

PROMOTING SELF-COMPASSIONATE ATTITUDES TOWARD EATING AMONG RESTRICTIVE AND GUILTY EATERS

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This study investigated the possibility that inducing a state of self-compassion would attenuate the tendency for restrained eaters to overeat after eating an unhealthy food preload (the disinhibition effect). College women completed measures of two components of rigid restrained eating: restrictive eating (desire and effort to avoid eating unhealthy foods) and eating guilt (tendency to feel guilty after eating unhealthily). Then, participants were asked either to eat an unhealthy food preload or not and were induced to think self-compassionately about their eating or given no intervening treatment. Results showed that the self-compassion induction reduced distress and attenuated eating following the preload among highly restrictive eaters. The findings highlight the importance of specific individual differences in restrained eating and suggest benefits of self-compassionate eating attitudes.

Research on restrained and unrestrained eaters has uncovered a paradoxical effect in which consuming food often results in increased eating for those who are trying to restrain their food intake. In the seminal experiment in this vein, Herman and Mack (1975) required normal-weight female restrained and unrestrained eaters to eat either zero, one, or two milkshakes and then allowed them to eat as much ice cream as they wanted in what appeared to be an ice cream taste test. The amount of ice

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cream consumed by unrestrained eaters was as expected from the standpoint of satiation: those who had eaten more milkshakes ate less ice cream during the taste test. However, for restrained eaters, a different and counterintuitive pattern emerged. Those who had just eaten a milkshake ate more ice cream in the taste test than those who had not eaten a milkshake. Herman and Mack termed this effect of eating more after a food preload than after no preload "counter-regulation." Ever since Herman and Mack's study, researchers have sought to understand when and why the "disinhibition effect" (instances of overeating among restrained eaters) occurs, but many questions remain. The purposes of the present study were to examine individual differences in reactions to eating in order to shed light onto why certain people become disinhibited after a food preload and to investigate the possibility that the negative effects of undesired eating, including disinhibition, may be eliminated by inducing self-compassion.

Research suggests that the disinhibition effect is not simply the result of physiological processes associated with eating. Studies have shown that restrained eaters overeat after a preload that they believe to be high in calories, regardless of its actual caloric content (Herman & Polivy, 2004). For example, Spencer and Fremouw (1979) found that restrained eaters who were told that a milkshake preload was highly caloric ate more ice cream following the preload than those who believed the milkshake to be low in calories (although actual caloric content of the milkshake was identical in both groups). In addition, Knight and Boland (1989) found that restrained eaters ate more ice cream after eating one or two milkshakes than after eating cottage cheese that contained the same number of calories. However, two milkshakes did not result in more counter-regulation than one milkshake. Taken together, these studies show that the type of food, not necessarily the amount of calories, produces counter-regulation. For restrained eaters, disinhibited eating seems to involve cognitive mechanisms, including the belief that certain foods are forbidden.

Further evidence for the inadequacy of physiological explanations for the disinhibition effect is that individual differences in self-esteem moderate dieters' eating after preloading. For example, Polivy, Heatherton, and Herman (1988) found that dieters ate more ice cream after a preload only if they were low in trait self-esteem. Clearly, overeating in response to a preload cannot be accounted for simply by the physiological effects of caloric intake, and cognitive and emotional processes must underlie disinhibited eating.

EATING AS EMOTIONAL COPING AND ESCAPE FROM SELF-AWARENESS

If people sometimes try to regulate their emotions and alleviate distress by eating, as many have suggested (e.g., Tice, Bratslavsky, & Baumeister, 2001), the disinhibition effect might reflect dieters' attempts to reduce negative affect and escape unpleasant self-awareness. Heatherton and Baumeister (1991) suggested that when self-awareness is unpleasant (such as when people are judging themselves negatively or are distressed by life circumstances), people sometimes engage in activities that allow them to focus on concrete aspects of their present environment or behavior. When focusing on concrete thoughts, people can achieve a lower level of self-awareness that precludes meaningful self-thought and comparison to ideals (Leary, Adams, & Tate, 2006; Wegner & Vallacher, 1986). For example, dieters might focus on the smell, texture, and taste of food rather than contemplating higher-level goals for healthy eating or weight loss. Although this "cognitive narrowing" might help people to avoid negative self-thoughts, it also might result in disinhibition because people are no longer focused on their plans, ideals, and long-term goals vis-à-vis eating.

Heatherton and his colleagues (Heatherton, Herman, & Polivy, 1991; Heatherton, Polivy, Herman, & Baumeister, 1993) found that dieters who experienced an ego-threat (e.g., failing at a seemingly easy task) ate more ice cream than dieters who did not experience failure. In contrast, non-dieters in these studies either ate less after failure or ate similar amounts in the failure and control conditions. This pattern suggests that people who attempt to control their eating are most likely to become disinhibited when facing unpleasant thoughts and feelings about themselves.

Unfortunately, dieters frequently experience negative emotions related to body-image concerns, and diet-breaking itself can induce negative affect and self-criticism (Heatherton, 1993; Heatherton & Polivy, 1990). For dieters, eating tasty foods that are forbidden because of personal restrictions might be an appealing way to experience pleasure and reduce negative feelings. Research suggests that dieters are especially prone to overeat in response to negative emotional states or aversive self-awareness (e.g., Jackson, Cooper, Mintz, & Albino, 2003). Paradoxically, then, certain dieters might eat more after a preload as a way to reduce the negative emotions associated with breaking their diets. Although eating more as a way to cope with negative affect triggered by eating seems irrational, this strategy is understandable if we consider the preload as we would any other stressful, upsetting experience (Herman & Polivy, 2004).

The role of negative self-thoughts and emotions in reaction to diet-breaking is related to the “limit violation effect” (LVE) that occurs with respect to alcohol consumption (e.g., Muraven, Collins, Morsheimer, Shiffman, & Paty, 2005a, 2005b). LVE theory postulates that people who blame themselves for drinking too much experience negative affect after drinking episodes and that, paradoxically, people who feel worse after drinking are likely to drink even more in later episodes. Muraven et al. (2005b) found that participants with more rigid personal restrictions for alcohol consumption felt worse when they broke their limits and subsequently drank more to cope with their negative feelings. As Muraven and his colleagues (2005b) explained the “logic” of the LVE, “I feel bad about how much I drank, so I will drink more to cope with those feelings” (p. 254). Similarly, dieters who feel badly after eating personally forbidden foods might overeat in an attempt to escape negative self-thoughts and feelings.

