
Reward activity in satiated overweight women is decreased during unbiased viewing but increased when imagining taste: an event-related fMRI study

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Abstract

This fMRI study tested the hypothesis that reward-related brain activity is stronger in overweight (n=14) than in healthy-weight (n=15) participants in response to high-calorie palatable food pictures. This brain activity was measured while participants received two types of attention instructions: unbiased viewing (no prior instructions) vs. taste imagination. We expected the difference between overweight and healthy-weight participants to be most pronounced with unbiased viewing, assuming that especially overweight participants would spontaneously be more inclined to pay attention to food palatability. Stimuli included pictures of palatable (e.g., chocolate, strawberries) and less palatable (e.g., herring, radishes) high-calorie and low-calorie foods, presented in an event-related design.

A similar pattern of activation, reflected in a body-mass-index \times condition interaction, was observed in 14 brain areas involved in food reward processing (main areas: amygdalae, ventral tegmentum, and areas in the orbitofrontal and anterior cingulate cortex). During taste imagination, activation was stronger in overweight participants than in healthy-weight participants, reflecting the relatively higher reward induced by high-calorie palatable foods. Unexpectedly, during unbiased viewing the opposite pattern was observed: a weaker activation in overweight participants than in healthy-weight participants, which may be interpreted as avoidance behavior by the overweight participants when they are not required to focus on the taste of food.

These results indicate a large difference in reward area activation between healthy-weight and overweight people. The activation pattern in overweight people may possibly represent the ambivalence between avoidance of (in the unbiased viewing condition) and desire for (in the taste imagination condition) high-calorie palatable food stimuli.

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