Exposure to Slim Images in Mass Media: Television Commercials as Reminders of Restriction in Restrained Eaters

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Objective: The aim of the present study was to explore the effects of exposure to slim images and diet-related products in commercials on actual food intake in relation to dietary restraint. Design: An experimental design was used, in which food intake was measured in 124 female students who watched either a sad or a neutral movie on television, which was interrupted by either commercials featuring slim models and diet products, or neutral commercials. Subsequently, participants filled out questionnaires on dietary restraint and any tendency toward overeating. Main outcome variable: Intake of snack food while watching television. Results: It was found that highly restrained students exposed to commercials with slim models and diet-related products ate less food, whereas less restrained eaters ate slightly more after seeing these commercials. Conclusion: The findings suggest that restrained eaters confronted with diet products and slim images when watching television will be reminded of their restricted eating behavior and eat less. The present study provides support for the reinhibition theory of slim media images.

Keywords: slim media images, food intake, restraint, tendency toward overeating, reinhibition.

It has been suggested that the mass media may be partly responsible for the increase in the prevalence of eating pathology. The widening gap between women’s actual body sizes and the media’s use of unrealistic thin ideals make women feel bad about their bodies and pressures them to lose weight (e.g., Dunkley, Wertheim, & Paxton, 2001; Stice, Mazotti, Krebs, & Martin, 1998; Stice & Shaw, 2002; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Such exposure to thin body images may therefore lead to dieting, and dietary restraint is known to be an important risk factor for overeating and eating disorders like bulimia nervosa and binge eating (Harrison & Cantor, 1997; Stice, Schupak-Neuberg, Shaw, & Stein, 1994). Furthermore, Field et al. (2005) found that girls who were trying to look like media models were more likely to use products to improve their appearance or strength (i.e., protein powder or weight loss shakes), which might be very unhealthy.

The average adolescent in the United States watches about 20,000 television commercials a year (Gentile & Walsh, 1999). Commercials with women as a target group often use beautiful, slim models to promote their products. Furthermore, the use of diet-related products in western countries (e.g., light cheese or diet drinks) seems to be very popular among young adults (Alexander & Tepper, 1995). Commercials with slim models and/or diet-related products may cause western women to believe that to be attractive and successful, they must be thin. According to social comparison theory, people tend to evaluate their own appearance more negatively after viewing highly attractive individuals (Thornton & Moore, 1993). It is likely that the effects of slim models in the media are different for restrained and unrestrained eaters, the former probably being more concerned with their bodily appearance because otherwise they would not be dieting.

Although it is widely assumed that restrained eaters restrict their food intake, results from...
some experimental studies showed that they ate more after a certain disinhibitor (i.e., the forced consumption of a forbidden food, such as a milkshake [preload] or emotional manipulation), whereas unrestrained eaters showed the opposite pattern and ate less (e.g., Herman & Mack, 1975; Hibbscher & Herman, 1977; Polivy, Heatherton, & Herman, 1988; Polivy & Herman, 1999; Schotte, Cools, & McNally, 1990). Thus, restraint may lead to disinhibition because certain conditions can disrupt the restriction in dieters and cause them to relinquish their diet (Herman & Polivy, 1980).

A few studies have examined how restrained eaters might reestablish control in a disinhibiting situation, and showed that the presence of a successful dieting confederate can suppress elevated food intake in response to disinhibiting factors in restrained eaters (Herman, Polivy, & Silver, 1979; Polivy, Herman, Hackett, & Kuleshnyk, 1986; Polivy, Herman, Younger, & Erksine, 1979). Because commercials with slim models and diet-related products indirectly represent successful dieting, these might have the same effect as a successful dieting confederate. This means that restrained eaters who are disinhibited by a certain factor may be reminded of their diets by commercials with slim images and diet products, and therefore be reinfibited and eat less.

