

Visually Evoked Potentials Sensitive to Perceived Fat Content of Food Items

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Background

Two general motivational systems underlie behavior. A behavioral approach system (BAS) in which the goal is to move toward something desired. A behavioral avoidance (or inhibition) system (BIS) in which the goal is to move away from something unpleasant.

Our Question

Do the brains of people who score high on the BIS scale respond to high fat foods differently than people who score low on the BIS scale?

Participants

7 male and 7 female UW-Stout students

What did the participants do?

Viewed and rated 40 pictures of food items, each presented twice, while we measured their brain activity using a 128 channel electrode net.

- once preceded by a low fat label
- once preceded by a high fat label

High Fat Label



100% Beef Burger

Low Fat Label



Turkey Burger



Cheesecake



Low-Fat Cheesecake

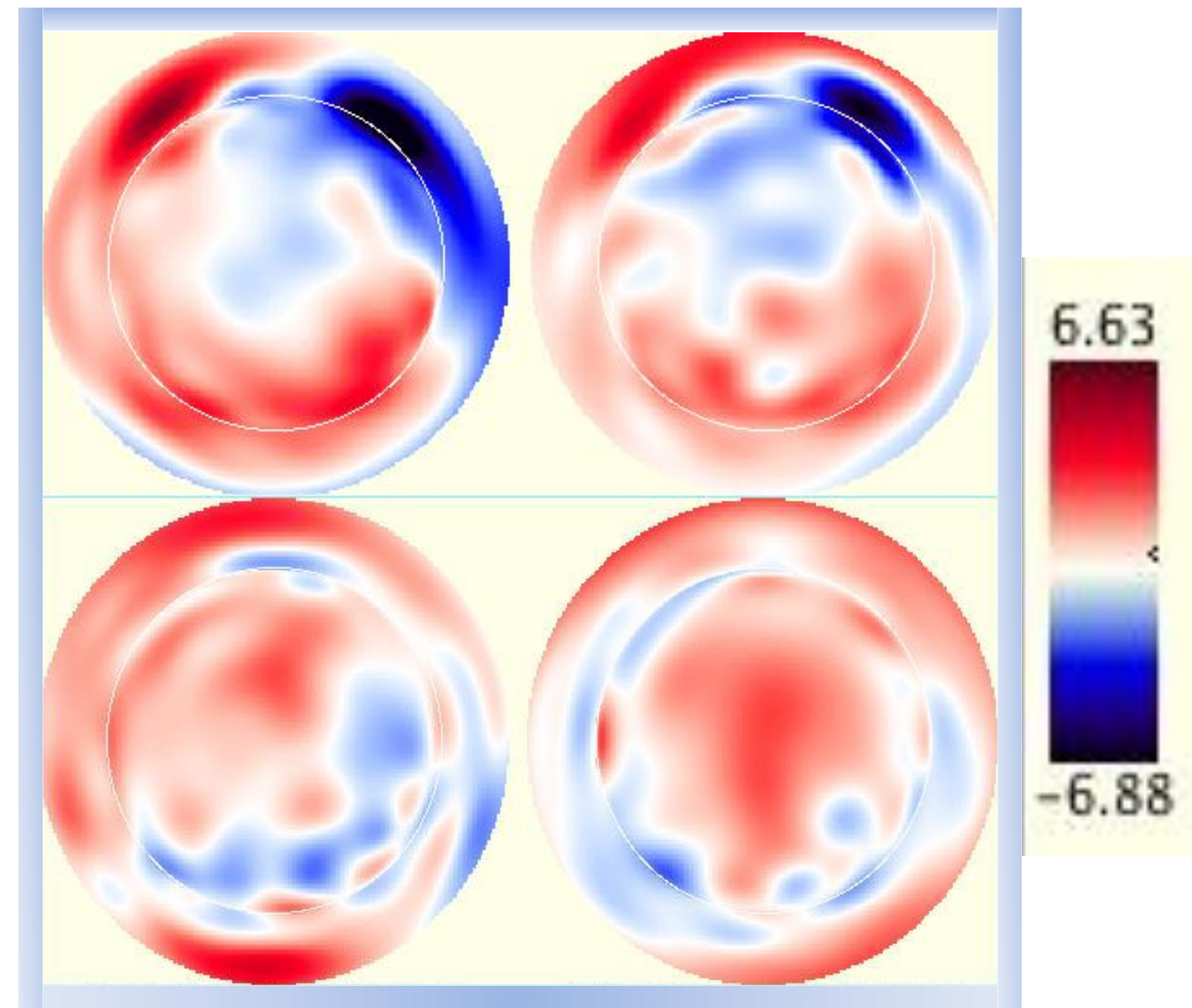
Food Ratings & Questionnaires

- The pictured food item *looks appetizing*.
- The pictured food item *tastes good*.
- Hunger and energy level ratings
- BIS/BAS Scale
- Dieting Survey

