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Research report

Is counter-regulation among restrained eaters a result of motivated overeating?

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ABSTRACT

The aim of the present study was to determine whether the counter-regulation observed among preloaded restrained eaters is a result of motivated overeating. Restrained eaters (n = 58) and unrestrained eaters (n = 60) first consumed either a non-caloric drink or a high-calorie milkshake preload. Next, participants completed a food-reinforcement task to assess their motivation to obtain cookies. Finally, participants completed a cookie taste test. Preloaded unrestrained eaters ate less than did unrestrained eaters in the control condition. Preloaded restrained eaters, in contrast, displayed the typical pattern of counter-regulation in that they ate significantly more cookies than did restrained eaters in the control condition. Reinforcing value predicted cookie consumption for unrestrained but not for restrained eaters. These findings suggest that counter-regulation is not a result of motivated eating, and that the exact mechanism that underlies the phenomenon still requires clarification.

Introduction

Restrained eaters (or chronic dieters) regularly attempt to control their food intake but are usually only intermittently successful in those attempts, often indulging in palatable foods when their diets have been violated. Indeed, a common finding from controlled experiments is that restrained eaters (particularly those identified by the Restraint Scale; Polivy, Herman, & Warsh, 1978) will overeat after they have consumed a high-calorie preload. In a classic study, Herman and Mack (1975) found that unrestrained eaters displayed a regulatory eating pattern, eating less ice cream if they had consumed a milkshake preload than if they had not. Preloaded restrained eaters, in contrast, ate more ice cream than did non-preloaded restrained eaters. The counter-regulation observed among restrained eaters is typically explained in terms of a motivational shift referred to as the "what-the-hell" effect: when restrained eaters have broken their diets (e.g., as a result of consuming a high calorie preload), they abandon their dietary goals for that day (which are no longer attainable) and instead plan to redouble their efforts the following day. This abandonment of their dietary goals for the day in effect gives the restrained eaters permission to indulge in typically forbidden foods (Herman & Polivy, 1984).

Consistent with the cognitive or motivational nature of restrained eaters' eating behaviors, research evidence indicates that their food intake can be affected by their perceptions of the food they have consumed. For instance, counter-regulation has been observed when restrained eaters believe they have consumed a high-calorie or high-fat preload (Mills & Palandra, 2008; Polivy, 1976; Spencer & Fremouw, 1979), or when they consume what they perceive as a "forbidden" food (Knight & Boland, 1989), regardless of the actual nutritional properties of the food. Counter-regulation has also been observed when restrained eaters anticipated a future diet violation (Ruderman, Belzer, & Halperim, 1985, Study 2) or when they believe that they will be starting a diet the following day (Urbszat, Herman, & Polivy, 2002). Thus, perceptions of an actual or anticipated dietary transgression, or even the intention of starting a diet the following day, appears to result in restrained eaters abandoning their diets and subsequently indulging in typically forbidden foods.

Although counter-regulation among restrained eaters is well-documented, there has been no direct evidence for the presumed motivational shift underlying the what-the-hell effect. For example, Jansen, Merckelbach, Oosterlaan, Tuiten, and van den Hout (1988) sought to identify disinhibitive cognitions (e.g., "Now that I have blown my diet, I may as well indulge myself") among restrained eaters by asking participants to verbally report their thoughts after the consumption of a preload. However, preloaded restrained eaters did not report significantly more disinhibitive thoughts than did the non-preloaded restrained eaters. Rather than relying on verbal reports of cognitive processes, French (1992) tried to obtain evidence for the motivational shift by examining restrained eaters' food choices following a preload. If counter-regulation represents an increased drive for indulgent or forbidden foods, then preloaded restrained eaters should choose high-calorie foods that are normally forbidden in their diets over the lower-calorie foods they normally permit themselves to consume. French tested this hypothesis by asking preloaded and non-preloaded participants to choose

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between high- and low-calorie foods to taste and rate during a taste test. Results of that study showed that high- and low-calorie foods were equally preferred among restrained eaters, regardless of whether they had consumed a preload or not.

