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Research examines vicious cycle of overeating and obesity

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New research provides evidence of the vicious cycle created when an obese individual overeats to compensate for reduced pleasure from food.

Obese individuals have fewer pleasure receptors and overeat to compensate, according to a study by University of Texas at Austin senior research fellow and Oregon Research Institute senior scientist Eric Stice and his colleagues published this week in *The Journal of Neuroscience*.

Stice shows evidence this overeating may further weaken the responsiveness of the pleasure receptors ("hypofunctioning reward circuitry"), further diminishing the rewards gained from overeating.

Food intake is associated with dopamine release. The degree of pleasure derived from eating correlates with the amount of dopamine released. Evidence shows obese individuals have fewer dopamine (D2) receptors in the brain relative to lean individuals and suggests obese individuals overeat to compensate for this reward deficit.

People with fewer of the dopamine receptors need to take in more of a rewarding substance -- such as food or drugs -- to get an effect other people get with less.

"Although recent findings suggested that obese individuals may experience less pleasure when eating, and therefore eat more to compensate, this is the first prospective evidence to show that the overeating itself further blunts the award circuitry," says Stice, a senior

scientist at Oregon Research Institute, a non-profit, independent behavioral research center. "The weakened responsivity of the reward circuitry increases the risk for future weight gain in a feed-forward manner. This may explain why obesity typically shows a chronic course and is resistant to treatment."

Using Functional Magnetic Resonance Imaging (fMRI), Stice's team measured the extent to which a certain area of the brain (the dorsal striatum) was activated in response to the individual's consumption of a taste of chocolate milkshake (versus a tasteless solution). Researchers tracked participants' changes in body mass index over six months.

Results indicated those participants who gained weight showed significantly less activation in response to the milkshake intake at six-month follow-up relative to their baseline scan and relative to women who did not gain weight.

"This is a novel contribution to the literature because, to our knowledge, this is the first prospective fMRI study to investigate change in striatal response to food consumption as a function of weight change," said Stice. "These results will be important when developing programs to prevent and treat obesity."

Provided by University of Texas at Austin