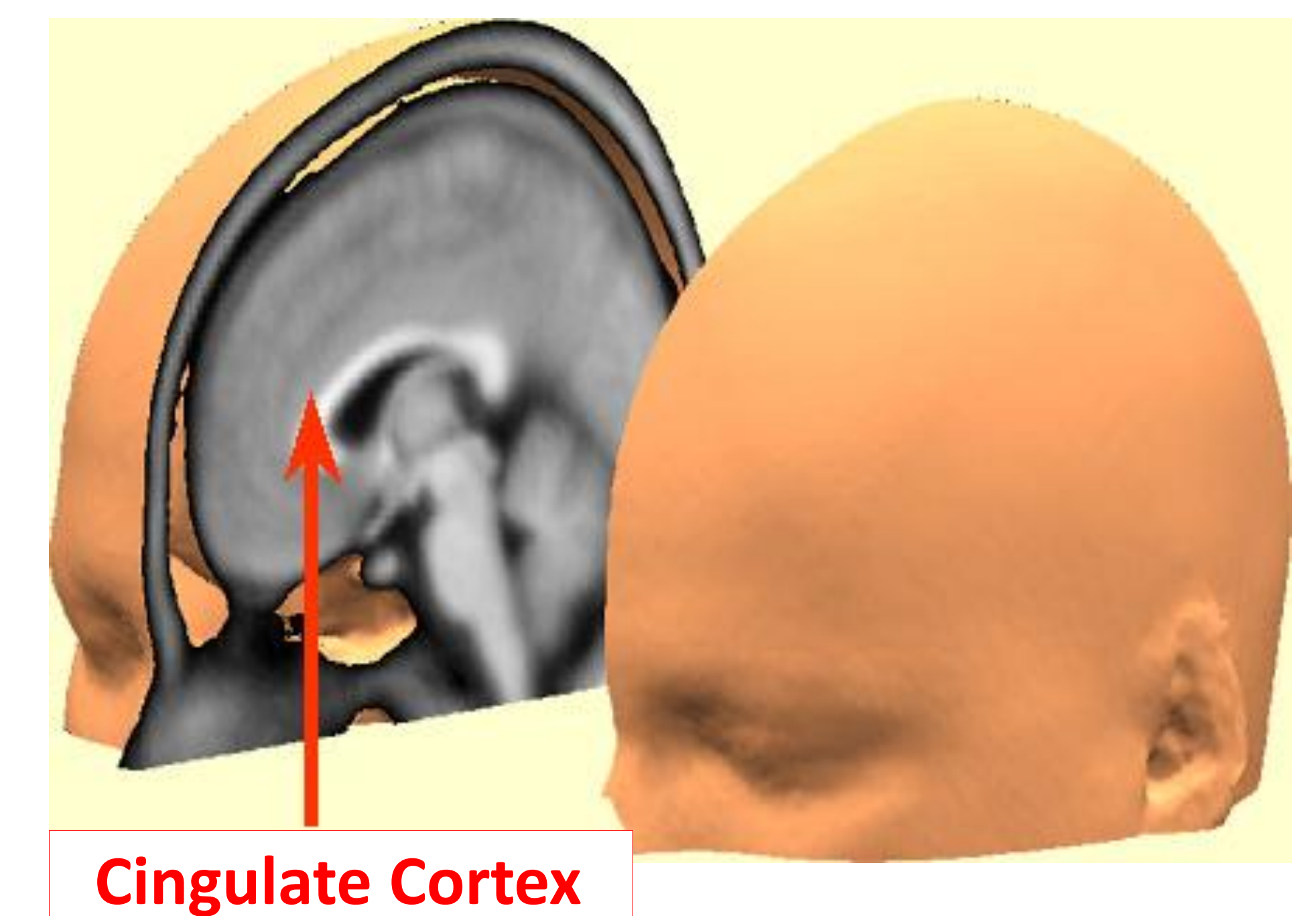
High BIS

High Fat

Low Fat



Low BIS



Scalp topographic voltage maps at 250 msec post-stimulus onset (after the picture of the food item appeared on the screen) which signals the occurrence of conflicts

Results

- At 250 msec after the onset of the food picture, high BIS subjects show highly positive voltages in electrodes located over left dorsal lateral prefrontal cortex and highly negative voltages in electrodes located over the right dorsal lateral prefrontal cortex. This dipole activity suggests activity in the dorsal anterior cingulate cortex, which indicates conflict in information processing, thereby triggering compensatory adjustments in cognitive control. Low BIS subjects do not show this same pattern.

Conclusions & Future Research

- Brains of low BIS and high BIS individuals show subtly different patterns of responding to high-fat and low-fat versions of the same foods; the differences in activation can be found in the frontal lobe.
- Individuals with high behavioral inhibition appear to experience conflict deciding how appetizing food items are, especially as it relates to choices between high fat and low fat versions of the same food. Whereas, individuals with low in behavioral inhibition do not experience conflict.
- Additional data regarding dieting and food consumption will be done to determine whether this difference has any influence on their food choices.