Although the studies by Jansen et al. (1988) and French (1992) failed to provide direct evidence for the what-the-hell effect, some methodological constraints leave the findings of those studies inconclusive with respect to the motivational shift among restrained eaters. For instance, Jansen et al. did not find counter-regulation among their restrained eaters and thus their restrained eaters might not have had any disinhibitive thoughts to report. It is also possible that restrained eaters generally might not be able to explicitly access these disinhibitive cognitions, as people are often unable to accurately report on the factors influencing their food intake (Vartanian, Herman, & Wansink, 2008). Furthermore, in French's study, the high-calorie foods (e.g., peanut butter bars) and low-calorie foods (e.g., low-calorie chocolate pudding) available to the participants were all sweet foods. Because participants were not given any explicit information about the caloric content of the food products, restrained eaters may have perceived all of the sweet choices as "forbidden" foods (Knight & Boland, 1989), in which case all foods may have been tempting to consume after their diets had been broken.

A more direct means of testing the motivational shift associated with the what-the-hell effect would be to examine the reinforcing value of food following a preload. Reinforcing value is the capacity of an object (reinforcer) to increase or decrease certain behavior and is generally defined by the effort an individual puts into working for the reinforcer. Thus, in the context of food intake, the reinforcing value of a particular food reflects an individual's motivation for obtaining and eating that food (Epstein, Temple et al., 2007). Reinforcing value is often measured by a progressive ratio reinforcement task (Epstein, Leddy, Temple, & Faith, 2007). In this task, an individual can work for and be rewarded with a reinforcer by performing a specific behavior, such as pressing a mouse button. The number of responses an individual makes for a reinforcer determines the reinforcing value of that reinforcer.

Food reinforcing value has been found to predict food intake in experimental settings (Epstein & Leddy, 2006; Epstein, Temple, et al., 2007; Epstein et al., 2004), demonstrating the validity of this measure as an index of motivation to eat a particular food. Research has also shown that food reinforcing value increases with higher ratings of subjective liking of the food (Lappalainen & Epstein, 1990), higher ratings of the palatability of the food (Ouwehand & Papies, 2010), and following food deprivation (Epstein, Truesdale, Wojcik, Paluch, & Raynor, 2003; Lappalainen & Epstein, 1990), and decreases with the consumption of a preload (Raynor & Epstein, 2003).

Only a few studies to date have examined restraint differences in food reinforcing value. Restrained eaters have a significantly higher reinforcing value of snacks when compared to unrestrained eaters (Giesen, Havermans, & Jansen, 2010; Giesen, Havermans, Nederkoorn, Strafaci, & Jansen, 2009), but restrained and unrestrained eaters do not differ in their reinforcing value of nonforbidden foods (Giesen et al., 2010). This difference in food reinforcing value between restrained and unrestrained eaters for snack foods could be a result of restrained eaters chronically refraining from those forbidden foods. Indeed, Epstein, Leddy et al. (2007) suggested the possibility that such chronic refrainment could lead to an increase in the reinforcing value of forbidden foods.

Although restraint differences have been identified in food reinforcing value, those studies did not examine the effects of a preload on the reinforcing value of snack foods among restrained and unrestrained eaters. Raynor and Epstein (2003) found that a preload decreased the food reinforcing value among unrestrained eaters. Given the pattern of counter-regulation observed among restrained eaters, would the converse be true for those individuals? The food reinforcement paradigm can provide a means of assessing the motivational shift in preloaded restrained eaters that circumvents some of the challenges faced by previous studies attempting to find direct evidence for the what-the-hell effect.

