

How does food taste in anorexia and bulimia nervosa?

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Authors

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Introduction

Taste disturbances in anorexia nervosa (AN) and bulimia nervosa (BN) have been suggested to be rather a consequence than a cause of the respective ED (see Garcia-Burgos et al., 2018). It remains unclear, however, whether these disturbances are a consequence of the physical (e.g., body mass index, physiological dysfunction) or the psychological conditions associated with AN/BN (e.g., biased cognitions, mood, depressiveness). Concerning taste hedonics, the need to understand the processes motivating approach/avoidance behaviour regarding low-/high-calorie foods is emphasized (Cowdrey et al., 2013; Wolz et al., 2015). Based on the literature (Garcia-Burgos et al., 2018), we assume that the perception of calorie intake and the fear of weight gain appear to be responsible for the avoidance of high-caloric food in AN and BN, mainly through two mechanisms: a first mechanism (more intentional) is based on resisting food craving actions in BN (who indeed like high-sweet food) and another (more visceral) is based on learned taste aversion in restrictive-type anorectics, who respond to palatable food as if its taste were disgusting.

Objective

We examined whether aversions to the taste of high-calorie food is observed and related to the suppression of energy intake in restricting-type AN; and whether an increased hedonic valence of sweet, caloric-dense foods may be part of the mechanisms triggering binge-eating episodes in BN.

Methods

This was an international and multi-centre project with a quasi-experimental, cross-sectional designed to compare gustatory perception and hedonics of taste among six groups of participants under two conditions of testing (sip-and-spit versus swallow test condition). The groups were currently-ill AN and BN patients (n=9 and n=27), recovered AN and BN patients (n=17 and n=17) and healthy normal-weight and underweight controls (n= 28 and n=25) without any eating disorder pathology. The total number of participants was of 123.

During testing, a sensory 2 alternative forced choice test and a full-scale taste reactivity test with multiple-sip temporal-liking and taste reactivity methodologies were used. In order to test gustatory perception, more ecologically valid mixtures of chocolate ice cream containing fat and sugar were presented in 100-ml disposable Styrofoam cups at room temperature and in counterbalanced order across participants. Chocolate ice cream was selected according to the assumptions that chocolate ice cream is likely to be a forbidden food for AN and BN participants. The samples are stored at minus 18°C.

The study was approved by the ethical committee of the leading centre at the University of Fribourg (CER-VD, n° 2016-02150) as well as in the cantons of collaborating clinics in Switzerland and the Ethics Review Panel of the University of Luxembourg.

For statistical analysis, in order to compare emotions among groups (currently-ill AN, recovered AN, healthy underweight and healthy normal-weight), analyses of variance (ANOVAs) on positive or negative valence score via facial expressions were conducted; with a within-subject factor Condition (swallowing versus spitting) and a between-subject factor named Group (currently-ill AN, recovered AN, healthy underweight and healthy normal-weight). Second, in order to check whether disgust emotion related to food and body were dominant in AN but only body in BN, an ANOVA one-way was performed to see if there is differences among the groups (AN, BN, normal weight and underweight) in the emotion of disgust assessed via facial expressions. Finally, in order to examine whether higher fear levels expressed by the facial expressions of the currently-ill AN and recovered AN compared to normal-weight group should be observed in order to explain the unsuccessful outcome of the current treatments, an ANOVA on fear intensity scores was performed comparing groups (currently-ill AN, recovered AN and healthy normal-weight).

Results

Given that the recruitment and data collection process was recently completed, most of the data preparation and final data analyses are not ready yet. Therefore, the results of the exploratory data sets are given here, instead. Thus, what it is followed is a set of preliminary results regarding the main objectives of the present project.

Emotions and eating disorders. The analysis on positive and negative affective valence scores revealed no significant main effect of the Condition or Group or interaction, the largest $F(3, 26) = 2.00, p > .05, \eta^2 = .19$. The decrease in positive valence scores (values ≈ -1.0) was greater than the decrease in negative valence (values < -0.3) in AN and BN.

Disgust and eating disorders. The results showed a significant difference in the disgust score among the groups, $F(3,28) = 3.12, p < .05$. Post hoc tests revealed that anorexics showed less emotion of disgust than bulimics ($p < .05$). However, the other three groups do not differ significantly from each other

Fear and eating disorders. The results on fear intensity scores provided by facial expression parameters showed that the difference among the groups was not significant, $F(2,25) = 1.37, p = .27$

Conclusion

Although we do not have final results to address the main objectives of the present project about whether the putative gustatory deficits reported for AN and BN are related to

orosensory versus psychological factors and the nature of taste hedonics in AN and BN, preliminary results suggest relevant issues. First, that AN patients seem to express less disgust reactions to high-calorie food, which is not in agreement with our hypothesis about aversive gustative mechanisms involved in extreme food restriction of restrictive AN. However, AN and BN show higher reduced expressions of positive emotions, which may be accounted by other emotions such as fear.

Determining how food is actually perceived in patients with AN and BN is of crucial importance. A better understanding of the conditions under which food becomes feared and disgusting should help to explain why AN patients select and avoid certain foods and how they lose their appetite. Furthermore, additional knowledge on cognitive mechanisms in the top-down process of taste hedonics complements theoretical models and fosters the specificity of new cognitive interventions reducing taste aversions. Second, added knowledge on the development of aversions to dietary items might help to identify new targets in the prevention and treatment of at-risk individuals and people with AN. Likewise, food learning techniques might be used for the acquisition of new functional food preferences (e.g., via conditioned-flavor learning) to overcome taste aversions in anorectics, and for the devaluation of the increased hedonic impact of sweet cravings and binge-eating in BN (e.g., via food-devaluation procedures).

References

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Research project offspring

The project as a whole has produced 2 publications and several communications at the international level. Also, a new research project directly related to the present project has already been founded from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Actions.