THE ROLE OF RIGID DIETARY RESTRAINT

One reason why the causes of the disinhibition effect are unclear may be that the specific aspects of eating-related beliefs that lead to disinhibition have not been distinguished and explored adequately. For example, much research showing the disinhibition effect in laboratory settings has measured restrained eating using Polivy, Herman, and Howard’s (1988) Restraint Scale. This scale is intended to measure chronic dieting and includes items assessing the tendency to consciously restrict eating, overeat, feel guilty about overeating, and experience frequent weight fluctuations. People who score high on the Restraint Scale do tend to become disinhibited after a preload, but it is unclear which facets of the construct underlie the effect.

Westenhoefer, Stunkard, and Pudel (1999) suggested the importance of distinguishing between two different approaches to dieting which they called rigid and flexible control. They proposed that rigid, but not flexible, control is related to disinhibited eating. According to Westenhoefer et al. (1999), “rigid” control involves strict dieting, even at the expense of enjoying eating, and feeling guilty about overeating. In contrast, “flexible” control involves conscious attention to eating without strict, all-or-none thinking. They suggested that rigid dieters feel guilty for eating unhealthily, whereas flexible dieters allow themselves unhealthy foods in limited quantities without feeling particularly guilty. Their data showed that rigid control was associated with a higher tendency for disinhibited eating than flexible control. Although Westenhoefer et al.’s (1999) suggestion to differentiate between rigid and flexible eating restraint has proven useful, rigid and flexible styles

of restraint have yet to be clearly defined and measured. A pilot study conducted for the present investigation did not replicate the two-factor structure (rigid vs. flexible control) that Westenhofer et al. suggested. Instead, we found that the scale measured eight underlying factors (within the rigid subscale alone, five factors—rather than one—emerged), and many items from the two subscales did not load together as Westenhofer et al. would suggest.

Thus, before conducting the present study, we sought to identify the fundamental components of rigid eating restraint and to create reliable measures of these dimensions. Based on previous conceptualizations and preliminary analyses of the pilot data, we identified two specific dimensions of rigid restraint. These two factors are: (a) conscious effort to avoid certain “forbidden” foods (termed *restrictive eating*) and (b) feelings of guilt when eating foods that are perceived as forbidden (termed *eating guilt*). Although these factors are related (e.g., people should be more likely to feel guilty about eating foods that they think should be avoided in the first place), they are conceptually distinct. Some dieters restrict their eating but do not feel badly if they do eat unhealthily, and others feel guilty about eating unhealthily but do not consciously attempt to restrict their intake of certain foods. Using one of Westenhofer et al.’s (1999) rigid control items and adding additional items, we created the Revised Rigid Restraint Scale (RRRS, described later and provided in the Appendix) to measure restrictive eating and eating guilt.

For people who score high on the RRRS, diet-breaking should be a particularly threatening, unpleasant experience. Thus, rigid restrained eaters, who experience negative affect when they break their diets even slightly, might be particularly motivated to escape negative self-awareness after eating forbidden foods. Because rigid dieters feel badly about eating disallowed foods, they might attempt to reduce unpleasant self-thoughts by focusing on food rather than contemplating higher-level goals for healthy eating.

SELF-COMPASSION AND REACTIONS TO DIET-BREAKING

If negative self-thoughts and feelings play a role in disinhibited eating after diet-breaking, then one way to reduce these reactions might be to prevent negative self-evaluation after an unhealthy eating episode. For example, as noted earlier, self-esteem might protect against the disinhibition effect (Polivy, Heatherton et al., 1988) because people with high self-esteem are able to maintain positive self-views when they break their diets and, thus, are not motivated to escape self-awareness and self-recrimination.

A related variable that might also protect against negative reactions to diet-breaking is self-compassion. Neff (2003) conceptualized self-compassion as involving self-kindness (reacting with kindness and understanding toward oneself when experiencing negative events), mindfulness (holding emotions in nonjudgmental awareness), and common humanity (viewing one's life as part of the larger human experience and realizing that everyone goes through difficult times). When experiencing negative events, self-compassionate people tend to have less extreme reactions, ruminate less, and experience more positive emotions than people low in self-compassion. Self-compassion is related to self-esteem; people who react to negative events with self-kindness and equanimity also tend to feel good about themselves. However, the effects of self-compassion are distinct from those of self-esteem, and a self-compassionate mindset might be more beneficial than having high self-esteem when dealing with negative events (Leary, Tate, Adams, Allen, & Hancock, 2007). Self-compassion can be conceptualized as a relatively stable personality trait (Neff, 2003), but it also varies between situations and has been induced successfully with a state manipulation (Leary et al., 2007).

People who are especially kind to themselves should be less self-critical when they break their diets, thus reducing the need to cope with negative self-thoughts by eating. When people react in a self-compassionate manner to diet-breaking, they should experience less negative emotional reactions and a lower motivation to escape from self-awareness. Indeed, pilot data for the present study, collected on 141 college women, indicated that women high in trait self-compassion have less negative reactions to a hypothetical diet-breaking scenario than those lower in self-compassion. Over and above self-esteem, self-compassion was associated with reports of feeling better ($sR^2 = .03$, $p = .04$), calmer ($sR^2 = .08$, $p < .001$), and less overwhelmed ($sR^2 = .04$, $p = .02$) in reaction to the imagined diet-breaking scenario. In addition, over and above trait self-esteem, self-compassion was associated with a lower tendency to eat as a way of coping with negative emotions (as indicated by lower scores on the coping subscale of the Motivations to Eat Scale; Jackson et al., 2003; $sR^2 = .04$, $p = .02$).

On one hand, self-compassion could be viewed as an excuse for over-indulgence; people who forgive themselves and do not feel badly about diet-breaking might completely relinquish their responsibility to control their eating and overeat. However, we predicted that self-compassion would lead people to forgive themselves for an instance of diet-breaking without losing sight of their goals to regulate their eating. Consistent with this prediction, previous research suggests that self-compassion leads people to forgive themselves for their actions but

does not necessarily lead them to abdicate responsibility for those actions. For example, Leary et al. (2007) found that inducing self-compassion reduces negative affect but increases personal responsibility for an undesirable event. Self-compassion involves recognizing mistakes without becoming overwhelmed with negative emotion, thereby possibly increasing self-regulation in the future.