The present study

The aim of the present study was to obtain direct evidence for a motivational shift following consumption of a high-calorie preload. Restrained and unrestrained eaters consumed either a high-calorie milkshake preload or lime-water. After consuming the preload, participants completed a reinforcement task and then took part in a cookie taste test. We predicted that, following consumption of a high-calorie preload, unrestrained eaters would display a regulatory eating pattern whereas restrained eaters would counter-regulate their food intake. Furthermore, following from past research, we predicted that unrestrained eaters would show a decrease in the reinforcing value of cookies following a preload. We also more tentatively predicted that restrained eaters would show an increase in the reinforcing value of cookies following a preload. Finally, we predicted that cookie reinforcing value would predict cookie intake, and that the reinforcing value of cookies would mediate the effects of preload on cookie intake.

Method

Participants

Participants were 118 females enrolled in an introductory psychology course at the University of New South Wales, Australia. Participants were recruited based on their responses to the Revised Restraint Scale (Polivy et al., 1978) that they completed during a prescreening session at the start of the academic semester. Individuals scoring 15 or above were classified as restrained eaters ($n = 58$) and those scoring 14 or below were classified as unrestrained eaters ($n = 60$). Their mean age was 19.39 years ($SD = 2.63$) and their mean body mass index (BMI; kg/m^2) was 21.65 ($SD = 4.15$). All participants received course credits for their participation in this study. This study was approved by the university's ethics committee.

Materials

Preload

Participants were given either 500 ml of chocolate milkshake or 500 ml of chilled lime-water. Each milkshake was prepared by blending 275 g of chocolate ice cream and 175 ml of homogenized full cream milk with 0.1 g of guar gum (a thickening agent). The resulting product was a 500 ml chocolate milkshake that contained approximately 2755 kJ (660 kcal). The lime-water for the control condition was prepared by mixing 10 ml of lime juice with 490 ml of water and contained approximately 15 kJ (3.5 kcal). While consuming the preload, participants completed a 10-item rating scale assessing various characteristics of the drink (e.g., how sweet, creamy, etc.). This questionnaire provided participants with a rationale for requiring them to finish the drink.

Progressive ratio task

This task measured the reinforcing value of cookies and of money, which were operationalized by the number of responses (mouse clicks) participants made for each reinforcer. Following the methodology of previous studies that examined food reinforcing value, the relative rather than the absolute reinforcing value of cookies was measured (e.g., Goldfield, Adamo, Rutherford, & Legg,

2008) and money was used as the reinforcer alternative to cookies in the progressive ratio task (e.g., Lappalainen & Epstein, 1990).

The computerized progressive ratio task was presented as a slot machine game consisting of five sessions. Within each session, participants saw a slot machine appear on the top and the bottom of the computer screen and they could choose to work for a reward on either machine. Working on the top machine rewarded participants with points exchangeable for cookies, and working on the bottom machine rewarded them with points exchangeable for money. For each machine, there were three reels, and a mouse click on the machine changed the color and shape combination of the reels. Whenever the three reels matched, participants earned a point. The number of points earned from each machine within each session was displayed next to each machine. To increase the salience of the reinforcers, a picture of a plate of chocolate chip cookies and a picture of a money bag was displayed next to their respective slot machines. Every 10 points from the cookie slot machine rewarded participants with "a serving of premium cookies," and every 10 points from the money slot machine rewarded them with $0.25. Each session ended when the participant earned a total of 20 points from the two machines combined, and the participant then received a summary of their earnings for that session.

The reinforcement ratio for each reinforcer was predetermined. In the first session of the task, the reinforcement ratio both for the cookies and the money was set at a variable ratio of four (VR4), with participants earning on average one point with every four responses. Unbeknownst to the participants, the behavioral cost of cookies in each successive subsequent session steadily increased by four responses while the behavioral cost of money remained the same across all sessions: the reinforcement ratios for cookies from the first to the fifth session of the game were VR4, VR8, VR12, VR16, and VR20, whereas the reinforcement ratio for money remained at VR4 across all sessions. The reinforcing value of cookies was calculated by summing the total number of responses for cookies in each of the five trials (Goldfield et al., 2008).

