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# Voxel-based morphometry correlates of Body Mass Index and eating behavior

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## Abstract

Many brain areas including ventral striatum (VS) and the limbic system are involved in the control of eating behavior. Previous studies indicate that the VS shows increased or decreased responses to food in overweight subjects, who are classified as Hedonic and Self-medicating eaters, respectively. We investigated whether these differences in functional anatomy were reflected in the relationship between brain anatomy (more specifically, gray matter density) and Body Mass Index (BMI) for distinct eating subtypes. To this end, we performed voxel-based morphometry (VBM) on T1-weighted structural MRI scans of 245 20-25 years-old participants. Eating personality subtypes were based on individual BIS-BAS questionnaire scores. Participants scoring either high or low on Behavioral Activation Scale (BAS) were defined as Hedonic or Self-Medicating eaters, respectively. The preliminary results showed an overall negative association between VBM values in the right inferior frontal operculum and BMI, confirming two earlier studies. The positive association between BMI and VBM values in the thalamus and the caudate nucleus has also been described previously. Interestingly, the strongest correlations in this cluster were present in the right nucleus accumbens. Regarding subtypes, the association between high BMI and high VBM values in the right ventral striatum was observed in Hedonic participants only. In contrast, only in the Self-medicating participants high BMI was associated with high VBM values in the left ventral striatum and with low VBM values in the right operculum. These results indicate subtype-specificity of associations between BMI and brain anatomy. The results are presently being validated in larger independent samples.

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