Strauss, Doyle, and Kreipe (1994) tested this reinhibition theory by examining the effects of diet commercials on food intake in women high or low in dietary restraint. They gave each participant a preload, and then showed them a sad movie interrupted by diet-related commercials, neutral commercials, or no commercials at all. While watching the movie participants could eat salted peanuts and chocolate-coated peanuts (M&Ms) freely. Strauss et al. (1994) predicted that images of slim women and successful dieting would foster reinhibition in high restrained participants, after the preload and negative mood induction would have caused disinhibition. The results, however, revealed the opposite: highly restrained eaters who watched the diet commercials ate more than all other participants in the study. These results suggest that the diet-related images acted as additional disinhibitors. Warren, Strauss, Taska, and Sullivan (2005) replicated the study of Strauss et al. (1994), without giving their participants a preload, to check whether they would find the same results when the sad movie was the only disinhibitor. Again, it appeared that women with high dietary restraint consumed significantly more after exposure to diet commercials than those with low restraint.

Besides the work of Strauss and colleagues, there have been few studies on the effects of commercials with slim models or diet products on food intake. Seddon and Berry (1996) measured food intake in restrained and unrestrained eaters during a taste-test task after first showing a video of neutral commercials or commercials with stereotypically thin, attractive women. They also found that restrained eaters ate more than unrestrained eaters in response to the video of stereotypical thin images.

In short, only a few studies have examined the relation between thin body television commercials and actual food intake. The main finding of these studies was that restraint status moderated this relation: diet-related products and thin models acted as disinhibitors of food intake in restrained eaters.

The studies by Strauss et al. (1994) and Warren et al. (2005) had several limitations that might have affected their results. First, because they only used a sad movie, it is not clear whether there would be an effect of the diet commercials on food intake if the mood had not been manipulated. Second, they tested their participants in a cubicle, which is not a naturalistic setting and might have prevented participants from displaying their usual behavior. Another limitation could have been that they did not distinguish between restrained eaters with or without a tendency to overeat. They used the Restraint Scale (Herman, Polivy, Pliner, Threlkeld, & Munic, 1978), which contains items concerned with dieting and items concerned with weight fluctuation and bingeing (i.e., Do you eat sensibly in front of others and splurge alone?) and, therefore, also selects restrained eaters with a tendency toward overeating instead of purely restrained eaters (Stice, Ozer, & Kees, 1997). This might explain the overeating they found in restrained eaters after exposure to the diet commercials.

Summarizing, the scarce amount of literature has clearly some unresolved issues that need to be explored to better understand the complex relation between commercials with slim models and diet-related products on food intake in restrained and unrestrained eaters.
In the present study, half the participants were presented with a sad movie and half with a neutral movie to see whether we would find the diet commercials influenced food intake when participants were not in a negative mood. To minimize the presence of demand characteristics and to increase the ecological validity of the study, great care was taken to use a setting as naturalistic as possible, creating a context in which people felt relaxed and displayed their natural behavior. In addition, we were interested in whether higher levels of restrained eating would be associated with higher food intake, controlling for the tendency toward overeating (see also Ouwens, Van Strien, & Van der Staak, 2003a, 2003b; Van Strien, Cleven, & Schippers, 2000). As was originally hypothesized by Strauss et al. (1994), we expected that restrained eaters would eat less after being exposed to commercials with slim models and diet-related products because these would remind them of their diet and would presumably continue to restrict their food intake. We expected this effect to be irrespective of the kind of movie participants watched.

Method

Participants

The sample consisted of 124 female students recruited at the Radboud University Nijmegen. Their mean age was 21.8 years (SD = 3.66), and they had a mean body mass index (BMI = weight/height²) of 23.3 (SD = 3.66). The results of six participants were excluded from the database because of sickness (2), anorexia nervosa (1), diabetes (1), severe physical disability (1), and eating her own food during the session (1).

Procedure

The study was presented as an examination of general television viewing behavior in daily life. Each participant was tested individually, in the afternoon. We used a naturalistic setting to increase the ecological validity of the study and minimize demand characteristics. Therefore, the experiment took place in a specially equipped comfortable room at our lab, with a sofa and a large television screen, similar to a home cinema. Participants were told that staff members normally used this setting. After arrival at the lab, participants were asked to sit on the sofa while the researcher explained they were going to watch a movie for about 45 minutes, which would be interrupted by two commercial breaks. Participants were told they did not have to try to remember or pay explicit attention to anything they saw, but simply had to act as though they were relaxing at home.