Taste test

Arnott's Premier Chocolate Chip Cookies (Arnott's Australia) were used in the taste test. Each cookie weighed approximately 15 g, was 6.5 cm in diameter, and contained approximately 315 kJ (75 kcal). Each participant was presented with a bowl filled with 21 cookies to ensure that participants could eat as much as they wanted without feeling self-conscious about their intake. Bowls of cookies were weighed before and after the experimental session, and the difference in weight represented the total amount eaten (in grams). Participants also completed a 10-item taste-rating form assessing various characteristics of the cookies (e.g., how crunchy, chocolaty, etc.). Included on the taste-rating form were two items assessing how much they liked the cookies and how "good tasting" the cookies were (0 = *not at all*, 9 = *very*).

Dietary restraint

The Revised Restraint Scale (Polivy et al., 1978) was used to confirm the participants' restraint status. This scale consists of 10 items that measure concern for dieting and weight fluctuations. Because kilogram is the standard unit of weight in Australia, items referring to weight fluctuations were modified to refer to kilograms instead of pounds. The Revised Restraint Scale has satisfactory levels of criterion, construct, and concurrent validity (Heatherton, Herman, Polivy, King, & McGree, 1988), and has high test–retest reliability ($r = 0.95$) and internal reliability ($\alpha = 0.82$; Allison, Kalinsky, & Gorman, 1992). In the current sample, Cronbach's alpha was 0.79.

Affect

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was included to control for any possible effects of mood on food intake. The PANAS included 20 words that describe different positive emotions (e.g., interested, excited) and negative emotions (e.g., angry, guilty) and participants were asked to indicate the degree to which they were experiencing each of the listed emotions at the time they were completing the measure ("right now") (1 = *very slightly or not at all*; 5 = *extremely*). The scores for each subscale were calculated by summing their individual item scores and higher scores indicate higher degrees of PA and NA, respectively. The PANAS has been shown to have a high test–retest reliability and high internal reliability (Watson et al., 1988). In the current study, Cronbach's alpha for the PA subscale was 0.84 and for the NA subscale was 0.78.

Procedure

When participants were initially recruited, they were informed that the study was investigating the effects of hunger on taste preferences and were asked to refrain from eating for 3 h prior to the experiment. All participants were tested individually between 11 am and 6 pm. Restrained and unrestrained eaters were randomly assigned to the preload or to the control condition. Upon arrival, participants completed a consent form and then indicated the last time they ate and rated their current hunger level (1 = *Not at all hungry*, 9 = *Extremely hungry*). Participants were then given either the milkshake preload or the lime-water along with the taste-rating form. Participants were asked to finish the whole drink "to standardize all participants' hunger levels for the subsequent tasks in the study." The experimenter left the room for five minutes to allow the participant to finish the drink and complete the taste ratings.

After finishing the preload or lime-water, participants were seated in front of a computer to complete the progressive ratio task, which was presented as a computer game from which participants could win both food and money. Participants were told that their monetary earnings would be paid at the end of the experimental session whereas the food earned would be consumed immediately after they finished the game. The reason for informing participants about the immediate consumption of the earned food was to ensure that the progressive ratio task measured their current motivation to eat (rather than their motivation to consume the food outside of the experimental session). Participants then read instructions for the game on the computer screen, which included step-by-step information on how to earn points from the game. The experimenter remained in the room until the participant had finished reading the instructions to ensure that any uncertainties could be clarified. Participants were then left alone to complete the task.

After they completed the progressive ratio task, all participants were given a pre-weighed bowl of cookies and the taste-rating form, regardless of whether or not they had earned any cookie points. Participants who had earned at least 10 cookie points were told that the amount of cookies provided was more than they had earned because the researchers would like them to rate the cookies on various characteristics. Participants who did not earn enough cookie points to redeem any cookies were told that the researchers would still like them to taste and rate the cookies on various characteristics. Participants were told that they could eat as many cookies as they needed to make accurate ratings. The experimenter also casually mentioned to participants that they could eat as many cookies as they wanted because the opened packages of cookies had to be discarded at the end of the day. Participants were then left alone for 10 min to taste and rate the cookies.

