



Short communication

Dietary restraint moderates the effects of food exposure on women's body and weight satisfaction

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ABSTRACT

The influence of dietary restraint and food exposure on body satisfaction was tested. Body and weight satisfaction were measured before and after exposure to either high- or low-caloric food, without actual eating. Independent of caloric condition, higher dietary restraint was associated with a decrease in *body satisfaction* after food exposure. With regard to *weight satisfaction*, however, the association between higher dietary restraint and decreased weight satisfaction was specific for the high-caloric condition. Thus, the actual eating of food is not necessary for decreased body and weight satisfaction to occur, suggesting an exposure-induced activation of dysfunctional cognitions in restrained eaters.

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Introduction

Body dissatisfaction is an important risk and maintenance factor for eating disorders (Graber, Brooks-Gunn, Paikoff, & Warren, 1994; Killen et al., 1996; Stice, 2002). In contrast to earlier views of body satisfaction as a stable and trait-like feature, it is now known that body satisfaction fluctuates considerably, depending on the situation and the environment in which it is measured (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002; Tiggemann, 2001). This fluctuation has been found to be more pronounced in people prone to body dissatisfaction (Tiggemann, 2001). Exposure to foods, in particular high-caloric foods, is expected to elicit schemas related to overeating, possibly resulting in heightened body dissatisfaction (Thompson, Coovert, Pasman, & Robb, 1993). Therefore, the purpose of this paper is to shed light on how body satisfaction fluctuates in response to food exposure, and how this is affected by participants' restraint status and the caloric content of foods.

Concerns about weight and shape are closely related to attempts to restrict one's food intake (Herman & Polivy, 1980).

Exposure to food therefore is likely to activate concerns about caloric content, overeating, and related issues like body dissatisfaction in those worried about their weight and shape (Corte & Stein, 2005). Indeed, exposure to food has been found to increase body dissatisfaction and negative affect in studies with bulimic patients (Bulik, Lawson, & Carter, 1996; Carter, Bulik, Lawson, Sullivan, & Wilson, 1996; Legenbauer, Vögele, & Rüddel, 2004; Mauler, Hamm, Weike, & Tuschen-Caffier, 2006; McKenzie, Williamson, & Cubic, 1993; Neudeck, Florin, & Tuschen-Caffier, 2001). However, because these studies typically used patients' binge foods as food cues, a decrease in body satisfaction might largely reflect learned negative associations between binge food and bingeing/purging.

To investigate whether exposure to food affects body satisfaction independent of negative associations with bingeing and purging, it is essential to look at the effects of food exposure in people who are vulnerable to problematic eating behaviours but in all likelihood unaffected by bulimia. Restrained eaters represent such a group because they are constantly struggling with their natural appetite and their goal to lose weight (Herman & Polivy, 1980), but rarely engage in bingeing and purging (Lowe et al., 1996). They can be considered as being on a continuum between unrestrained eaters and bulimic patients (Lowe et al., 1996).

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Studies with restrained eaters have focussed on measuring the effects of food *consumption*, but not food *exposure*, on body satisfaction. Vocks, Legenbauer, and Heil (2007) found that body satisfaction decreased after milkshake consumption. This effect was stronger in those scoring higher on restraint than in those scoring lower on restraint. In contrast, Wardle and Foley (1989) report a more pronounced decrease of body satisfaction in *unrestrained* eaters after food consumption, compared to restrained eaters. Overall, however, the restrained participants displayed lower levels of body satisfaction than the unrestrained participants. In a study of Pietrowsky, Straub, and Hachl (2003), restrained eaters indicated lower body satisfaction when hungry than when sated. Finally, Lattimore (2005) found that changes in body satisfaction after the consumption of a main meal were not at all moderated by dietary restraint but by body mass index. Overall, the results of these studies are inconsistent, possibly due to methodological differences (see Vocks et al., 2007). Additionally, food consumption studies pose interpretive problems because the physical effects of digestion or other bodily signals (like a bloated or rumbling stomach) cannot be distinguished from cognitive effects (e.g., the potential threat of food to dietary restraint).

To eliminate the interpretive problems with both food consumption studies and studies with bulimic patients, the present study examines the influence of high- and low-caloric food exposure on body and weight satisfaction in a nonclinical population. This allows investigating whether exposure to food affects body and weight satisfaction (a) independent of digestive effects and (b) independent of learned associations with bingeing and purging. Apart from general body satisfaction, a measure of weight satisfaction was included as well, because it taps a potentially more food-sensitive aspect of body satisfaction.