PURPOSES AND HYPOTHESES OF THE PRESENT STUDY

The primary goals of the present study were (a) to investigate the role of self-compassion in attenuating negative reactions to eating and preventing disinhibited eating following a food preload and (b) to determine if the effects of a self-compassion manipulation are moderated by individual differences in rigid dietary restraint (both eating guilt and restrictive eating components). As noted, research has documented the role of a preload in leading to disinhibited eating among restrained eaters (e.g., Herman & Mack, 1975; Herman & Polivy, 2004), and researchers have suggested individual differences (e.g., rigid control, self-esteem) that might moderate the effects of preloading on subsequent eating behavior (e.g., Polivy, Heatherton et al., 1988; Westenhoefer et al., 1999). However, researchers have not previously used an experimental manipulation to attenuate negative reactions to preloading in an attempt to prevent disinhibition in a single-session laboratory setting.

We hypothesized that, among rigid dieters (dieters high in both restrictive eating and eating guilt), inducing self-compassion would attenuate the disinhibition effect. Without the self-compassion manipulation, participants who think in rigid, all-or-nothing ways about "forbidden" food should be upset by diet-breaking and more likely to become disinhibited after the preload. In contrast, rigid participants who are encouraged to think self-compassionately should feel better and eat less than rigid participants who do not receive the self-compassion induction. We also sought to explore how individual differences in eating guilt versus restrictive eating would moderate the effects of preloads and self-compassion.

METHOD

PARTICIPANTS AND OVERVIEW

Participants were 84 female undergraduate students who received experimental credit for an undergraduate psychology course. In a mass testing session, students completed the Revised Rigid Restraint Scale

(RRRS). Only women who indicated that they were not diabetic, did not have food allergies, and had not been diagnosed with or treated for a clinical eating disorder within the past three years were selected for participation. Twenty-six women (31% of this sample) reported that they were currently on a diet to lose weight. Body mass indices (BMI) in this sample ranged from 17.8 to 41.1, with a mean of 23.1 ($SD = 3.84$).

Participants were randomly assigned to one of three experimental conditions: preload/self-compassion condition (preload/SC), preload/no-self-compassion condition (preload/no-SC), or no-preload control condition. Participants in the preload/SC and preload/no-SC conditions ate a set amount of food (preload), whereas participants in the no-preload control group received no food to eat. Later, all participants performed a bogus taste test (which was used as the measure of eating behavior) and completed self-report measures.

MATERIALS

Revised Rigid Restraint Scale (RRRS). The RRRS (see Appendix) was created to assess two components of rigid restrained eating: restrictive eating (desire and effort to avoid eating unhealthy, "forbidden" foods) and eating guilt (tendency to feel guilty when eating foods perceived as forbidden). Rather than defining "forbidden foods" based on objective dimensions of healthfulness, this scale assesses participants' tendency to avoid and feel guilty about eating foods that they perceive as forbidden or unhealthy. Using principal axis factor analysis with an oblimin rotation, the RRRS (containing 12 items) yielded two factors that captured the conceptualization of restrictive eating and eating guilt. Each of the subscales showed good internal consistency (Eating Guilt subscale: $\alpha = .92$; Restrictive Eating subscale: $\alpha = .82$) and correlated moderately, as one would expect, $r = .61, p < .001$. For preliminary validation of the RRRS, we administered questionnaires to a sample of 173 college women. Scores on the RRRS correlated positively with both the Disinhibition and Cognitive Restraint scales of the Three-Factor Eating Inventory (see Table 1).

Food preload. Doughnuts were selected as the preload because they represent a "forbidden food" for rigid restrained eaters and should induce guilt among people who feel guilty when eating unhealthily. The doughnuts were Dunkin Donuts® cake doughnuts. Participants were asked to eat one doughnut and were given the choice of either a glazed cake (250 calories, 19 grams of fat) or chocolate glazed cake (290 calories, 16 grams of fat) doughnut. A pilot sample of 15 female college students ate these doughnuts and rated them as "somewhat unhealthy" (mean rating = 4 on a 12-point scale; $SD = 3.40$). In addition, Knight and Boland

TABLE 1. Zero-Order Correlations Between the RRRS and TFEQ
(Sample of 173 College Women)

	TFEQ-Disinhibition	TFEQ-Cognitive Restraint
RRRS-Total Score	.47*	.84*
RRRS-Eating Guilt Subscale	.55*	.79*
RRRS-Restrictive Eating Subscale	.29*	.71*

Note. RRRS = Revised Rigid Restraint Scale; TFEQ = Three-Factor Eating Inventory; * $p < .001$.

(1989) found that college students rated doughnuts high on a continuum ranging from "dietary-permitted" to "dietary forbidden." Taken together, these findings suggest that doughnuts are viewed as sufficiently unhealthy to use as a preload.

Videotape. Participants watched a 4-minute segment of a video while eating the food preload (preload/SC and preload/no-SC conditions) or while drinking water (no-preload condition). Later, all participants watched a 5-minute segment of the same video during the bogus taste test. The video used was "Man and the Biosphere: The Tropical Rainforest," an educational video in which a narrator describes the ecosystem of the rainforest (FR 3 and Eolis Productions in Cooperation with UNESCO, 1991). This video was chosen because it does not address eating, does not depict women or prime body image issues, and should not induce strong emotions.

Candies for the Bogus Taste Test. Participants were served three bowls of small, unwrapped candies. The bowls were large and mostly full so that candy could be eaten without producing a noticeable difference in the amount of candy in the bowls. Bowls contained an average of 702 grams of candy when they were served to participants. The three different types of candy (Reeses' Popables®, Skittles®, and York Popables®) were chosen to accommodate individual flavor preferences (i.e., peanut butter/chocolate, fruity, and chocolate-covered mint flavors, respectively).

PROCEDURE

Participants completed the RRRS in a mass testing session. Later in the semester, participants were tested individually between 2:00 and 5:00 P.M. and were asked not to eat for two hours prior to their session. When participants arrived, a female researcher told them that the study was designed to study reactions to eating experiences while watching television. The cover story was necessary so that participants would not know

that the study was designed to investigate eating and would not be aware that the amount that they ate was monitored.

