

Brain volume predicts successful weight loss in the elderly

November 2 2016



This is an image of a weight scale. Credit: CDC/Debora Cartagena

If you're trying to lose weight, what are your chances of success? Your brain may hold the key.

Scientists at Wake Forest Baptist Medical Center believe they may have found a way to predict who will be successful in their weight-loss efforts with a quick, non-invasive brain scan.

In findings from a small study published in the current online issue of the journal *Obesity*, the researchers were able to predict weight loss success with 78 percent accuracy based on the brain volume of the [study participants](#).

"A simple test that can predict intentional [weight loss success](#) using structural brain characteristics could ultimately be used to tailor treatment for patients," said Jonathan Burdette, M.D., professor of radiology at Wake Forest School of Medicine, part of Wake Forest Baptist, and co-author of the study.

"For example, people identified at high risk for failure might benefit from intensive treatment and close guidance. People identified as having a high probability for success might best respond to less intensive treatment."

In the study, 52 participants, age 60 to 79, were recruited from the Cooperative Lifestyle Interventions Programs II (CLIP-II) project. The participants were overweight or obese (BMI greater than 28 and less than 42) and had a history of either cardiovascular disease or metabolic syndrome.

All participants had a baseline MRI scan and then were randomized to one of three groups - diet only, diet plus aerobic exercise training or diet plus resistance exercise training. The goal of the 18-month diet and exercise program was a weight loss of 7 to 10 percent of body mass.

Basic brain structure information garnered from the MRIs was classified using a support vector machine, a type of computerized predictive algorithm. Predictions were based on baseline brain gray and white matter volume from the participants' MRIs and compared to the study participants' actual weight loss after the 18 months. Brain gray matter volume provided higher prediction accuracy compared with white matter

and the combination of the two outperformed either one alone, Burdette said.

The study's small sample size was a limitation, Burdette said, but the researchers hope to include more people in follow-up studies and broaden the types of interventions to help improve the predictive nature of the test.

"Future studies will investigate whether [functional brain networks](#) in association with patterns of brain anatomy may improve prediction, as our recent research has demonstrated that brain circuits are associated with food craving and the self-regulation of eating behavior," he said.

Provided by Wake Forest University Baptist Medical Center

Citation: Brain volume predicts successful weight loss in the elderly (2016, November 2) retrieved 24 April 2024 from <https://medicalxpress.com/news/2016-11-brain-volume-successful-weight-loss.html>

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