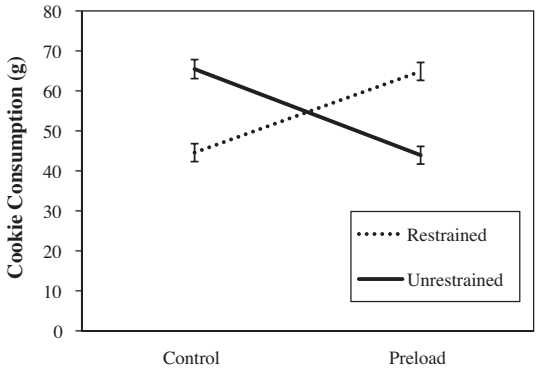

Fig. 1. Mean consumption of cookies as a function of preload condition and dietary restraint. Error bars represent the standard error of the mean.

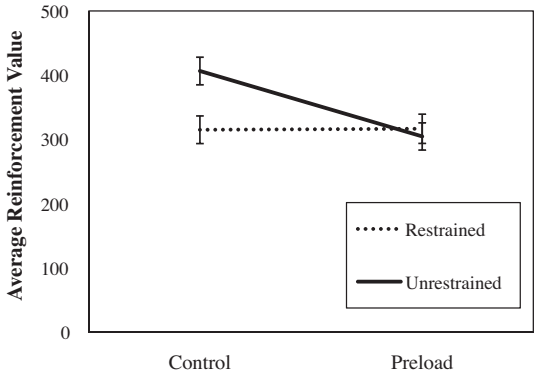

Fig. 2. Mean reinforcing value as a function of preload condition and dietary restraint. Error bars represent the standard error of the mean.

After participants completed the taste-rating task, the bowl of cookies was removed and re-weighed while participants completed the final questionnaires (including the Restraint Scale and the PANAS) and provided some basic demographic information (age, and height and weight which were used to calculate BMI). Finally, participants were paid their monetary reward from the progressive ratio task, probed for suspicion, and debriefed about the true purpose of the study.

Data analysis

Prior to conducting the main analyses, data were screened for outliers (±3 SD). Eight participants were excluded from the data analyses on the basis of this screening (unrestrained/control = 2; unrestrained/preload = 1; restrained/control = 1; restrained/preload = 4). The final sample consisted of 110 participants. Separate 2 (condition: preload vs. control) × 2 (restraint[1]: unrestrained vs. restrained) Analyses of Variance (ANOVAs) were conducted on total cookie intake and cookie reinforcing value. Pearson correlation was used to examine the bivariate relationship between cookie reinforcing value and cookie intake, and mediational analyses were conducted using the SPSS macro provided by Preacher and Hayes (2008).

Results

Cookie consumption

The ANOVA on cookie consumption revealed no main effect of condition, $F(1,106) = 0.18$, $p = 0.89$, $\eta_p^2 < 0.001$, and no main effect of restraint, $F(1,106) < 0.001$, $p = 1.00$, $\eta_p^2 < 0.001$. As expected, however, there was a significant interaction between condition and restraint, $F(1,106) = 21.23$, $p < 0.001$, $\eta_p^2 = 0.17$ (see Fig. 1). Simple-effects analysis revealed that unrestrained eaters in the preload condition ate significantly less than did unrestrained eaters in the control condition, $F(1,106) = 11.69$, $p = 0.001$, $\eta_p^2 = 0.10$. This pattern was reversed in restrained eaters, with preloaded participants eating significantly more than non-preloaded participants, $F(1,106) = 9.64$, $p = 0.002$, $\eta_p^2 = 0.08$. Controlling for age ($M = 19.11$, $SD = 1.58$), BMI ($M = 21.17$, $SD = 3.40$), PA ($M = 23.65$, $SD = 6.54$), NA ($M = 13.98$, $SD = 4.10$), liking of the food ($M = 6.93$, $SD = 1.71$), and initial hunger ($M = 5.66$, $SD = 1.60$) did not impact the results.

