I like it, I crave it, I eat it: Determinants of food intake in obese children and adolescents

Background

Binge eating has been proposed to account for a significant proportion of excess calorie intake in a subgroup of obese adults that is characterized by high reward-sensitivity. However, less is known about adolescents in this regard and binge eating is difficult to assess in this age group [1]. Accordingly, obese children and adolescents do not receive specific treatments focusing on modifying the reward-sensitive eating behavior, which binge eating obese adults receive [2].

In order to capitalize on research in adults and to improve treatment outcome in younger age, the current study tested whether such a reward-sensitive subtype already exists in obese children and adolescents while avoiding the controversial concept of binge eating in this age group. A promising concept to do so is food craving, which shows very high correlations with scores on the Binge Eating Scale [3]. Moreover, individuals who score high on trait food craving have been shown to be hyperresponsive to palatable food-cues, e.g. they show higher cue-elicited food craving and intake in the laboratory [4].

It was examined if children and adolescents differed in their liking (subjectively perceived palatability) for and intake of high-calorie (HC) and low-calorie (LC) foods as a function of both body mass and trait food craving.

Method

Moderations

Results from regression analyses revealed a significant BMI-SDS X trait food craving interaction when predicting liking for HC foods (moderation 1, blue color, Fig. 1; Table 2). Simple slope analyses illustrate that trait food craving was positively associated with liking for HC foods only in individuals with high BMI-SDS (figure 1C). No significant results were reached with liking for LC foods as dependent variable (red).

Furthermore, we found a significant BMI-SDS X trait food craving interaction when predicting consumed energy density (green). That is, trait food craving was positively associated with consumed energy density, but again, only in individuals with high BMI-SDS (figure 1B).

Moderated Mediation Model

Putting together our conceptual model displayed in figure 1, i.e. ‘linking’ the moderations reported above, the total (moderated mediation) model yielded a significant conditional indirect effect. That is, liking for HC foods mediated the relationship between trait food craving and the average calorie density of consumed foods, but only in individuals with high BMI-SDS (conditional indirect effect of mediator .501, 95% CI [.221, .862]), not in low BMI-SDS individuals. Liking for LC foods was no significant mediator.

Results

Figure 1: (A) Conceptual model consisting of moderation 1 (blue), moderation 2 (red), moderation 3 (green), and moderated mediation model (all colours).

(B) Simple slopes probing the interaction between trait food craving and body mass when predicting liking for high-calorie foods (moderation 1).

(C) Simple slopes probing the interaction between trait food craving and body mass when predicting energy density of consumed foods (moderation 3).

Conclusions

The purpose of the current study was to investigate liking for and consumption of foods as a function of trait food craving and body mass in children and adolescents. Specifically, we aimed at identifying a reward-sensitive subtype within adolescents who are obese. Results showed interaction effects of body mass and trait food craving when predicting (1) liking for HC foods and (2) calorie consumption. This is indicating a higher susceptibility for selecting and consuming foods with relatively higher calorie density in adolescents with both high body mass and high trait food craving scores.

Findings of our total model show (3) exaggerated calorie consumption (and therefore of heightened reward-sensitivity) in the very same individuals, mediated by the liking for high-calorie foods. The present result suggest that individuals with obesity do not generally overconsume nor do they display elevated HC food liking consistently. Rather there seems to be a subgroup doing so and this subgroup can be characterized by trait food craving whereas no similar craving based subgroup seems to exist in individuals with healthy weight. In fact, only in individuals with obesity there was a consistent chain of general food craving giving rise to cue based liking responses, which in turn determined food choice. Therefore, we hereby propose a reward-sensitive phenotype in adolescents who are obese, characterized by high trait food craving. Thus, as for reward-sensitive obese adults, different treatment strategies are required for these subgroups.

References


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