In front of the participant was a small table with two preweighed bowls containing crisps and M&Ms and a glass of water. Each participant was told by the researcher to take whatever she liked from the snacks because there was plenty available. To make sure everyone would eat something, they were asked to eat at least something from one or other of the snacks. After the instructions the participant was left alone to watch the movie clip. Unlike the studies by Strauss et al. (1994) and Warren et al. (2005), in which all participants viewed a sad movie, half of our participants viewed a sad movie (“Breaking the Waves”) while the other half viewed a neutral one (“Traveling Birds”). “Breaking the Waves” was selected for its strong, but sophisticated, emotional intensity, while “Traveling Birds,” a movie about migratory birds, was assumed to be interesting but as neutral as possible.¹ Both movies were considered to be relatively unknown to the study sample, which might be important to avoid boredom or advanced preconceptions. After both 14 minutes and 33 minutes, the movie was interrupted by a commercial break of 3.5 minutes, containing either neutral ads (e.g., promoting a car or a video camera) or those featuring slim models or diet products (e.g., promoting shaving gel or light drinks). We aimed at presenting the commercial breaks after about 15 and 30 minutes, but because we considered it not well to cut off a scene in the middle (especially not in the sad movie), we had to fit the commercials breaks into the movie clip. We assumed that this would contribute to our naturalistic setting and keep

¹ We selected “Breaking the Waves” because the atmosphere in the movie is somber and generally negative without being exciting, like a lot of “sad” movies used in experiments (e.g., about war) and because we did not want to cause fear so that food intake was affected. We also did not want the movie to contain a “mixed message,” meaning that it was also beautiful in a way, like for example “Terms of Endearment.” The movie also could not contain any food cues. We conducted a pilot study to find a sad movie and “Breaking the Waves” was selected by the students taking part in this pilot study.
participants from paying too much attention to the commercials. The ads were selected with care: we avoided humor and ensured that the commercial breaks had the same number, length and diversity of ads. The neutral commercials only included a few people, which were older men. In addition, some commercials with slim women and diet products contained men as well, so the differences we found could not be explained by the exposure to primarily men in the neutral commercials. Hence, four different conditions were created, sad movie/slim ads, sad movie/neutral ads, neutral movie/slim ads, and neutral movie/neutral ads. After the end of the movie, participants completed several questionnaires about the manipulation checks, their attitudes toward the movie and the ads, their recall, and the assessment of dietary restraint. The researcher measured their weight and height, and a checklist concerning the purpose of the experiment was presented. Finally, all participants were thanked and paid, or given course credits for participating. They were fully debriefed after data collection was finished.

Measures

Mood. We measured mood afterward because due to the random assignment of the participants, differences in mood can only be attributed to the different conditions. To check whether the emotional manipulation had the desired outcome, a visual analogue scale (VAS) was used to measure sadness. Participants could indicate to what extent they felt sad at that moment on a line ranging from “not at all” to “very much.” Mood was also assessed by the subscale for negative affect of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants had to rate the extent to which they experienced each of the 10 negative mood states of this scale (e.g., distressed or hostile) on a 5-point rating scale. Six extra items were added to this scale that referred specifically to sadness (e.g., miserable or depressed). Internal reliability coefficients (Cronbach’s $\alpha$) for this sample were 0.80 for the original PANAS subscale for negative affect and 0.90 for the additional items.

We investigated participants’ attitudes toward the movie more directly by presenting them with eight statements about the movie, for which they could respond on a five-point Likert scale the extent to which they agreed (ranging from “totally do not agree” to “totally agree”). Examples of the items included the following: “I found the movie interesting, and I felt worse after seeing the movie.”

Recall and attitudes toward the ads. We asked the participants to write down as many ads as they could remember, including the brand and product name. The number of remembered ads was added to get the recall score for each participant.

The participants also filled out a 12-item questionnaire in which they indicated on a five-point Likert scale (ranging from “totally do not agree” to “totally agree”) to what extent they agreed with the statement presented. Examples of items concerning the ads were: “I liked the kind of ads I’ve seen, and I felt better after seeing the ads.” The items added together yielded a score that showed to what extent a participants’ attitude toward the ads was positive. In our study sample the internal reliability coefficient (Cronbach’s $\alpha$) was 0.78 for this scale.

