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Research report

Negative affect and cue-induced overeating in non-eating disordered obesity

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ABSTRACT

The recent separation of non-eating disordered obesity into a subtype that is high in negative affect and a subtype that is low in negative affect led to the hypothesis that the two subtypes would show opposite eating responses to typical triggers of overeating. Overweight/obese and normal weight participants, clustered into high and low negative affect subtypes, took part in an experiment using a control condition and two typically disinhibiting manipulations: negative mood induction and tasty food exposure. In accordance with the hypothesis, the negative mood induction and the food exposure elicited overeating in the overweight/obese high negative affect subtype. The overweight/obese low negative affect subtype did not eat more after negative mood induction and food exposure than without a trigger for overeating. Likewise, the normal weight participants did not show differential responses to the three manipulations. The increased vulnerability to overeating in this non-eating disordered overweight/obese subtype that is characterized by increased negative affect shows that individual differences play a crucial role in the way overweight/obese people handle temptations of the current environment. Being characterized by high negative affect makes it more difficult for the overweight/obese to resist temptations. Future studies into non-eating disordered obesity should consider the existence of these two subtypes.

Introduction

Obesity nowadays is increasingly prevalent worldwide, and one of the main questions is why the obese overeat. Overeating is a phenomenon that has been studied extensively, but this mainly happened in relation to eating disorders. Risk factor models for eating disorders and self-reports during treatment put forward that, in particular, negative mood states and food exposure-induced urges are triggers of overeating in samples with eating disorders (see e.g., Carter, Bulik, McIntosh, & Joyce, 2001; Jansen, van den Hout, & Griez, 1990; Jansen, Broekmate, & Heymans, 1992; Vögele & Florin, 1996).

Laboratory experiments studying disinhibited eating in obese clinical groups are however rather scarce. One study in which obese eating disorder patients participated showed that a sad mood triggered overeating in the obese with eating disorders (Chua, Touyz, & Hill, 2004), but this was not the case in another study (Telch & Agras, 1996). Experiments using analogue samples of highly restrained eaters do support that both a negative mood induction and exposure to food cues, like seeing, smelling, and tasting flavorsome high calorie foods, are triggers that elicit overeating in unsuccessful restrained eaters (Jansen & van den Hout, 1991; Schotte, Cools, & McNally, 1990). A robust finding in all these experiments with analogue samples is, however, that normal non-eating disordered samples show opposite eating behavior. Contrary to the overeating of clinical samples, they do eat less in a sad mood and after food exposure compared to control conditions (e.g., Jansen & van den Hout, 1991; Schotte et al., 1990).

In some recent studies, eating disorders were subtyped along dimensions of negative affect and most of the studies showed, among other things, that increased negative affect signaled more severe eating disorder symptoms, including overeating and vulnerability to disinhibition (Grilo, Masheb, & Wilson, 2001; Stice & Agras, 1999; Stice, Bohon, & Fischer, submitted for publication). The non-eating disordered obese are also at increased risk of depression, compared to normal weight people (Werrij, Mulkens, Hospers, & Jansen, 2006). However, the association between obesity and depression typically is weaker in the non-eating disordered obese than in clinical samples, implicating that obesity in itself is not necessarily depressing (Carr, Friedman, & Jaffe, 2007; Wardle, Williamson, Johnson, & Edwards, 2006). In line with this, Jansen, Havermans, Roefs, and Nederkoorn (submitted for publication) recently subtyped a non-eating disordered overweight and obese sample along a negative affect dimension. The cluster analysis classified the sample into two mutually exclusive groups of about the same size, based on similarity in scores on

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diverse negative affect measures that each taps a slightly different facet of negative affect, with minimal within-group and maximal between-group variation. Jansen et al. (submitted for publication) demonstrated the existence of a subtype that is high in negative affect and a subtype that is low in negative affect within this non-eating disordered sample of overweight and obese people.

Considering this recent subtyping of the non-eating disordered obese in a subtype that is high in negative affect and a subtype that is low in negative affect, it would be of theoretical and clinical interest to test experimentally whether the two subtypes show different eating responses to triggers of overeating. It could be hypothesized that it is a specific state-trait interaction that facilitates overeating. It might, in other words, be expected that the high negative affect overweight/obese subtype is more vulnerable to overeating in the presence of a disinhibiting cue (negative mood induction or food exposure) than the overweight/obese subtype that is low in negative affect. In the present study, it is tested whether the typically disinhibiting cues food exposure and negative mood induction, elicit overeating in the overweight/obese subtype that is high in negative affect. The low negative affect overweight/obese subtype might be expected to show the opposite behavior, like normal non-eating disordered samples do; eating less in a sad mood and after food exposure compared to control conditions. More specifically, the hypotheses that will be tested in the present study are: (1) high negative affect overweight/obese participants will overeat after negative mood induction and after food exposure compared to a control condition, and (2) low negative affect overweight/obese participants will eat less after negative mood induction and food exposure compared to a control condition. For all normal weight participants a same intake pattern as in the low negative affect overweight/obese participants is predicted; they are expected to consume less after a disinhibiting cue than without one.