[1] Conducting the analyses using only the concern for dieting items from the Restraint Scale produced identical results, as did including restraint as a continuous variable in a regression model.

Reinforcing value of cookies

A condition (preload vs. control) × restraint (restrained vs. unrestrained eaters) ANOVA on the average reinforcing value of cookies found no significant main effect of condition, $F(1,106) = 1.33$, $p = 0.25$, $\eta_p^2 = 0.01$, no main effect of restraint, $F(1,106) = 0.84$, $p = 0.36$, $\eta_p^2 = 0.01$,and no interaction effect between condition and restraint, $F(1,106) = 1.42$, $p = 0.24$, $\eta_p^2 = 0.01$ (see Fig. 2). Although the pattern of means for unrestrained eaters is in the predicted direction and appears to parallel the pattern observed for their cookie intake, this effect did not reach statistical significance, $F(1,106) = 2.85$, $p = 0.09$, $\eta_p^2 = 0.03$.

Correlation between consumption and reinforcing value

There was a significant positive correlation between cookie reinforcing value and cookie intake, $r(110) = 0.26$, $p = 0.01$. Because the pattern of means for cookie intake and food reinforcing value was similar for unrestrained eaters but not for restrained eaters, we sought to determine whether the correlation between cookie consumption and food reinforcement was carried by the unrestrained eaters. Indeed, there was a significant positive correlation between cookie consumption and the reinforcing value of cookies for unrestrained eaters, $r(57) = 0.35$, $p = 0.01$, but the correlation for restrained eaters was not significant, $r(53) = 0.19$, $p = 0.18$.

Because neither the condition × restraint interaction on cookie reinforcing value nor the correlation between reinforcing value and cookie intake for restrained eaters were significant, we did not proceed with the meditational analyses.

Discussion

The primary aim of this study was to determine whether counter-regulation among restrained eaters could be attributed to motivated overeating following a perceived diet violation. Our findings regarding food intake following a preload are consistent with a long history of research on the eating behaviors of restrained and unrestrained eaters (e.g., Mills & Palandra, 2008; Polivy, 1976; Spencer & Fremouw, 1979). Unrestrained eaters displayed a regulatory pattern of food intake in that they ate more when they consumed a glass of lime-water than when they consumed a high-calorie milkshake. Restrained eaters, in contrast, counter-regulated their cookie intake, eating more after they had consumed a high-calorie milkshake preload than when they consumed a glass of lime-water. These findings provide additional support for the paradoxical eating behavior of restrained eaters and, importantly,

provide the necessary conditions for testing the mechanisms underlying this behavior.

The counter-regulation observed among restrained eaters has often been attributed to a motivational shift referred to as the "what-the-hell" effect. Direct evidence supporting the motivational shift, however, has been elusive. Jansen et al. (1988) did not find any evidence of disinhibitive thoughts among preloaded restrained eaters, and French (1992) did not find an increase in the likelihood of restrained eaters choosing to eat high-calorie foods following a preload. In the present study, we used the progressive ratio task (Epstein et al., 2003) to directly assess motivation to obtain cookies, thereby overcoming some of the limitations of past studies that have tried to provide evidence for the what-the-hell effect.

First, for unrestrained eaters, the pattern of food reinforcing value paralleled the results for the impact of condition on cookie consumption. That is, consistent with prior research (Raynor & Epstein, 2003), unrestrained eaters in the preload condition appeared to be somewhat less willing to work for cookies compared to unrestrained eaters in the control condition, but this pattern was not statistically significant. Furthermore, cookie reinforcing value predicted cookie intake for unrestrained eaters, which is consistent with previous findings (Epstein & Leddy, 2006; Epstein, Temple et al., 2007; Epstein et al., 2004).