Eating behavior. The Dutch Eating Behavior Questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986) was used to assess different eating styles. This 33-item questionnaire contains three scales measuring restraint (e.g., Do you deliberately eat less in order not to become heavier?), emotional eating (e.g., Do you have the desire to eat when you are irritated?), and external eating (e.g., If food smells and looks good, do you eat more than usual?). This scale has good internal reliability and good concurrent, construct, and predictive validity (Van Strien, 2005; Van Strien, Engels, Van Staveren, & Herman, 2006). Cronbach’s $\alpha$ coefficients of the DEBQ scales in this sample were 0.91, 0.94, and 0.78 for restraint, emotional, and external eating, respectively.

The bulimia scale of the Dutch version of the eating disorder inventory-2 (EDI-II; Garner, 1991; Van Strien, 2002) was used to measure bulimic eating behavior. An example of an item was: “I have gone on eating binges where I felt I could not stop.” In our sample the internal reliability coefficient (Cronbach’s $\alpha$) for this scale was 0.83.

The mean scores on emotional and external eating and the bulimia scale together represented the participants’ tendency toward overeating, because high scores on all three mea-
sures imply that a person will eat more in response to either emotional arousal, external cues, or other stimuli triggering overeating (see also: Van Strien, Cleven, & Schippers, 2000; Ouwens et al., 2003a, 2003b). In our sample, the three measures were all highly significantly correlated with each other. Moreover, these three eating behaviors (emotional, external, and bulimic eating) are also included in the disinhibition subscale of the TFEQ (Stunkard & Messick, 1985). We included the tendency toward overeating because we were interested whether higher levels of restrained eating would be associated with higher food intake, controlling for the tendency toward overeating.

**Hunger.** Because food intake may also be affected by a state of deprivation (e.g., Polivy, Coleman, & Herman, 2005; Urbaszat, Herman, & Polivy, 2002), we controlled for individual differences in hunger by presenting the participants with a VAS to measure the extent to which the participants felt hungry or satisfied before the experiment.

**Food intake.** We wanted to use high-caloric test food which participants preferred to eat in the evenings when they were sitting on the sofa at home to improve our naturalistic setting. In a preliminary inquiry, we asked female students what they normally ate while watching television. The results showed that crisps and M&Ms (chocolate coated peanuts) were the most popular snack foods. Therefore, while watching the movie participants in this study were allowed to eat freely from two preweighed bowls of crisps and M&Ms. The amount of food eaten during the experiment was measured with a professional balance (Mettler PM3000) to the nearest 0.1 g. Unlike Strauss et al. (1994) and Warren et al. (2005), who used the amount of salted peanuts and M&Ms eaten, we used total caloric intake as dependent variable instead of total grams of food consumed because crisps and M&Ms differ both in weight and caloric value.

**Strategy for Analyses**

We checked whether the mood manipulation had the desired effect on mood, using analyses of variance (ANOVAs) to compare groups that saw either the sad or the neutral movie on their scores on negative mood, as measured by the VAS or the version of the PANAS with the six additional items. We also investigated whether participants who saw the sad movie agreed more with the statement that they felt worse after the movie, compared to participants who viewed the neutral movie.

To examine the relation between restraint, ad type and food intake, we used regression analyses. Using the scales as dichotomous rather than continuous measures has several disadvantages including lower estimates of effect size, reduction of statistical power, disruption of the latent covariance structure, and increased risk of Type I errors (Maxwell & Delaney, 1993; Whisman & McClelland, 2005). Therefore, in the present study multiple regression analyses instead of ANOVAs were performed.

To test whether restraint and ad type had a main effect and/or interaction effect on food intake, corrected for state of hunger, a first regression analysis was conducted with total caloric intake as dependent variable. The independent variables were entered into the equation in the following order: (1) Hunger and Ad type, (2) Restraint, (3) Ad type × Restraint. A second regression analysis corrected for tendency toward overeating, represented by the mean score on emotional and external eating and the bulimia subscale of the EDI-2 taken together. This led to the following order of variables being entered into the equation: (1) Hunger and Ad type, (2) Tendency to overeat (3) Restraint, (4) Ad type × Restraint. Prior to the regression analyses, ad type and restraint were centered on their grand mean; the overall mean was subtracted from each value of the variable (Whisman & McClelland, 2005).