Method

Design, assessment and analysis

The dependent variable food intake was assessed during a bogus taste test after three different manipulations: negative mood induction, smelling tasty foods (exposure) and a control manipulation during which participants viewed a local festival movie. A between subjects design was used. Participants completed negative affect and eating disorder questionnaires before participating in the experiment. They were clustered into groups along the dimensions negative affect (high/low) and overweight (yes/no). Several ANOVAs (condition × affect × weight) were used to test the hypothesis, if appropriate followed by post hoc *t*-tests. The Ethical Committee of the Psychology Faculty approved the study.

Participants

An advertisement in a popular Dutch women's magazine (Margriet) asked for overweight women to take part in a questionnaire study. The questionnaire included the BDI, PANAS, RSE, EDE-Q and a binge eating questionnaire (see assessment) and participants were asked whether they were willing to take part in a laboratory study. Following the World Health Organisation (WHO), a Body Mass Index (BMI) of 30 or more was considered to reflect obesity and a BMI equal to or more than 25 was considered overweight. The 53 overweight and obese females that volunteered to participate were invited to take their own age-matched normal weight female control with them to make good matching on age and socio-economic status more likely; this procedure yielded 38 controls. The participants ($n = 91$, all female) ranged in age from 21 to 53 years (M = 41.3, S.D. = 6.9) and in BMI from 17.5 to 47.1 (M = 30.4, S.D. = 8.6). The BMI of the overweight/obese group ($n = 53$, M = 36.4, S.D. = 6.0) was significantly higher than the BMI of the normal weight group ($n = 38$, M = 22.0, S.D. = 2.0), $t(89) = 14.2$, $p < 0.001$. The groups did not differ in age (obese: M = 41.0, S.D. = 6.3, normal weight: M = 41.6, S.D. = 7.6, $t < 1$).

The participants were divided in a low and a high negative affect group by means of an iterative K-means cluster analysis (Quick Cluster algorithm, SPSS), following the methodology of Jansen et al. (submitted for publication) and Stice and Agras (1999). The cluster analysis classifies a set of observations into two or more mutually exclusive unknown groups based on similarity in scores on a combination of variables. The analysis seeks to identify homogeneous subgroups of cases; it identifies a set of groups that both minimize within-group variation and maximize between-group variation. In the iterative (nonhierarchical) cluster analysis, cluster centers are repeatedly recomputed and early misclassifications are detected and corrected. The scores on the BDI, PANAS and RSE were selected as indicators of diverse flavors of negative affect and they were entered in the cluster analysis. Because the obese sample scored significantly higher on all negative affect scales, cluster analyses were done separately for the overweight (BMI > 25, $n = 53$) and the normal weight group (BMI ≤ 25, $n = 38$). Within each weight group, two clusters were identified that minimized within group variation and maximized the differences among the cases in the different clusters. The first cluster, the 'high negative affect' (HNA) cluster, included 26 obese participants (49% of the obese sample), and 13 normal weight participants (34% of the normal weight sample). The second cluster, the 'low negative affect' (LNA) cluster, included 27 obese participants (51% of the obese sample), and 25 normal weight participants (66% of the normal weight sample). Table 1 shows the descriptives of both clustered subtypes in each weight category, and their BMI's as well as Eating Disorder Examination Questionnaire (EDE-Q) scores. The obese high and low negative affect groups did not differ significantly in BMI, $t(51) < 1$, whereas the normal weight high and low negative affect groups did; the normal weight high negative affect group had a significantly lower BMI than the normal weight low negative affect group ($t(36) = 2.2$, $p < 0.05$).

Although the high and low negative affect obese subgroups did not differ in BMI, binge frequency and eating restraint, the high negative affect obese sample showed more eating-, weight-, and shape concerns than the three other groups. None of the normal weight participants reported binge eating, whereas 7 (13.5%) of the obese sample did. The high and low negative affect subtypes did not differ in the proportion of participants reporting binge eating (high negative affect: $n = 5$, low negative affect: $n = 2$, $\chi^2(1) = 1.77$, NS) and, in case they did report binge eating, the high and low affect groups did not differ in their binge frequency ($\chi^2(5) = 5.5$, NS). Binge frequency ranged from 1 to 4 times a week, two participants in each affect group binged two or more than two times a week (respectively 2 and 3 times a week in the HNA group, and 2 and 4 times a week in the LNA group).

Assessment

State mood: Current mood was measured with a shortened Dutch version of the Profile of Mood States (POMS; Wald & Mellenbergh, 1990), which included 8 items stating how participants felt at that moment: dejected, helpless, sad, lonely, unhappy, unworthy, gloomy, desperate. Answers were given on a 5-point Likert scale ranging from not at all (0) to extremely (4). Higher scores indicate a worse mood.