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Research Report

Perceived caloric content of a preload and disinhibition among restrained eaters

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Abstract

The present study examined the effects of the perceived caloric content of a preload on the eating behaviour of restrained and unrestrained eaters. Participants were randomly assigned to one of the three experimental conditions in which they ingested an isocaloric milkshake preload presented as either high or low in calories, or no preload. Subsequent ad lib food consumption was measured. Both the high-calorie and the low-calorie milkshakes elicited disinhibited eating among restrained eaters, with a non-significant difference between the two preload conditions in terms of food consumption. Participants overall reported that consumption of the ostensibly high-calorie milkshake was more anxiety provoking for them than was the low-calorie milkshake. However, anxiety did not predict intake in the preload conditions. These results demonstrate that even low-calorie "forbidden" foods can elicit disinhibited eating among restrained eaters.

Keywords: Restrained eating; Preload; Disinhibition; Calories; Anxiety

Three decades have passed since Herman and Mack (1975) first demonstrated preload-induced disinhibition in the laboratory, whereby restrained eaters (i.e., chronic dieters) break their intended pattern of food restriction and eat more following a food preload than without a preload. This now well-replicated phenomenon has been taken as evidence of a cognitive "boundary model" of dietary restraint (Herman & Polivy, 1983) and even provides a framework by which to understand binge eating in a clinical context (Polivy, 1996). According to the boundary model (Herman & Polivy, 1983), preload-induced disinhibition results from the dieter's perception that she has eaten more than is allowed by her self-imposed diet boundary. Once a subjective threshold of allowable food consumption has been breached, the dieter will continue to eat until satiety or capacity is reached. The result is a counterintuitive and counter-regulatory pattern of eating among restrained eaters. The eating behavior of chronic dieters generally displays a cyclical pattern that is characterized by periods of dieting that become suspended during episodes of overeating (Herman & Polivy, 1980). Unrestrained eaters, whose eating is not primarily determined by self-imposed cognitive boundaries pertaining to allowable food consumption, typically regulate their food intake and eat less following a preload than they do without one (Herman & Polivy, 1983).

Research over the past few decades has delineated several factors that lead to disinhibited eating among restrained eaters, including, but not restricted to, a large enough preload (Herman, Polivy, & Esses, 1987), ego depletion (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Kahan, Polivy, & Herman, 2003), low self-esteem (Polivy, Heatherton, & Herman, 1988), and low dieting self-efficacy beliefs (Stotland, Zuroff, & Roy, 1991). Specific components of dietary restraint may predispose an individual to disinhibited eating, including weight gain (Lowe & Kleifield, 1988) and general behavioural disinhibition (Westenhoefer, Broeckmann, Munch, & Pudel, 1994). The Restraint Scale (Polivy, Herman, & Howard, 1988) seems to be particularly good at identifying those individuals who are prone to disinhibit their intake

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following the ingestion of a preload. Some authors argue that it is really the tendency to overeat, and not dietary restraint per se, that predicts counterregulation (e.g., Ouwens, van Strien, & van der Staak, 2003; van Strien, Cleven, & Schippers, 2000; Westenhoefer et al., 1994).