Phase 1: Preload (for both Preload/SC and Preload/No-SC Conditions) or No Preload. Participants were seated at a table, facing a television approximately 4 feet away. All participants were asked to drink a full glass of water “to clear the palette.” The purpose of this drink was to induce a similar feeling of fullness in all participants.

Next, participants were asked to choose one of two doughnuts (original or chocolate flavor) and to eat it while they watched a video. The researcher emphasized the importance of drinking all of the water and eating all of the doughnut so that everyone consumed the same amount. During this time, participants in the control condition watched the same video while drinking a cup of water without any food.

Phase 2: Self-Compassion Manipulation. After 4 minutes, the researcher returned and turned off the television. To participants in the Preload/SC condition, the researcher said:

You might wonder why we picked doughnuts to use in the study. It's because people sometimes eat unhealthy, sweet foods while they watch TV. We thought it would be more like the “real world” to have people eat a dessert or junk food. But several people have told me that they feel bad about eating doughnuts in this study, so I hope you won't be hard on yourself. Everyone eats unhealthily sometimes, and everyone in this study eats this stuff, so I don't think there's any reason to feel really bad about it. This little amount of food doesn't really matter anyway. Just wait a second and I'll bring you the questionnaire.

The self-compassion manipulation contains the three components of self-compassion (self-kindness, mindfulness, and common humanity).

In the preload/no-SC condition as well as the no-preload condition, the researcher turned the video off and said, “Just wait a second and I'll bring you the questionnaire.” In all conditions, the researcher returned again after 2 minutes and gave a questionnaire about the TV-watching experience (consistent with the cover story).

Phase 3: Bogus Taste Test. After 2 minutes, the researcher returned, took the questionnaire, and brought in a tray with three large bowls of unwrapped candies. Each bowl was marked with a number between 1 and 3 and had been weighed beforehand. The researcher gave the participant a “Taste Perception Rating Sheet” on which they rated the taste, texture, and goodness of each separate candy, using 7-point scales (ranging from “not at all” to “extremely”). These ratings were made primarily to be consistent with the cover story of the study. Before starting the videotape and leaving the room, the researcher explained that par-

ticipants should eat at least one piece of each type of candy to make the taste ratings, but that they were welcome to help themselves to as much candy as they liked.

Phase 4: Final Questionnaire. After 5 minutes, the researcher returned and gave participants the final questionnaire, which assessed participants' reactions to diet-breaking and feelings about eating during the experiment. First, participants indicated (on a 1 to 5 scale) the degree to which what they ate in the experiment made them feel 24 different emotions, representing a wide array of feelings that people might have in reaction to their eating (e.g., guilty, ashamed, out of control, energized, relaxed, content). Next, participants rated their level of agreement (on a 5-point scale ranging from *strongly disagree* to *strongly agree*) with six items indicating self-compassionate responses to diet-breaking. In order to assess state-based reactions rather than general attitudes, these items assessed participants' thoughts and feelings about eating specifically during the experimental session. Of these six items, two items were directly related to each component of self-compassion: self-kindness, mindfulness, and common humanity.

The researcher left the tray of candies on the table so that participants would be able to continue to eat if they wished as they completed the final questionnaire (in order to maximize the amount of time that they were able to eat). When participants completed the questionnaire, the researcher returned and gave them a debriefing statement describing the true purpose of the study and reiterated the essential elements of the self-compassion manipulation.

RESULTS

OVERVIEW

The data were analyzed in a series of multiple regression analyses in which eating guilt (G) and restrictive eating (R), both zero-centered, were entered on Step 1. On Step 2, two dummy-coded variables reflecting the three experimental conditions were entered. On Step 3, the product of G and R was entered to test the interaction between eating guilt and restrictive eating. Steps 4 and 5 tested each 2-way interaction between guilt or restrictive eating and experimental condition while controlling for the other 2-way interactions. On Step 6, two product terms were entered to test for the 3-way interaction of guilt, restrictive eating, and experimental condition. Significant interactions were decomposed with analyses of simple slopes and tests of between-condition differences at specified levels of eating guilt and restrictive eating as recommended by Aiken and West (1991). Data were examined for adherence

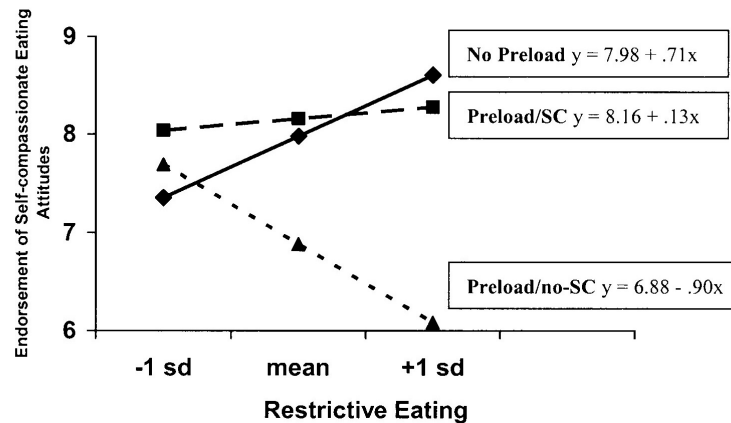


FIGURE 1. Interaction of restrictive eating by experimental condition for self-compassionate eating attitudes.

to assumptions of normality and homoscedasticity, and outliers more than three standard deviations from the mean of their predicted value were excluded from analysis.

To facilitate reporting of the results, dependent variables are grouped into three categories: (a) self-compassionate eating attitudes (serving as a check of the self-compassion manipulation), (b) amount of candy eaten in the taste test, and (c) emotional reactions to eating.

