofrontal cortex, or mOFC, was more active when the subject thought he or she was drinking the more expensive wine.

Shiv has gotten similar results without the scanner. In another study, some subjects were sold an energy drink at a discounted price while others were charged the full price. Then, they were given brain-teasing puzzles. The group that bought the energy drink at full price did better on the puzzles.

“The most basic function of the brain is to perceive the real world, but our perception of the real world is so colored,” Shiv says. “The brain has to live with itself, so it is constantly building up a narrative” to reconcile all sorts of contradictory messages. The brain uses the narrative’s expectation to send more energy to certain tasks or behaviors. It’s not unlike the visualization techniques athletes use to give themselves confidence before an activity. Shiv says the wine and energy-drink experiments show that marketing can affect a product’s perceived value at a very deep level, and thus influence future buying choices.

“Ten years ago if you said there is going to be fMRI in marketing research, I would have said it will never happen: ‘We don’t have the right training, and why would someone who does that want to talk with someone in marketing?’” Shiv says. “It turns out it is good for us [business researchers and neuroscientists] to work together. We’re moving toward systems of brain analysis, figuring out what gives us the juice to make decisions.” Agrees Knutson, who hopes to collaborate with Shiv on some decision-science research projects soon, “We’re moving from the outside to the inside of the mind.”

As Knutson and Shiv readily admit, fMRI is a developing technology. It’s expensive, time-consuming and labor-intensive. Scanners collect far more information on a given individual than can be reliably evaluated, yet they cannot be practically deployed to collect data on the large numbers of subjects required to thoroughly validate findings. Several years ago, researchers at Emory University formed an enterprise that claimed it would work with companies to use fMRI technology to test future products, but those plans fizzled when the company admitted the technology was not advanced enough to test the kinds of questions marketers found most compelling. For one thing, Knutson says getting the resolution of the images to smaller time increments is critical, because the brain works so quickly. “We’re doing the basic research right now, showing there is a signal. We’re laying the groundwork.”

Uzma Khan’s research relies on traditional behavioral studies to explore new kinds of questions. She points out that marketers have always tested individual preferences among consumers using focus groups. There are lots of well-known differences in buying patterns based on gender or culture, for example. But she and her colleagues are interested in understanding a level of thinking above that—the things we all do in the same way that are related to how our brains are wired. “There’s a greater movement to synthesize all the information that has existed in field silos.”

Khan is exploring the larger context of a subject’s shopping experience, such as the design and marketing approach of retail stores. She also is teasing apart the sort of permission-granting process that individuals undergo as they make buying decisions. Her research suggests that the two are related.

Think of the typical grocery store. Most retailers put the items most likely to bring people to the store—milk, bread, meat—in the back of the store, and they put higher-profit-margin “impulse” items—flowers, candy, magazines—in the front by the checkstands. By lengthening the route through the store to the items people need, retailers increased people’s exposure to items they might want.

Khan’s research has shown, however, that there is a transaction between a shopper’s permission-granting emotions that may play a role in any given shopping trip. In experiments with students, she showed that the more relevant to actual needs a first purchase on a shopping trip is, the more likely a shopper is to buy unrelated items and fall prey to “shopping momentum.” Although it does not make much sense economically, she believes that psychologically the shopper seeks to reward him or herself for completing the buying errand.

Khan says this process may be related to research by University of Florida psychologist Roy Baumeister, who pioneered the concept of “ego depletion.” The gist is that self-control develops like a muscle. You can cultivate a strong sense of self-control by using it, resting it, and then challenging it again, over time. However, on any given day, you can deplete your self-control such that you will make different decisions after a long hard day than you might in the morning.

Khan and her research colleagues have coined the term “licensing effect” to explain how people give themselves permission to treat themselves to a purchase they want after they've taken care of dutiful purchases. She says online retailers are starting to talk with her about different website design elements that might facilitate self-licensing. “Online retailers are in line with what we think. They make it easy to keep putting items in the shopping cart and there you go, you're on a roll.”

For some, unfortunately, that roll never stops. Elsewhere on campus, the notion that researchers may give retailers even better tools to persuade even more people to spend and shop elicits something of a shudder.

Lorin Koran, professor of psychiatry, is a specialist in obsessive-compulsive disorder, a condition characterized by the irresistible urge to do such things as gamble, wash hands, steal—or even shop. Although plenty of us use retail therapy to counteract a bad day, compulsive shoppers' desire to buy becomes so overwhelming that their lives are disrupted. They lose jobs because they spend too much time shopping on the Internet. They hide credit card accounts from their spouses.

Koran and his team published a landmark study in 2006 that suggested that almost 6 percent of the population, and perhaps most startlingly an almost equal number of men and women, can be classified as compulsive shoppers. “We were surprised that it was that high, and it surprised everybody that men have it as much as women,” he says. (In general, male compulsive shoppers buy technology: shop tools, high-end electronics. Women buy items of personal adornment: jewelry, clothing. Women are far more likely than men to seek treatment.)

Koran also says that compulsive shopping should not be confused with collecting or devotion to a hobby. Collectors may get into financial trouble indulging their hobby, but they feel great attachment to the items they buy and tend to use or display them. Not so with compulsive shoppers. “I had a patient who had 75 cameras. He never used the cameras or even took them out of the box. He simply liked buying cameras,” Koran explains. “This is very common. Compulsive shoppers lose interest in the item as soon as they own it.”

Koran says that he and other experts in compulsivity disorders find that they cannot get funding to study the dark side of these choices. The budgets of the National Institute on Mental Health are heavily weighted toward disorders such as schizophrenia and depression. Koran says he also has trouble persuading insurers to cover treatment for compulsive shopping because there is not sufficient clinical data to have it officially recognized as a disorder. “We don't know how many lives are ruined by this,” he says, even though at the almost 6 percent prevalence rate he reported, compulsive shopping is more common than major depression.

Koran is not opposed to the basic research in decision making; in fact, he and Knutson have discussed working together on a study. Koran notes that all personal decisions are based on three frames of reference—biological, psychological, social. Right now, “the knowledge base for the biology is pitiful. Brian is beginning to generate that biological knowledge. The frameworks are complementary.”

Psychologist and author Benson, who developed a treatment program for compulsive shoppers, says she is less interested in which brain regions are firing and more concerned with a culture of consumption that causes so much havoc. She believes compulsive shoppers need to “understand what it is that they’re *really* shopping for—love, revenge, affirmation, belonging, control”—before they can gain control over the problem.

Nonetheless, there may be opportunities for all sorts of insights that both sides can share. Khan is not just arming the latest skinny-jean marketers with better ideas for store design; she is interested in using elements of the psychology of shopping and decision science to figure out how to get people to make healthier food choices. Ultimately, Knutson says, the negatives associated with helping companies more effectively market products to consumers may be balanced by using the same data to help people make better financial decisions—to save for retirement, or to overcome bad spending habits. His goal, in any event, is not marketing. Rather, he’s after “a unified theory of decision making where we can predict everything.”