In sum, the aim of the current study is to examine whether mere exposure to high-caloric foods in comparison to low-caloric foods decreases body and weight satisfaction, and whether this relationship is moderated by dietary restraint. Because high-caloric foods should evoke cognitive schemas related to overeating more than low-caloric foods, and because high-restrained eaters are known to be concerned about their weight, it is hypothesized that specifically high-caloric food exposure leads to a decrease in body and weight satisfaction with increasing levels of restraint.

Method

Measures

Two 100-mm Visual Analogue Scale (VAS) items (“Right now, I feel not at all satisfied with my body/very satisfied with my body” and “Right now, I feel not at all satisfied with my weight/very satisfied with my weight”) were used to assess body and weight satisfaction. VAS-measures have been found to be reliable and valid tools for measuring human cognition and emotion (e.g., De Boer et al., 2004; Flint, Raben, Blundell, & Astrup, 2000). To avoid memory-effects and to maintain the cover story (see procedure), the VAS items were hidden among other, irrelevant VAS-items (e.g., “Right now, I am not at all concentrating/concentrating very much”). The VAS-items were presented in a small booklet (one item per page). The order of the VAS-items was randomized separately for the pre- and the post-measure but was the same for all participants.

Procedure

Participants were tested individually between 11 a.m. and 1 p.m. or between 3 p.m. and 5 p.m. They were asked to eat a sandwich with a normal filling approximately 2.5 h before their appointment and to refrain from eating and drinking anything but water from then on.

Upon arrival at the laboratory, participants were welcomed and their compliance concerning the instructions on food intake prior to the appointment was checked. All participants had complied with the instructions and were asked to sign the informed consent form. The experimenter informed the participants that they were taking part in a study on the effects of mindfulness and concentration on general well-being. This cover story was used to prevent recognition of the true purpose of the study. Then participants completed the pre-exposure set of VAS-items.

After completion of the VAS-premeasures, the cover story was elaborated in more detail. Participants were told that bowls with food would serve as stimuli for the mindfulness session. To make the food exposure more intense and realistic, participants were informed that they would be allowed to eat as much of the food as they wanted after the experiment because the food would have to be thrown away anyway (though only two participants actually ate something).

Depending on the experimental condition, bowls with either high-caloric foods (crisps, chocolate, and cake) or low-caloric foods (cucumber, carrot and pepper) were presented one by one. Except for the bowl of crisps (which only contained 50 g due to the crisps' high volume), each bowl contained 100 g of food. The experimenter modelled the exposure procedure during which the participants were asked to look at the food, pay attention to its texture, smell the food, and lick the food. They were asked to pay attention to the thoughts and feelings the foods elicited. The exposure lasted approximately 2 min per food item.

After the exposure to all foods was completed, participants filled in the postmeasure set of VAS-items. Participants were then given the opportunity to eat as much as they wanted, and an appointment for the second session (approximately 1 week later) was made.

During this second session, the participants filled in the Restraint Scale (RS; Herman & Polivy, 1980), and the Dutch Eating Behaviour Questionnaire (DEB-Q; Van Strien, Frijters, Bergers, & Defares, 1986). After that, participants' weight and height were measured using standard equipment. Finally, participants were thanked for their participation and paid. A complete debriefing was sent to them at the end of the study.

Participants

Sixty-five female first-year students were recruited for participation through announcements during lectures. Participants received either course credits or 10 Euros at the end of the experiment. This study was approved by the local ethics committee. Participants were randomly assigned to either the high- or the low-caloric condition. Five participants were excluded because their body mass index (BMI; kg/m²) was lower than 18 or higher than 30, leaving 30 participants in the high-caloric condition (age: $M = 18.7$, $S.D. = 1.9$; RS: $M = 11.5$, $S.D. = 4.6$; DEB-Q emotional eating: $M = 2.6$, $S.D. = 0.7$; DEB-Q external eating: $M = 3.0$, $S.D. = 0.4$; DEB-Q restrained eating: $M = 2.7$, $S.D. = 0.9$; BMI: $M = 22.0$, $S.D. = 2.5$), and 30 participants in the low-caloric condition (age: $M = 18.8$, $S.D. = 1.0$; RS: $M = 11.9$, $S.D. = 4.4$; DEB-Q emotional eating: $M = 2.6$, $S.D. = 0.6$; DEB-Q external eating: $M = 3.0$, $S.D. = 0.4$; DEB-Q restrained eating: $M = 3.0$, $S.D. = 0.8$; BMI: $M = 22.2$, $S.D. = 2.4$). Independent *t*-tests indicated that there were no significant differences between conditions on RS, BMI, and DEB-Q measures, all $p > 0.15$.

Data analysis

To examine our hypothesis that specifically high-caloric food exposure leads to a decrease in body satisfaction with increasing

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