**Results**

**Mood Manipulation Checks**

A series of ANOVAs was performed to compare participants who viewed the sad movie with those who viewed the neutral movie on their scores on the VAS of sadness, the subscale for negative affect of the PANAS (including the additional items), and the question whether they felt worse after seeing the movie. We calculated effect sizes (Cohen’s $d$) by dividing the difference between the means by the pooled standard deviation. Hence, the effect sizes may be viewed as the difference between the groups, expressed in standard deviation units. Effect
sizes between 0.2 and 0.5 reflect a small effect, effect sizes between 0.5 and 0.8 a moderate effect and effect sizes above 0.8 a large effect (Cohen, 1988). The results revealed a significant main effect of the movie on all dependent measures. Participants who watched the sad movie scored much higher \( (M = 6.3, SD = 2.7) \) on the VAS sadness than participants who watched the neutral movie \( (M = 2.6, SD = 2.5) \), \( F(1, 123) = 62.07, p < .001 \), Cohen’s \( d = 1.4 \). They also scored significantly higher on the negative affect subscale of the PANAS \( (M = 1.8, SD = 0.6) \) than participants who had seen the neutral movie \( (M = 1.3, SD = 0.4) \), \( F(1, 123) = 21.29, p < .001 \), Cohen’s \( d = 1 \). In addition, they reported feeling significantly worse after seeing the movie \( (M = 1.8, SD = 1.5) \), \( F(1, 123) = 56.19, p < .001 \), Cohen’s \( d = 1.4 \) compared to participants who watched the neutral movie \( (M = 0.3, SD = 0.7) \). There were no interaction effects found between movie and ad type or movie and restraint status on all the above mentioned dependent measures of sadness.

**Food Intake**

First, we examined whether the commercials and restraint were related to food intake and second whether there was an interaction effect of commercial type and restraint status on food intake.\(^3\) Because BMI was not significantly related to food intake, we did not enter BMI in the regression equation. Surprisingly, it also appeared that restraint was not associated with increased levels of deprivation.

The first regression analysis (see Table 1) showed that state of hunger and ad type, together in step 1, explained a significant amount of variance of food intake \( (R^2 = 0.14, p < .001) \). Inspection of the beta coefficients revealed that only state of hunger contributed significantly to food intake \( (\beta = 0.36, p < .001) \), whereas ad type did not \( (\beta = -0.09, ns) \). Restraint led to a significant increase in explained variance when entered into the model (step 2, \( R^2 \) change = 0.04, \( p < .05 \)). Furthermore, the interaction between ad type and restraint was significant (step 3, \( R^2 \) change = 0.03, \( p < .05 \)).

A second regression analysis (see Table 2) included the tendency toward overeating in the equation, to test whether it was restraint or rather the tendency toward overeating which was associated with increased food intake. It appeared that, as expected, the tendency toward overeating was a significant predictor of food intake (step 2, \( R^2 \) change = 0.08, \( p < .001 \)). When controlling for the tendency toward overeating, restraint no longer explained a significant amount of variance (step 3, \( R^2 \) change = 0.02, \( ns \)). The interaction between ad type and restraint remained significant (step 4, \( R^2 \) change = 0.05, \( p < .01 \)).

To understand the interaction between restraint and ad type, we examined two regression equations (see Figure 1) representing the association between restraint status and food intake, while controlling for tendency toward overeating, for the respondents who were exposed to the neutral commercials and those shown ads with slim models and diet related products (Aiken & West, 1991). As we expected, the slope for the two regressions changed from positive (for the neutral ads) to slightly negative, which indicates that the ad

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\(^2\) The PANAS does not primarily focus on sadness and also contains items on anxiety (“afraid” and “nervous”). We added six extra items especially referring to sadness (i.e., “down” or “depressed”). Afterward, we conducted a hierarchical regression analysis, and it appeared that anxiety did not explain a significant amount of variance of movie type, whereas sadness did explain a significant amount of variance.

