



Get in my Belly: Anterior-Posterior Postural Shifts in Response to Foods

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Background

• Bidirectional links exist between approach and avoidance motivational states and overt (e.g., arm flexion & extension) and covert (e.g., postural sway) measures of motor behavior.

Eder et al., 2013; Elliot & Covington, 2001

• Research on human feeding behavior suggests that appetitive approach-oriented states can guide attention to, and potentially direct behavior toward, preferred food items.

Mogg et al., 1998; Overduin et al., 1995

• No work to date has assessed individuals' unique food preferences and behaviors and how they might selectively activate approach versus avoidance states and, in turn, dynamically influence motor behavior toward or away from food items.

Primary Questions

1. Will individuals' food preferences alter postural sway toward and away from pictured food items?
2. Will individual differences in eating behavior, such as dietary restraint, predict the extent of these postural sways?

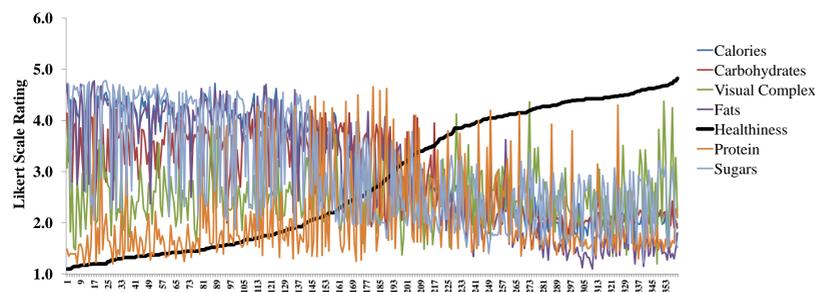
Methods

Experiment 1 (Image Ratings): (n=40)

Goal: To standardize a set of food images for use in Experiment 2.

Procedure: Participants rated a set of 360 food images for perceptions of healthiness, calorie content, carbohydrate content, fat content, sugar content, and protein content. They also rated perceived image complexity.

Results: A set of 100 images was selected for use in Experiment 2. These images showed a wide range of nutritional attributes without confounding visual complexity.



Experiment 2 (Posture Study): (n=100)

Goal: To assess spontaneous postural sway during preferred versus non-preferred image viewing.

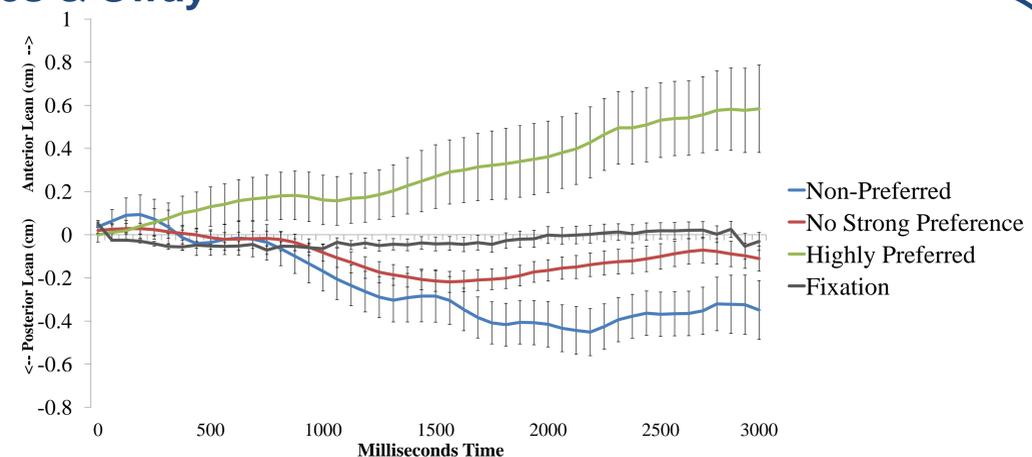
Procedure: Participants stood on a calibrated Wii Balance Board and viewed the 100 food images one at a time in random order for 3 sec each (3 sec ISI). Custom software logged balance board xy coordinates over time. Participants were then seated at a desktop computer and asked to rate their liking of each food item using a 5-point Likert scale.



Results: Preferences & Sway

Data Analysis

1. Raw center of pressure data referenced to standard 2x2 coordinate grid, then converted to centimeters with reference to overall board dimensions.
2. Individual trials referenced to 500 ms pre-stimulus window to account for postural drift over course of session.
3. 100 food items parsed into preference conditions by each participant's unique liking ratings.
4. Analyses performed in each of six 500 ms time bins.

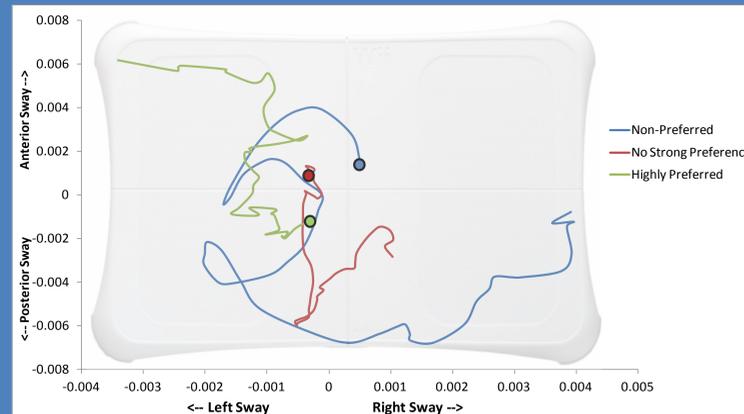


• Preference x Time interaction: $F(10, 990) = 10.16, p < .001, \eta^2 = .02$. Simple effects ANOVAs within each time bin showed effects in bins 3 through 6 (1000-3000 ms; all p 's $< .01$).

• Participants tended to lean toward personally preferred, and away from non-preferred foods. This pattern was stronger than simply parsing by healthy/unhealthy or nutritional characteristics. No apparent influence of individual differences in restraint, disinhibition, trait/state hunger, BMI, gender, history of dieting, or age.

• Medio-lateral (side-side) sway showed no effects by Preference condition, though participants did tend to sway rightward over time, particularly in non-preferred condition.

Results: Plotted on Wii



• Non-preferred items tended to elicit a broad and gradual/meandering sway toward the posterior. The rightward sway was non-significant.

• Highly preferred items elicited a relatively rapid and direct anterior sway. The leftward sway was non-significant.

• No strong preference tended to elicit a rapid back-then-forward response within a restricted coordinate space.

Conclusions & Discussion

• **Bidirectional links exist between motivational states and motor activity:** Existing research shows that adopting particular postures can activate approach versus avoidance states; here, we show that activating these states can also elicit postural sway toward or away from food items.

• **Food preferences are individualized:** Traditional studies linking emotionally salient images to postural sway have used standardized images intended to elicit particular emotional states in *most* individuals (e.g., mutilated bodies, cockroaches on food, chocolate cake). Presently, we show that *individualized preferences* are the strongest predictor of postural sway, beyond the predictive value of rated healthiness or nutritional content.

• **Future work should expand upon individual differences as predictors:** Though we did not find evidence that individual differences in eating behavior predicted our effects, our sample showed a restricted range of BMI, dieting behavior, and obesity.

References

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