SELF-COMPASSION MANIPULATION CHECK

The six items that assessed self-compassionate reactions to diet-breaking were averaged to create a composite score ($\alpha = .79$). As expected, the regression analysis revealed a main effect of condition, $F(2, 79) = 4.62, p = .01, sR^2 = .10$. A Tukey's HSD test revealed that participants in the preload/self-compassion condition ($M = 8.2, SD = 1.56$) reported more self-compassionate eating attitudes than those in the preload/no-SC condition ($M = 6.9, SD = 2.14$), $p = .03$. Participants in the no-preload control condition ($M = 8.0, SD = 1.54$) indicated marginally more self-compassionate eating attitudes than those in the preload/no-SC condition, $p = .06$, suggesting that the preload itself induced self-critical attitudes. Furthermore, participants in the preload/SC condition did not differ from participants in the no-preload condition, $p > .10$, showing that preloaded participants who were given the self-compassion

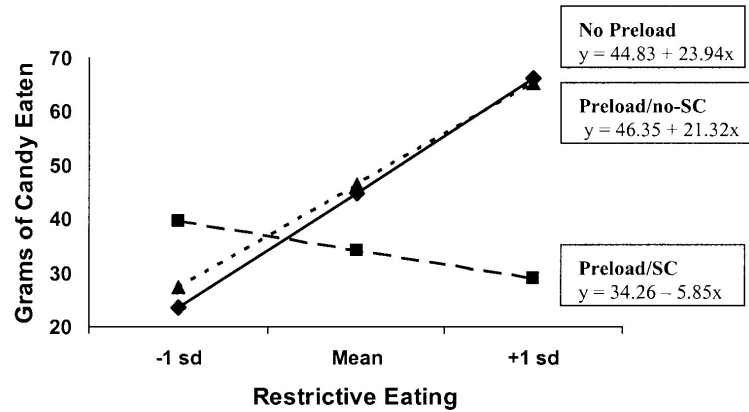


FIGURE 2. Interaction of restrictive eating by condition for weight of candy eaten.

manipulation were as self-compassionate as those who had not been preloaded.

However, the effects of the self-compassion manipulation were moderated by individual differences in restrictive eating (see Figure 1). A significant restrictive eating by condition interaction, $F(2, 74) = 3.83, p = .03, sR^2 = .07$, revealed that restrictive eating was not significantly related to self-compassionate eating attitudes in the no-preload condition, $p = .13$, or in the preload/SC condition, $p = .73$. However, in the preload/no-SC condition, participants higher in restrictive eating expressed significantly less self-compassionate attitudes than those low in restrictive eating, $t(25) = -2.06, p = .05, sR^2 = .11$.

Viewed the other way, among participants low in restrictive eating (i.e., those 1 SD below the mean), self-compassionate eating attitudes did not differ as a function of experimental condition, $ps > .45$. However, among participants high in restrictive eating (1 SD above the mean), those in the preload/no-SC condition reported less self-compassionate eating attitudes than those in the no-preload, $t(51) = 3.61, p = .001, sR^2 = .17$, and preload/SC conditions, $t(51) = 3.96, p < .001, sR^2 = .21$. Highly restrictive participants' attitudes did not differ significantly between the no-preload condition and the condition in which they were preloaded but induced to think self-compassionately, $p = .87$. Thus, the preload seems to have caused highly restrictive participants to think less self-compassionately about their eating, but the self-compassion manipulation eliminated this effect.

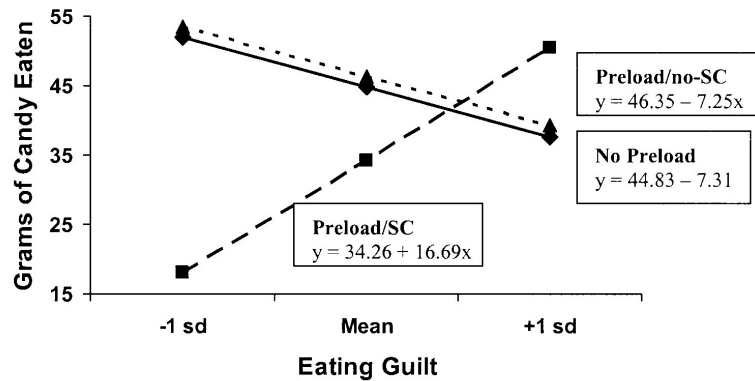


FIGURE 3. Interaction of eating guilt by experimental condition for weight of candy eaten.

In addition, a main effect of eating guilt was obtained for this item such that participants who were higher in eating guilt indicated less self-compassionate attitudes toward eating, $t(2, 81) = -2.32, p = .02, sR^2 = .06$.

AMOUNT OF CANDY EATEN

To obtain the weight of the candy that each participant ate, the weight (in grams) of each bowl of candy at the end of the session was subtracted from its initial weight. The three resulting weights (indicating the weight eaten of each type of candy) were then summed to calculate the total grams of candy eaten.

A main effect of restrictive eating showed that highly restrictive participants paradoxically ate more candy than participants who were low in restrictive eating, $t(78) = 2.02, p = .05, sR^2 = .05$. However, this effect was qualified by a significant restrictive eating by condition interaction, $F(2, 71) = 3.96, p = .02, sR^2 = .09$ (see Figure 2). Restrictive eating was related to eating more candy in both the no-preload, $t(23) = 2.46, p = .02, sR^2 = .21$, and preload/no-SC conditions, $t(25) = 2.28, p = .03, sR^2 = .17$, but not in the preload/SC condition, $p = .40$. Participants who were low (1 SD below the mean) and average in restrictive eating did not eat different amounts as a function of condition (all $ps > .20$). However, among highly restrictive participants (1 SD above the mean), those in the

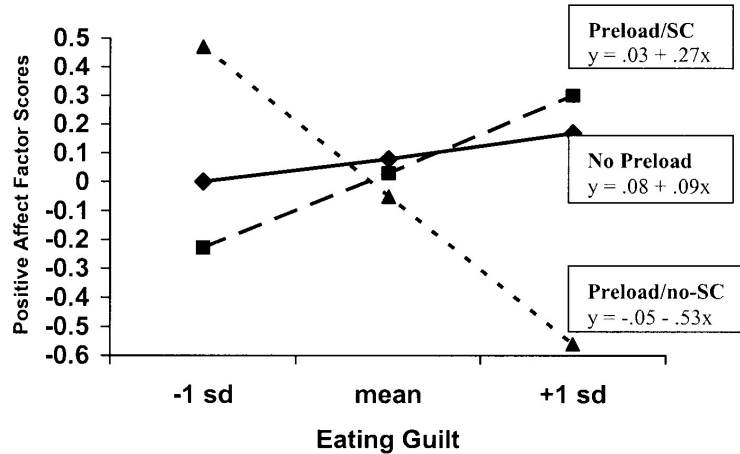


FIGURE 4. Interaction of eating guilt by condition for positive affect.

self-compassion condition ate less than those in the no-preload condition, $t(48) = 1.99, p = .05, sR^2 = .07$. This is the “normal” eating pattern observed in non-dieters (eating less to compensate for having eaten a preload). In contrast, highly restrictive participants in the preload/no-SC condition did not compensate for having eaten the preload in that these participants did not eat less than restrictive participants who had not been preloaded, $p = .96$. In addition, highly restrictive participants in the preload/SC condition ate marginally less than those in the preload/no-SC condition, $t(50) = 1.81, p = .08, sR^2 = .06$.