Most central to the aims of the present study is whether food reinforcing value predicted cookie consumption for restrained eaters. If counter-regulation among restrained eaters is the result of a motivational shift toward indulgence of forbidden foods (the "what the hell" effect), then preloaded restrained eaters should show a higher reinforcing value of cookies (indexed by a greater willingness to work to obtain cookies). Contrary to prediction, however, the consumption of a preload did not affect food reinforcing value for restrained eaters. That is, restrained eaters worked equally hard to earn cookies whether or not they received a milkshake preload. Thus, consistent with the past studies by Jansen et al. (1988) and French (1992), the present study failed to find any direct evidence for the motivational shift captured by the what-the-hell effect as an explanation for the counter-regulation observed among restrained eaters. Particularly notable is the fact that studies using diverse methodologies (verbal reports of cognitions, selection of high-calorie vs. low-calorie food, willingness to work to obtain food) have failed to find direct evidence for the what-the-hell effect. Given the robust nature of counter-regulation among restraint eaters identified by the Restraint Scale (at least in laboratory settings; cf. Wardle & Beales, 1987), these findings suggest that alternative accounts are needed to explain restrained eaters' eating behaviors.

It is also notable that food reinforcing value was unrelated to cookie intake for restrained eaters. This finding is inconsistent with the findings for unrestrained eaters, and is also inconsistent with previous research on the predictive relationship between food reinforcing value and intake (Epstein & Leddy, 2006; Epstein, Temple et al., 2007; Epstein et al., 2004). Although previous studies found differences in food reinforcing value between restrained and unrestrained eaters (Giesen et al., 2009, 2010), these studies did not measure ad libitum food intake. The current finding therefore suggests that the predictive relationship between food reinforcing value and intake may not extend to restrained eaters.

If the eating behavior of restrained eaters is not the result of motivated overeating, then how can the findings be explained? According the boundary model of the regulation of food intake (Herman & Polivy, 1984), once restrained eaters' self-imposed diet boundary is surpassed, they will essentially eat to capacity. That is, preloaded restrained eaters may simply give up on their hopes of meeting their diet goals and subsequently follow a regulatory pattern of eating (Herman, Polivy, & Esses, 1987), eating until they were sated but without any strong motivation to indulge in previously forbidden foods. Thus, the food intake of restrained eaters following a preload may be better characterized as a "why bother" effect than a "what-the-hell" effect. Partial support for this perspective comes from studies that have found disinhibition among restrained eaters after simply smelling a forbidden food (e.g., Fedoroff, Polivy, & Herman, 1997; Jansen & van den Hout, 1991). Exposure to such food cues does not constitute a diet violation per se, but does appear to trigger cravings for the cued food that subsequently lead to an abandonment of one's diet. Perhaps most consistent with a "why bother" effect, however, are the findings that restrained eaters disinhibit after consuming alcohol (Polivy & Herman, 1976) or when they are planning to start a diet the following day (Urbszat et al., 2002). Rather than breaking their diet and triggering a motivated shift toward previously forbidden foods, these conditions might instead lead restrained eaters to temporarily lose the motivation to sustain their diet ("why bother"), after which they simply eat until sated. The current study however could not provide direct evidence for this postulation. Future research could do so by examining the intake of non-forbidden foods following a preload among restrained eaters. If counter-regulation is in fact a regulatory eating pattern resulting from the abandonment of one's diet and subsequently eating to capacity, then preloaded restrained eaters should increase their intake of both forbidden and non-forbidden foods, assuming they are equally palatable.

In conclusion, the findings from this study do not support the notion that counter-regulation among restrained eaters is caused by a motivational shift from dieting to indulgence in forbidden foods. Counter-regulation among restrained eaters remains a robust finding in laboratory settings, but the mechanisms underlying this eating pattern still require clarification. It may be that the eating behavior of restrained eaters is better characterized as a "why bother" effect rather than a "what-the-hell" effect.

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