A healthy diet is associated with an attentional bias towards low-calorie food stimuli

Background

Attentional bias towards high-calorie food-cues is associated with overeating and obesity [1,2]. Attentional retraining can reduce attentional bias for chocolate as well as subsequent chocolate consumption [3] and may also induce healthier food choices [4]. However, studies on correlates of attentional bias towards high-calorie food-cues are inconsistent and many studies did not appropriately control for important stimulus features, that is, that picture categories did not differ in characteristics like visual complexity or colors. The aim of the present study was to investigate attentional bias to food-cues and its correlates with a complex food frequency list [6] among other questionnaires. This instrument asks about how frequent certain foods are consumed. A healthy diet is associated with overeating and obesity [1,2].

Method

Female university students (N = 55; age: M = 20.36 ± 3.90, range 18-45 years; BMI: M = 21.75 ± 2.90, range 17.09-29.67 kg/m²) performed a dot-probe task. Ten pictures of high-calorie and ten pictures of low-calorie foods were selected from the food.pics database (Fig. 1) [5]. The caloric content of the foods in the two categories differed both in calories per 100 g (M = 321.35 ± 126.43 kcal/100g vs. M = 47.25 ± 40.05 kcal/100g, t10 = 6.53, p < .001) and in calories displayed per image (M = 1769.62 ± 1363.04 kcal/image vs. M = 102.23 ± 128.89 kcal/image, t10 = 3.85, p < .01). Picture categories did not differ in palatability, visual complexity (jpg file size, edge detection, subjective ratings), brightness, and contrast (all t10 < 1.84, ns).

Trial procedure is displayed in Fig. 2. Participants first performed a brief practice block (15 trials) with non-food pictures. In the main task, all possible picture pairs were presented, resulting in 400 trials. After the task, participants completed the Food Frequency List [6] among other questionnaires. This instrument asks about how frequent certain foods are consumed. A diet quality index can be calculated based on the recommendations of the German Nutrition Society, with higher scores representing a healthier, balanced diet.

Results

Incorrect trials (1.12% of all trials) and trials with a reaction time < 150 ms or > 1500 ms (0.19% of all trials) were excluded from further analyses. Reaction times in response to dots replacing pictures of low-calorie foods (M = 408.21 ± 45.26 ms) were faster than in response to dots replacing pictures of high-calorie foods (M = 414.17 ± 44.37 ms; t10 = 4.55, p < .001). Attentional bias score (reaction times to dots replacing low-calorie foods minus reaction times to dots replacing high-calorie foods) was negatively correlated with the diet quality index (r = -.32, p = .02, Fig. 3), indicating an attentional bias for low-calorie foods in individuals eating more healthy foods and, vice versa, an attentional bias for high-calorie foods in individuals eating more unhealthy foods.

More frequent consumption of lettuce and raw vegetables (r = -.39, p = .004) and fresh fruits (r = -.27, p = .05) was associated with higher attentional bias towards low-calorie foods.

Conclusion

Results show that attentional bias for food is related to diet quality rather than measures of habitual overeating (e.g., BMI) or state-dependent variables (e.g., hunger), if important aspects such as palatability are controlled for between picture categories.

Attentional bias modification aiming at facilitating healthy food choices may be particularly effective in individuals who exhibit an attentional bias towards unhealthy foods (and who actually eat more of those generally) in the first place.

References