In addition, a nearly significant guilt by condition interaction was obtained (see Figure 3), $F(2, 71) = 2.93, p = .06, sR^2 = .07$. Eating guilt was associated with eating more candy in the preload/self-compassion condition, $t(24) = 2.25, p = .03, sR^2 = .17$, but not in the no-preload condition ($p = .33$) or preload/no-SC condition, $p = .37$. Participants who were high in guilt did not eat different amounts as a function of condition (all $ps > .80$). Among low-guilt participants (1 SD below the mean), those in the preload/SC condition ate marginally less than those in the no-preload condition, $t(48) = 1.75, p = .09, sR^2 = .06$.

EMOTIONAL REACTIONS

Many of the emotion ratings had skewed distributions (because few participants reported highly negative emotions) and, thus, violated as-

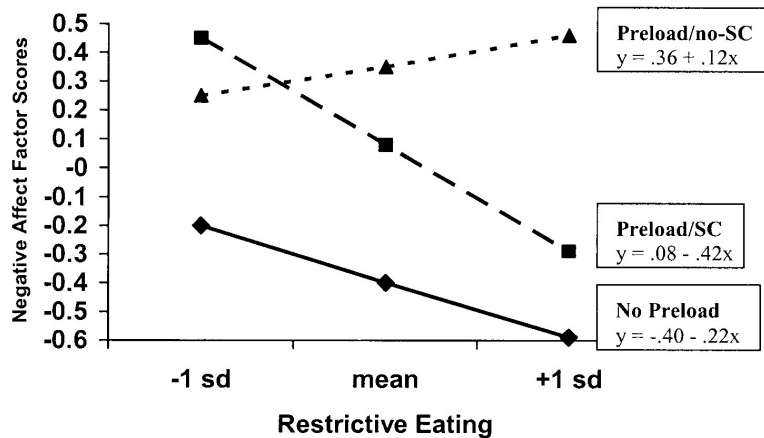


FIGURE 5. Interaction of restrictive eating by condition for negative affect.

sumptions underlying linear regression. These 10 variables were excluded, after which a principal axis factor analysis with a direct oblimin rotation was performed on the remaining 14 ratings. Two factors were obtained, reflecting positive affect (happy, excited, cheerful, content, energized, competent, relaxed, pleased, and joyful) and negative affect (guilty, ashamed, disgusted, disappointed, and worried). Hierarchical regression analyses were performed on the factor scores from these two factors.

For the positive affect variable, a guilt by condition interaction showed that participants high in eating guilt expressed the least positive emotions in the preload/no-SC condition, $F(2, 71) = 3.42, p = .04, sR^2 = .09$. As shown in Figure 4, eating guilt was not significantly related to positive affect in either the no-preload condition, $p = .69$, or preload/SC condition, $p = .20$. However, among participants in the preload/no-SC condition, those higher in eating guilt expressed less positive affect than those lower in eating guilt, $t(23) = -2.65, p = .01, sR^2 = .23$. Among participants low in eating guilt (1 SD below the mean), positive affect scores did not differ between conditions, $ps > .30$.

Among high-guilt participants, those in the preload/no-SC condition tended to show lower positive affect than those in the no-preload and the preload/SC conditions, but these trends were not significant among participants 1 SD below the mean, compared to no-preload: $t(48) = 1.60, p = .12, sR^2 = .05$; compared to preload/SC: $t(49) = 1.54, p = .13, sR^2 = .04$.

In addition, high-guilt participants did not differ in positive affect between the no-preload and preload/SC conditions, $p = .92$. This pattern suggests that the self-compassion manipulation led high-guilt participants to feel as positively following the preload as those who were not preloaded.

For the negative affect factor, participants higher in eating guilt reported more negative feelings than those lower in eating guilt, regardless of experimental condition, $t(76) = 3.33$, $p = .001$, $sR^2 = .13$. Thus, self-compassion might have been effective in protecting positive affect but not in reducing negative affect in high-guilt participants.

In addition, a significant main effect of condition, $F(2, 74) = 3.16$, $p = .05$, $sR^2 = .07$, showed that participants in the preload/no-SC condition ($M = .36$, $SD = 1.13$) reported more negative affect than participants in the no-preload condition ($M = -.40$, $SD = .53$), $p = .01$. However, negative affect did not differ between the preload/self-compassion condition ($M = .06$, $SD = .91$) and the preload/no-SC condition, $p = .42$, or the no-preload condition, $p = .14$.

A restrictive eating by condition interaction for the negative affect factor suggests that the self-compassion manipulation attenuated negative affect associated with eating a preload for highly restrictive eaters, $F(2, 69) = 3.80$, $p = .03$, $sR^2 = .08$ (See Figure 5). Restrictive eating was not related to negative affect in either the no-preload condition, $p = .18$, or the preload/no-SC condition, $p = .68$. However, in the preload/self-compassion condition, restrictive eating was associated with lower negative affect, $t(25) = -2.10$, $p = .05$, $sR^2 = .14$. Put another way, highly restrictive participants expressed more negative emotion if given a preload (preload/no-SC) than if not preloaded, $t(46) = 4.02$, $p < .001$, $sR^2 = .21$. However, this effect did not occur when they were encouraged to be self-compassionate. Highly restrictive participants expressed less negative affect in the preload/self-compassion condition than in the preload/no-SC condition, $t(47) = 2.19$, $p = .03$, $sR^2 = .07$. Furthermore, highly restrictive participants in the preload/SC condition did not express more negative affect than those in the no-preload condition, $p = .20$, indicating that self-compassion eliminated an increase in negative affect following a preload.

