

Brain scans can predict weight gain and sexual activity: study

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At a time when obesity has become epidemic in American society, Dartmouth scientists have found that functional magnetic resonance imaging (fMRI) brain scans may be able to predict weight gain. In a study published April 18, 2012, in *The Journal of Neuroscience*, the researchers demonstrated a connection between fMRI brain responses to appetite-driven cues and future behavior.

"This is one of the first studies in brain imaging that uses the responses observed in the scanner to predict important, real-world outcomes over a long period of time," says Todd Heatherton, the Lincoln Filene Professor in Human Relations in the department of psychological and [brain sciences](#) and a coauthor on the study. "Using [brain activity](#) to predict a consequential behavior outside the scanner is pretty novel."

Using fMRI, the researchers targeted a region of the brain known as the nucleus accumbens, often referred to as the brain's "[reward center](#)," in a group of incoming first-year college students. While undergoing scans, the subjects viewed images of animals, environmental scenes, appetizing food items, and people. Six months later, their weight and responses to questionnaires regarding interim sexual behavior were compared with their previously recorded weight and brain scan data.

"The people whose brains responded more strongly to food cues were the people who went on to gain more weight six months later," explains Kathryn Demos, first author on the paper. Demos, who conducted the research as part of her doctoral dissertation at Dartmouth, is currently on

the research faculty at the Warren Alpert Medical School of Brown University.

The correlation between strong food image [brain responses](#) and weight gain was also present for sexual images and activity. "Just as cue reactivity to food images was investigated as potential predictors of weight gain, cue reactivity to sexual images was used to predict [sexual desire](#)," the authors report.

The paper stresses "material specificity," noting that the participants who responded to food images gained weight but did not engage in more sexual behavior, and vice versa. The authors go on to say that none of the non-food images predicted weight gain.

Heatherton and William Kelley, associate professor of psychological and brain science and a senior author on the paper, have a longstanding interest in psychological theories of self-regulation, also called self-control or willpower.

"We seek to understand situations in which people face temptations and try to not act on them," says Kelley.

The researchers note that the first step toward controlling cravings may be an awareness of how much you are affected by specific triggers in the environment, such as the arrival of the dessert tray in a restaurant.

"You need to actively be thinking about the behavior you want to control in order to regulate it," remarks Kelley. "Self-regulation requires a lot of conscious effort."

Provided by Dartmouth College

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