Nonregulation of Food Intake in Restrained, Emotional, and External Eaters

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In the present study, regulation of ice cream intake after a preload was examined in 20 high and 20 low scorers (median split) on subscales of the Restraint Scale (RS) (Herman, Polivy, Pliner, Threshold, & Munic, 1978) and the Dutch Eating Behavior Questionnaire (DEBQ) (van Strien, 1986). For each subscale it was hypothesized that low scorers would regulate their ice cream intake. High scorers on "disinhibitive" scales (i.e., the RS and the DEBQ-emotional and -external subscales) were expected to counter-regulate after a preload. In contrast, high scorers on the "inhibitive" DEBQ-restraint scale were expected to regulate their ice cream intake. A robust effect was found: high scorers never regulated ice cream intake after a preload on either the disinhibitive or the inhibitive scales, while low scorers always did. For the RS a significant interaction effect was found [F(1,39) = 4.97, p = .03]. None of the other subscales showed interaction effects. The t tests showed that low scorers on all subscales ate significantly less after a preload than without one, while high scorers on all subscales did not differ in intake after a preload or without one. This nonregulation appears to be characteristic of people preoccupied with caloric intake, regardless of the content of the preoccupation.

KEY WORDS: nonregulation of food intake; restrained eating; external eating; emotional eating.

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INTRODUCTION

A series of laboratory studies revealed that high scorers on the Restraint Scale (RS) (Herman, Polivy, Pliner, Threshold, & Munic, 1978) eat more ice cream after a preload of milkshakes than without a preload, while low scorers eat less after a preload than without one (Herman & Mack, 1975; Hibscher & Herman, 1977). Restraint theorists claim that this so-called "counterregulation" is due to disinhibition of cognitive dietary self-control or "restraint" (Ruderman, 1986). As a consequence of their restrained eating style, restrained eaters are supposed to have a body weight below their biological boyd weight "set-point." By disrupting their restraint by taking a preload of, for example, milkshakes, they tend to indulge in a biological urge to overeat. However, to consider the experimental results on counterregulation as solid proof of restraint theory is, for several reasons, premature. First, several factor-analysis studies have identified two subscales of the RS: "concern for dieting" (CD) and "weight fluctuations" (WF) (Blanchard & Frost, 1983; Ruderman, 1985; Wardle, 1986). Therefore, the RS cannot be seen as a pure measure of restraint. It remains to be determined whether counterregulation in samples scoring high on the RS is due to concern for dieting, weight fluctuations, or a combination of the two. Second, Wardle (1987a) and van Strien (1986) argue that inspection of the RS items reveals that it is not restraint, as such, that may be measured but rather unsuccessful dieting or disinhibitive restraint. The observation that high scorers on items such as "Do you eat sensibly in front of others and splurge alone?" and "Do you have feelings of guilt after overeating?" are in fact counterregulating in laboratory experiments underlines the predictive value of the RS. The Wardle (1987a) and van Strien (1986) reinterpretation of the RS raises an interesting issue about the association between high RS scores and counterregulation. Is it high restraint per se that predisposes to counterregulation, as restraint theorists claim, or does only a subgroup of high-restrained eaters counterregulate, as the Wardle and van Strien view suggests? More specifically, following Wardle and van Strien, one wonders if unsuccessful dieters, as identified by the RS, may counterregulate in laboratory experiments, while successful dieters may, in laboratory situations, remain able to resist the temptation to overeat. Indirect support for this interpretation of the RS/counterregulation data comes from recent experiments by Shrager et al. (1983; cited by van Strien, Frijters, van Staveren, Defares, & Deurenberg, 1986) and Wardle and Beales (1987). By using the Three Factor Eating Questionnaire (TFEQ) of Stunkard and Messick (1985), Shrager and co-workers demonstrated that it was not the "cognitive restraint of food intake" (factor I) but the "disinhibition of cognitive restraint" (factor II) that was associated with overeating (van Strien et al., 1986). Wardle and Beales used the restrained subscale of the Dutch Eating Behavior Questionnaire (DEBQ) as a purer measure of restraint; high
scorers on the DEBQ-restraint subscale may be considered successful dieters (van Strien, 1986). And in spite of the high correlation between the DEBQ-restraint subscale and the RS (.72; see Wardle, 1986) and its validity in a British population (Wardle, 1987a), Wardle and Beales (1987) could not replicate the earlier laboratory findings of counterregulation by using the DEBQ-restraint subscale. Wardle and Beales (1987) found no difference in regulation between high and low DEBQ-restraint scorers. However, reanalyzing their data showed that their high-restrained subjects did not regulate after the preload \[ t(23) = .71, \text{ NS} \], while their low scorers counterregulated even after a preload \[ t(27) = 1.96, p < .05 \]. Counterregulation in low scorers is in sharp contrast with what was found in comparable studies. This curious behavior of low scorers, plus the fact that the ice cream intake in this study was extremely low in all groups, suggests that the Wardle and Beales findings were derived from an atypical subject sample. This study needs replication before firm conclusions can be drawn.