\(^3\) To check whether our findings with respect to the commercials could actually be attributed to the commercials themselves, we videoed every session and recorded each time the participant ate per interval (before, after or during the first or second commercial break) to ensure that not all food intake took place before the first commercial break. However, this was not the case: there were no differences between the conditions regarding food intake before the first commercial break. Therefore, these data are not reported in this article.
type condition differentiated people who ate more versus less in function of their dietary restraint. In other words, highly restrained eaters ate more than less restrained eaters when they watched the neutral commercials. However, when highly restrained eaters were exposed to commercials with slim models and diet-related products, they were inhibited and ate less than less restrained eaters. In contrast, less restrained eaters ate more after seeing commercials with slim models and diet-related products.

We checked whether there were any differences between participants with respect to the kind of movie they had seen, but this was not the case. There was no significant three-way interaction between ad type, movie, and restraint ($R^2$ change = 0.01, ns), indicating that the kind of movie participants watched did not affect the interaction between ad type and restraint status. We conducted the same regression analyses with restraint as measured by the Restraint Scale (Herman et al., 1978). When the tendency toward overeating was entered in the equation, the results did not show a main effect for restraint (Step 3, $R^2$ change = 0.01, ns), and there was no interaction found between ad type and restraint (Step 4, $R^2$ change = 0.01, ns). This suggests that only restrained eaters without overeating tendencies were inhibited by the commercials with slim models and diet products.

### Recall and Attitudes Toward the Ads

In addition, we were interested in the mechanism underlying the relation between the commercials and food intake. Therefore, we examined whether there were any differences between recall and attitudes toward the ads between the groups that watched either commercials with slim models and diet products, or neutral commercials. Results from ANOVAs with ad type as independent variable showed that every participant who had seen the commercials with slim models and diet-related products recalled significantly more ads than participants in the neutral ad conditions, $F(1, 123) = 12.40, p < .001$. Furthermore, all participants who viewed these commercials also had more positive attitudes toward the ads than participants who viewed the neutral commercials, $F(1, 123) = 26.71, p < .001$. These results were not influenced by the type of movie participants viewed.

### Discussion

The aim of the present study was to further explore the effects of exposure to slim images and diet-related products in commercials on actual food intake. Our goal was to establish whether these commercials influence food intake, and whether this effect would differ for differences in restraint.

The main finding of our study is the interaction between the type of commercials participants watched and their restraint status. Highly restrained eaters who viewed the neutral commercials ate more than less restrained participants. However, when viewing commercials with slim models and diet-related products restrained eaters were inhibited and ate much less, while less restrained eaters ate more.

The results confirm our hypothesis but are the exact opposite of the results of previous studies.
which consistently found that restrained eaters were disinhibited by commercials or magazine advertisements containing slim models and diet products and ate even more (Mills, Polivy, Herman, & Tiggemann, 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren et al., 2005). Our contradictory findings, which are in fact similar to the hypothesis that Strauss et al. (1994) initially formulated, might be due to several factors.

A possible explanation for the disinhibition found in restrained eaters in previous studies could be that they had selected restrained eaters with the tendency to overeat by using the Restraint Scale (Herman et al., 1978). This scale contains items addressing weight fluctuation and disinhibited eating and therefore tends to select unsuccessful dieters; this might explain the overeating after exposure to slim models or diet products found in the earlier studies.4 There might be some differences between the effects of slim ads on restrained eaters with or without the tendency toward overeating. Perhaps only restrained eaters without overeating tendencies are susceptible for inhibiting their food intake after seeing ads with slim models and diet products, while commercials with diet-related products act as disinhibitors in restrained eaters with a tendency to overeat. In the neutral ad condition of our study, highly restrained participants ate more than less restrained eaters. This might be due to the fact that restrained eaters had to eat at least one piece of snack food (see also C.P. Herman, personal communication). Highly restrained eaters might tend to avoid situations in their daily lives in which they are forced to eat. In contrast with the slim ads, watching the neutral ads did not remind highly restrained eaters of their restriction.