The demonstration of preload-induced disinhibition in the laboratory has offered insight into real-world phenomena, such as the "what the hell effect" whereby dieters give up continued attempts at food restriction after a relatively small diet transgression (Polivy & Herman, 1985) as well as binge eating, as mentioned above. Given the continued relevance of preload-induced disinhibition to our understanding of both normal and "abnormal" eating in humans, there remain some issues requiring better clarification. According to the original boundary model of eating, a diet-breaking preload is perceived to be "too much" by the restrained eater, usually thought of in terms of calories. In an early study by Spencer and Fremouw (1979) restrained eaters ate more ice cream after consuming an allegedly high-calorie vs. low-calorie preload when both preloads were in fact equal in caloric value. However, a no preload condition was not included in the Spencer and Fremouw (1979) study, so it is not clear whether, as with the high-calorie preload, the low-calorie preload also disinhibited restrained eaters' intake and caused them to eat more than they otherwise would have. Another study by Ruderman, Belzer, and Halperin (1985) found evidence of disinhibition as a result of anticipatory consumption of a high-calorie forbidden (vs. a low-calorie "healthy" food) among restrained eaters. However, it was not clear whether it was the type of food or its associated caloric value that disinhibited restrained eaters' intake. Knight and Boland (1989) concluded, based on a series of experimental studies, that it is preload food type, and *not* caloric content, that predicts disinhibited eating. Therefore, there is some need for a more recent replication and a control group extension of Spencer and Fremouw's (1979) findings on the effects of the perceived caloric content of a preload on subsequent food intake.

Another related, but distinct issue in need of some of clarification is disinhibited eating as an all-or-nothing phenomenon. Herman and Polivy's (1983) boundary model predicts that disinhibited eating will continue until satiety or capacity has been reached. However, it is likely that the point of "satiety" is not physically absolute (i.e., in terms of gastric volume), but psychological. We know that satiety systems in humans are relatively insensitive (Blundell, 2002) and that eating (including fullness) is generally more under psychological than physical control (see Mills & Coleman, 2004). On the other hand, among clinical populations of individuals who binge eat, binge episodes vary in size, even within individuals (Rosen, Leitenberg, Fisher, & Khazam, 1986), providing at least some indirect evidence that disinhibited eating may not be all-or-nothing. Knowing the extent to which the perceived caloric content of a preload moderates disinhibition could inform whether disinhibition should be conceptualized as all-or-nothing.

In sum, upon reviewing the literature on preload-induced disinhibition, there appear to be some issues that arise. It is not clear whether perceived caloric content of a preload moderates disinhibition. It is also not clear whether disinhibited eating is an all-or-nothing event. Answering the first question could inform the second question. In the current study, our primary goal was to examine whether the perceived caloric content of the diet-breaking food moderates the amount of ensuing overeating. We sought to replicate the phenomenon of preload-induced disinhibition among restrained eaters and to test the effect of a preload's perceived caloric content on subsequent food intake. As such, we included three experimental conditions: an ostensibly high-calorie preload, an ostensibly low-calorie preload, and a no preload condition. Using isocaloric preloads, we predicted that an ostensible high-calorie preload (i.e., a "rich" milkshake) would elicit more eating than either no preload or a low-calorie preload among restrained eaters. A preload perceived as forbidden in food type but low in calories (i.e., a "light" milkshake) was predicted to elicit less eating than the high-calorie preload, but more than no preload. Unrestrained eaters, whose eating is generally not determined by cognitive moderators of food intake, were predicted to eat the most in the no preload condition and to eat less (and similarly) in both preload conditions.

Method

Participants

Seventy-nine female undergraduate students enrolled in Introductory Psychology at York University participated for partial course credit. The number of participants randomly assigned to the high-calorie milkshake preload condition, the low-calorie milkshake preload condition, and the no preload condition were 20, 28, and 28, respectively. Forty-two participants scored as unrestrained eaters (mean age = 20.00, SD = 3.64) and 34 scored as restrained eaters (mean age = 19.84, SD = 2.43). Toward the end of data collection, we selectively targeted six of the restrained eaters through an online participant screening and recruitment system in order to have more participants in certain cells. Three participants were excluded from the analyses, reducing the final sample to 76, for the following reasons. One individual had a peanut allergy and could not consume any food during the study, another individual had a body mass index (BMI) of 40 (more than three standard deviations above the mean), and another individual's apparent food intake was extremely high (more than three standard deviations above the mean). The experimenter suspected that this last participant removed cookies from the testing room for later consumption.

Materials and measures

Initial mood and hunger

Pre-manipulation mood and hunger were measured on a questionnaire designed for the current study. The purpose