Helping children make healthy eating choices

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Credit: AI-generated image (disclaimer)

Childhood obesity rates have more than doubled in the last 30 years, with pre-adolescence emerging as a critical window for preventing excess weight gain. In a new Penn State project, researchers are investigating why some children are more prone to weight gain than others, by studying how children's brains respond to food portion size.

According to Kathleen Keller, the Mark T. Greenberg Early Career

Professor in the Department of Nutritional Sciences at Penn State and principal investigator on the project, dietary approaches to treating obesity lack long-term success. "Given the challenges of obesity treatment, preventing the disease before it develops is a public health priority," she said.

Funded by the National Institutes of Health, the project will utilize functional magnetic resonance imaging (fMRI) to determine if brain responses to food cues can predict future obesity in children ages seven to eight. It will be the first study to use a "brain-as-predictor" framework to understand these mechanisms underlying eating choices.

It will also fill an important research gap, because middle-childhood is an understudied critical period. "Adolescence is considered a high-risk time for the development of obesity because children are going through physical, psychological and emotional changes while becoming more independent and making their own food choices. We want to find out what is going on in the brain before this growth period," said Keller.

The research team will recruit 120 children, all who are at a current healthy weight but vary by family risk for obesity. "About half the children will be considered high risk for obesity in adulthood because their biological parents are obese, while the other half will be considered low risk because their parents are at a healthy weight," Keller explained.

The children will undergo fMRI scans at Penn State's Social, Life, and Engineering Sciences Imaging Center, to characterize brain regions that are activated in response to food portion size and calorie content, as well as other measures of overeating, such as snacking on palatable snacks when not hungry. The researchers will also conduct follow-up visits with the children one year after the project to measure body mass index and body composition to see if brain and behavioral responses to portion size can be used to predict the development of obesity.

"This study will help us understand the brain's role in overeating and the development of obesity," said Keller. "In the future, we may be able to use this information to develop neurobiologically informed prevention or treatment programs.

"We're living in a world where 'supersized' portions are commonplace, so it is essential to develop novel and effective approaches to help children moderate their food intake in this environment."

Provided by Pennsylvania State University