Another possible explanation for the difference in results could be the care we took to create as natural a setting as possible to increase the ecological validity of our study. Thus, our results may be less biased by demand characteristics. Stice (2002) underlined the importance of avoiding these in experimental studies assessing diet behaviors because when participants think eating is the norm they might feel that they have permission to overeat, and this might affect their food intake (see also Stice et al., 2004). Most of the participants in our study clearly felt at ease, sitting on a comfortable sofa alone in the dark while watching a movie. Some even took off their shoes and stretched out. Perhaps this setting encouraged participants to display their natural tendencies. From that perspective, the results of the present study suggest that restrained eaters who are confronted with diet products and slim images when watching television, wherever they might be, will be reminded of their restricted eating behavior. Participants in previous studies examining the effects of slim images in media were possibly more aware of the scientific purpose of the experiment because those studies did not use a naturalistic setting (Strauss et al., 1994; Warren et al., 2005), or used a taste test to measure food intake (Mills et al., 2002; Seddon & Berry, 1996), which might have put too much emphasis on the available food in that setting. It is possible, however, that the amount of snack food eaten by the restrained eaters in the present study was not representative of their food intake in daily life, simply because they tend to avoid situations in which they are forced to eat. However, one would expect highly restrained eaters to restrict their food intake successfully, especially when external cues remind them of their diets. Nevertheless, we do not know what happened before and after the experiment regarding food intake, so it remains just a “snapshot” at a given moment in time. Perhaps self-regulation and impulse control only work in the short-term, whereas in the longer term, in everyday life, many factors may force restrained eaters to break their diet. Ideally, we would like to observe people unobtrusively in their daily lives, but unfortunately there are no ethically acceptable methods developed yet to do this (see also Stice, 2002; Stice, Fisher, & Lowe, 2004).

A third possible explanation for the difference between our results and those of previous studies involves a cultural aspect. All earlier studies used North American samples, and there may be differences in the way young Dutch women experience beauty ideals in the media and their way of dieting compared to the average white, North American population. Previ-

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4 In our sample, the correlation between the restraint scale of the DEBQ (Van Strien, Frijters, Bergers, & Defares, 1986) and overeating was 0.22. In addition, the correlation between the RS (Herman et al., 1978) and overeating was 0.50. Thus, restraint as measured by the RS indeed has higher association with overeating tendency than DEBQ-restraint scores.
ous research showed that the mean score on the restraint subscale of the DEBQ (Van Strien et al., 1986) in a North American sample of female college students ($N = 607$) was 3.1 ($SD = 1.0$) (Gorman & Allison, 1995), whereas the norm group score for Dutch female college students ($N = 405$) is 2.6 ($SD = 0.8$) (Van Strien, 2005). In our sample, the mean score on this restraint subscale was 2.8 ($SD = 0.8$). These results might indicate that North American students on average indeed score higher on restrained eating than Dutch students. North American women may feel a stronger pressure to be thin because appearance and beauty play a greater part in their development (e.g., beauty contest contests in high school). Because of this stronger focus on perfectionism and slimness, these American women might be more susceptible for so-called “crash diets” and other forms of unhealthy weight control behavior (e.g., Neumark-Sztainer et al., 2000). The restrained eaters in our study might have been less extreme dieters and, therefore, less likely to overeat because of healthier weight control strategies that were easier to sustain. However, because little is known about which cultural factors influence dietary restraint, this explanation remains hypothetical and needs more investigation (see also Wildes, Emery, & Simons, 2001).