Low-restrictive participants (those 1 *SD* below the mean) expressed higher negative affect in the preload/SC condition than in the no-preload condition, $t(50) = 2.02$, $p = .05$, $sR^2 = .06$. However, low-restrictive participants did not indicate higher negative affect in the preload/no-SC condition compared to the no-preload condition, $p = .87$.

DISCUSSION

Contrary to predictions, neither highly restrictive participants nor participants prone to eating guilt ate more after eating a preload compared to not having eaten a preload. Thus, the present study did not produce the classic disinhibition effect (Herman & Mack, 1975). However, although the disinhibition effect was not obtained, a variation of disinhibition did occur. Specifically, the disinhibition effect following a preload seems to involve two features: (a) a failure to reduce eating after eating a preload and (b) counter-regulatory overeating. The present study found evidence for a failure to compensate for the preload by eating less but not overeating after a preload. In addition, the self-compassion induction, as well as individual differences in restrictive eating and eating guilt, moderated the effects of the preload on subsequent eating.

EATING BEHAVIOR

Although participants who scored high in restrictive eating did not overeat following the preload, they failed to compensate by subsequently eating less unless they were induced to think self-compassionately about the preload. Remarkably, highly restrictive eaters who received the self-compassion induction behaved much like classic "non-dieters," reducing their food intake after eating a preload. In both the no-preload control and preload/no-SC conditions, restrictive eaters ironically ate more than low-restrictive eaters. However, after the self-compassion treatment, participants who were low versus high in restrictive eating did not eat different amounts. Thus, inducing self-compassion reduced how much restrictive eaters ate (compared to highly restrictive participants who were not preloaded), leading them to eat like low-restrictive participants. These findings suggest that negative self-evaluative thoughts and feelings play a role in restrictive eaters' failure to inhibit their eating after the preload. Because these findings are independent from those involving eating guilt, self-critical attitudes seem to play a role in restrictive eaters' reactions to eating unhealthy foods, regardless of their tendency to feel guilty when they eat unhealthily.

In contrast, the amount eaten by participants who were low in restrictive eating was not influenced by experimental manipulations and, as predicted, the self-compassion induction did not influence how much low-restrictive participants ate. People who score low in restrictive eating do not consciously try to avoid eating certain unhealthy foods, so self-compassion is not needed to ameliorate negative self-thoughts after a preload. However, contrary to predictions, low-restrictive eaters

did not eat different amounts in the no-preload versus preload conditions. We had expected that low-restrictive eaters who were preloaded would eat less than those who were not preloaded because people who are not trying to control their eating eat less when they become full (e.g., Herman & Mack, 1975). This finding might be due to the fact that, on average, low-restrictive eaters ate less candy than restrictive eaters and did not eat large amounts of candy in any condition. Thus, there was not a large amount of eating to be attenuated by the preload.

Importantly, although restrictive eating and eating guilt have previously been combined under the umbrella term of "restrained eating," these two variables moderated eating behavior in different ways. Whereas the preload and self-compassion induction influenced how much highly restrictive eaters ate, the experimental manipulation did not affect the amount that high-guilt participants ate. High-guilt participants did not inhibit their food intake after a preload or overeat after the preload (compared to those who were not preloaded).

Among participants who were preloaded and then given the self-compassion treatment, those higher in eating guilt ate more candy than those low in guilt. However, eating guilt was not related to the amount of candy eaten in the two other conditions. Among participants low in eating guilt, those in the preload/self-compassion condition ate less than those in the no-preload condition. Thus, low-guilt participants who received the self-compassion induction tended to show the "normal" compensatory eating pattern of eating less after eating a preload.

COGNITIVE AND EMOTIONAL RESPONSES

Participants who were preloaded evidenced less self-compassion than those who were not preloaded, but this effect was eliminated by the self-compassion induction. In fact, participants in the self-compassion condition indicated comparable eating attitudes to those who were not preloaded, indicating that the self-compassion induction reduced self-criticism associated with eating a preload. Similarly, the preload caused negative affect only for participants who were not given the self-compassion treatment. Thus, self-compassion successfully attenuated the effects of the preload on negative self-thoughts. However, the effects of preloading and self-compassion varied depending on individual levels of restrictive eating and eating guilt.

As predicted, restrictive eaters who were preloaded reported less self-compassionate eating attitudes than those who were not preloaded, but this effect was eliminated by the self-compassion induction. In contrast, neither the preload nor self-compassion manipulations affected the self-compassionate attitudes of low-restrictive eaters. Thus, encour-

aging self-compassion about eating was most helpful for highly restrictive participants. Consistent with these findings, highly restrictive eaters felt worse when they were preloaded compared to the no-preload control condition, but those who were induced to think self-compassionately about their eating showed lower negative affect.

In sum, the researcher's brief admonition for participants to be self-compassionate proved especially helpful in preventing self-criticism and negative affect for highly restrictive eaters who were preloaded. In addition, highly restrictive participants in the preload/SC condition ate less candy than those who were not preloaded. These findings suggest that when highly restrictive eaters eat an unhealthy food, they feel badly, become self-critical, and do not inhibit their food intake to compensate for having already eaten. Presumably, continuing to eat tasty, albeit unhealthy, food is a way of reducing negative affect and escaping unpleasant self-thoughts. In contrast, when led to avoid self-criticism, recognize that everyone eats unhealthily, and not become overwhelmed with negative feelings, restrictive eaters regulate their eating more effectively. In fact, restrictive eaters who were given the self-compassion treatment ate less following a preload just as non-dieters have been shown to do in past research.

RESTRICTIVE EATING VERSUS EATING GUILT

As noted earlier, existing measures of restrained eating include items assessing both restrictive eating (desire and effort to disallow oneself to eat forbidden foods) and eating guilt (the tendency to feel guilty when eating forbidden foods) and do not distinguish between these two components. Thus, we created the RRRS to measure these two aspects of restrained eating and hypothesized that both variables would be related to negative affect and self-feelings related to eating unhealthily without self-compassion. Indeed, both restrictive and guilty restrained eaters indicated negative affective and self-evaluative reactions to eating unhealthy foods. However, the self-compassion induction reduced self-criticism and negative affect for highly restrictive participants but not for participants high in eating guilt. People higher in eating guilt reported less self-compassionate eating attitudes and more eating-related negative emotion than those lower in eating guilt, regardless of experimental condition.