In addition, we examined whether movie type (sad vs. neutral) had an effect on the interaction between the type of commercials and restraint, as suggested by Strauss et al. (1994) and Warren et al. (2005). Although we successfully manipulated mood, we did not find a significant three-way interaction, which suggests that the effects of commercials and restraint on food intake did not depend on the type of movie. Previous studies repeatedly found that restrained eaters showed disinhibited eating after induction of negative emotional states (Heatherton, Polivy, Herman, & Baumeister, 1993; Cools, Schotte, & McNally, 1992; Heatherton, Herman, & Polivy, 1991; Heatherton, Striepe, & Wittenberg, 1998; Herman, Polivy, Lank, & Heatherton, 1987; McFarlane, Polivy, & Herman, 1998; Mitchell & Epstein, 1996; Polivy & Herman, 1999; Polivy, Herman, & McFarlane, 1994; Schotte et al., 1990). However, all of these studies used the Restraint Scale (Herman et al., 1978), which contains items concerning disinhibited eating and therefore also tends to select restrained eaters with a tendency to over-eat. In the present study the restraint subscale of the DEBQ (Van Strien et al., 1986) was used, which might be an explanation for the fact that we did not find an effect of the movie on the food intake of restrained eaters, because this scale does not include items on the tendency toward overeating. Apparently, commercials with slim models and diet products inhibited restrained eaters irrespective of what movie they watched during the experiment. This could indicate that dieters are susceptible for cues that remind them to restrict their food intake when watching television, regardless of what they are watching. Slim images might even have the same effect on restrained eaters not only when watching television but also in other situations, for example, when in contact with slim peers. However, further examination is needed to explore this assumption. Previously, Cools et al. (1992) found that restrained eaters who watched a comedy movie ate more than restrained eaters who watched a neutral movie, which might indicate that a positive mood can also affect food intake in restrained eaters. Therefore, future research could also include a happy movie, to investigate whether a positive mood state might alter the effects of the commercials with slim models and diet products on food intake.

Strauss et al. (1994) and Warren et al. (2005) attributed the overeating they found in restrained eaters to negative self-evaluation. According to them, restrained eaters felt bad about themselves after seeing the commercials. Although ego threats have been shown to be related to overeating (e.g., Heatherton et al., 1991), this so-called negative “contrast effect” remains speculative. Previously, Lockwood and Kunda (1997) found that superstars can cause self-enhancement when they are self-relevant to the individual and when their success seems attainable. These results are in line with an alternative “inspiration” hypothesis, which was formulated by Mills et al. (2002). They wondered why women continue exposing themselves to media sources containing slim models and diet products and even seem to enjoy them if it only caused negative feelings. The results of their study showed that restrained eaters engaged in self-enhancement after being exposed to idealized body images; not only did they want to look thinner, but they also reported that they were thinner than they objectively were and showed a trend toward increased self-
esteem. Apparently, not all women feel worse about themselves after viewing pictures of thin models in the media, unlike the majority of earlier studies proposed (e.g., Field et al., 2005; Harrison & Cantor, 1997; Stice et al., 1994; Strauss et al., 1994). In our study, it appeared that all participants (including restrained and unrestrained eaters) recalled more commercials when they contained slim models and diet-related products, and the attitudes toward these commercials were also more positive than the attitudes toward the neutral commercials. This suggests that the commercials with slim models and diet products did not cause immediate negative feelings, as proposed by Seddon and Berry (1996), Strauss et al. (1994), and Warren et al. (2005), but rather might have inspired restrained eaters to stick to their diets, which is more in line with the “inspiration” hypothesis. Although “inspiration” seems to be a positive effect, we agree with Mills et al. (2002) stating that in the longer term, women who are inspired by the beauty ideal presented in the media may internalize an unrealistic ideal body for themselves and become at risk for development of eating pathology. In addition, restrained eating showed to be a predictor of eating disturbance as well (e.g., Harrison & Cantor, 1997; Stice et al., 1994), which indicates that restrained eating is certainly not healthy behavior. It is important to stress that we are unable to draw any firm conclusions regarding the inspiration hypothesis. So, further investigation is required to examine the underlying mechanism of the effects of the commercials with slim women and diet products.

The present study has yielded some interesting points of departure for future research. Further examination on the effects of exposure to thin body images in mass media is needed to determine how consistent our findings are in different situations. For example, what happens after exposure to slim images in a movie instead of commercials, or when the attainability of the model is manipulated, or when watching television in the presence of others? Is it possible to replicate the inhibition we found in restrained eaters, and which factors may moderate the effects of exposure to slim images on food intake? Another interesting topic for future research involves investigating the mechanism behind the negative or positive effects of slim images on food intake to elucidate the complex role of the media in eating behavior. This is important because women in western society are exposed daily to different forms of media influences containing slim images or promoting diet products and very little is known about the consequences.

References


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