GENERAL CONCLUSIONS

The results of the present study have implications for understanding the disinhibition effect as well as the cognitive and affective processes un-

derlying the control of eating. Highly restrictive eaters (participants who reported strong desire and effort to avoid eating unhealthy foods) ate more candy than those low in restrictive eating. This paradoxical finding underscores the role of dietary rigidity in predicting increased eating and is consistent with arguments that strict dieting can lead to overeating (e.g., Polivy & Herman, 1985). In our study, restrictive eaters did not overeat following a preload, but they failed to eat less following the preload. However, highly restrictive eaters who were preloaded and then induced to think self-compassionately about their eating ate less candy compared to highly restrictive eaters who were not preloaded.

These patterns point to two major conclusions. First, given that the self-compassion induction reduced negative affect and helped highly restrictive eaters inhibit their food intake after the preload, self-criticism and negative affect related to eating unhealthy food might be involved in the control (or lack of control) of eating for these people. These results support Herman and Polivy's (2004) proposal that preloads may be a source of distress for strict restrained eaters. Distress about breaking diets might motivate people to cope with negative affect or escape self-awareness by eating. Perhaps one reason why restrictive eaters have trouble controlling their eating after a preload is that, paradoxically, they feel badly about eating.

Second, on a more positive note, the paradoxical cycle of rigid dieting and overeating might best be overcome in a paradoxical way. Helping people to control their eating in a less rigid manner and to react in more adaptive ways to diet failure might promote healthier eating. In general, people who treat themselves with compassion when they overeat might be more successful at regulating their eating because they are less motivated to eat in order to cope with negative self-feelings, and this might be particularly true of restrictive eaters. Paradoxically, these people might be able to remain aware of their goals for healthy eating because they have a "clear head" that is not cluttered with unpleasant thoughts and feelings. In order to regulate eating, people need to keep their dietary goals in mind and pay attention to their eating (Polivy, Herman, Hackett, & Kuleshnyk, 1986). However, people might be more successful at monitoring and regulating their intake if they are not focused primarily on regulating their affective states (Tice et al., 2001).

Although the self-compassion induction was effective for highly restrictive participants in this experiment, self-compassion did not seem as helpful for participants who were high in eating guilt. Strong eating attitudes and emotions might be difficult to counteract for guilt-ridden people in a one-session experiment, and deeply rooted feelings of guilt about eating might be more likely to change over time through psychotherapy. Because the self-compassion induction did appear to have pos-

itive effects for high-guilt participants, the results of the present study do show some promise for the use of self-compassion treatments with guilt-prone restrained eaters. Although the self-compassion induction did not reduce negative feelings or attenuate eating among high-guilt participants who were preloaded, it did seem to help participants maintain positive affect. Perhaps longer-term self-compassion treatments would help guilt-prone eaters to reduce negative affect, maintain positive affect, and control their eating. Future research with clinical interventions should explore the possibility of inducing self-compassionate eating attitudes over time.

One limitation of this study is that there may have been differences between the preload/SC and preload/no-SC conditions other than the intended difference in self-compassion. For example, the preload/no-SC group did not receive any statements from the researcher concerning food. Perhaps some of the effects of the self-compassion induction were not due to the self-compassion induction per se but to priming thoughts and/or feelings about food (specifically, unhealthy food recently eaten). Ideally, an additional control group would be included that received statements from the researcher related to food (thus priming thoughts about food) but not specifically inducing self-compassion. Future research should use different types of control conditions to investigate more specifically why the self-compassion induction works and to examine the separate effects of the three components of self-compassion.

In addition, future work investigating rigid eating restraint should consider restrictive eating and eating guilt as related but conceptually distinct approaches to eating. More research is needed to learn more about these individual differences, and the Revised Rigid Restraint Scale provides a new way to study these variables. Future researchers should also be wary of grouping different aspects of dieting under the broad terms of "dieting," "restrained eating," or even "rigid control of eating." Indeed, "rigid" restrained eaters who are highly restrictive eaters also tend to be prone to eating-related guilt, and vice versa. However, a "restrained eater" who is highly restrictive and also guilt-prone might have very different eating experiences from a restrained eater who is highly restrictive but does not feel particularly guilty when she splurges.

Finally, the results shed further light on the construct of self-compassion. Although some have expressed concerns that self-compassion might let people "off the hook," leading them to relinquish personal control and responsibility, Leary et al. (2007) found that inducing self-compassion helped to alleviate self-critical thought and negative feelings without reducing feelings of personal responsibility. Consistent with these findings, participants in the present study generally did not eat

more candy following the self-compassion induction, compared to the two other conditions. Thus, self-compassion did not seem to be used as an excuse for overindulgence. Rather, self-compassion helped certain participants to monitor and inhibit their eating. Paradoxically, restrictive eaters who learn to treat themselves compassionately when they break their diets, avoiding self-criticism and recognizing that everyone eats unhealthily once in a while, might control their eating more effectively than those who focus on the negative implications of diet failure.

APPENDIX. REVISED RIGID RESTRAINT SCALE

The following items are thoughts, feelings, and behaviors related to eating. For each item, indicate how often the statement describes your thoughts, feelings, or behaviors by writing a number between 1 and 5 in the space using the following scale:

1 = Never

2 = Occasionally

3 = Sometimes

4 = Usually

5 = Always

- _____ 1. There are certain unhealthy foods that I try not to eat in any quantity. (R)
- _____ 2. If I eat food that is not allowed by my personal diet plan, I feel like a failure. (G)
- _____ 3. I avoid some foods on principle even though I like them. (R)
- _____ 4. I feel guilty when I eat foods that are not allowed by my personal diet plan. (G)
- _____ 5. I feel really bad when I eat unhealthily. (G)
- _____ 6. I consciously try to avoid eating certain foods. (R)
- _____ 7. I believe it's important to avoid eating certain unhealthy foods, even in small quantities. (R)
- _____ 8. I don't feel upset if I break my diet. (G; reverse-scored)
- _____ 9. I think it's important to avoid eating certain foods so that I don't gain weight. (R)
- _____ 10. I feel extremely guilty after overeating. (G)
- _____ 11. I feel bad about myself if I eat foods that are extremely unhealthy. (G)
- _____ 12. I don't think there's any reason to feel guilty for overeating. (G; reversed-scored)

*G = Eating Guilt subscale

*R = Restrictive Eating subscale

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