The DEBQ has proven to give valid indications of restrained, as well as emotional and external eating (van Strien, 1986; Wardle, 1987a). While the DEBQ-restraint subscale measures successful inhibitive eating, the emotional and external eating subscales measure disinhibitive eating patterns. Therefore, one would expect "disinhibitive eaters" (i.e., emotional and external eaters) to show the disinhibitive eating pattern of counterregulation. On the basis of the above-mentioned considerations, it was hypothesized that (1) high scorers on scales measuring disinhibitive eating patterns (i.e., the RS, DEBQ-emotional, and DEBQ-external scales) would counterregulate, while low scorers on these scales would regulate after a preload, and (2) both high and low scorers on the scale measuring inhibitive eating patterns (i.e., the DEBQ-restraint scale) would regulate after the preload. In the present study, attention was also directed at determining whether counterregulation of high scorers on the RS is due to concern for dieting, weight fluctuations, or a combination of the two.

**METHOD**

**Assessment**

Subjects were classified as high or low scorers on the basis of the median split score on the following subscales.

**Restraint Scale (RS) (Herman et al., 1978)**

(a) Total score on the RS: 10 items measuring attitudes toward eating, frequency of dieting, and weight fluctuations.
(b) RS subscale Concern for Dieting (CD) (see Wardle, 1986): six items of the RS measuring attitudes toward eating and frequency of dieting (e.g., "How often are you dieting?").

(c) RS subscale Weight Fluctuations (WF) (see Wardle, 1986): four items of the RS concerning weight fluctuations (e.g., "In a typical week, how much does your weight fluctuate?").

Dutch Eating Behavior Questionnaire (DEBQ) (van Strien, 1986)

(a) DEBQ-restraint subscale: reflecting the degree to which one eats less than he or she actually would like to eat (e.g., "Do you try to eat less at mealtimes than you would like to eat?").

(b) DEBQ-emotional subscale: measuring overeating due to "confusion between internal arousal states accompanying emotional states and physiological states of hunter and satiety" (van Strien, 1986, p. 137) (e.g., "Do you have a desire to eat when you are feeling lonely?"). A subdivision was made between eating in response to diffuse emotional states and eating in response to clearly labeled emotions.

(c) DEBQ-external subscale: reflecting overeating due to a "hyperresponsiveness to food-related cues in the environment together with unresponsiveness to internal cues of hunger or satiety" (van Strien, 1986, p. 137) (e.g., "If you see or smell something delicious, do you have a desire to eat it?").

The dependent variable was the number of grams of ice cream consumed.

Subjects

Forty female students and employees of Limburg University volunteered to participate in what they believed to be a taste test. Their mean age was 25.5 years (SD = 8.1 years) and their mean body mass index (BMI = weight/height²) was 22.8 (SD = 2.7). High and low scorers (median split) on all subscales did not differ in age or height, but on the RS, RS/WF, and DEBQ-external scales, the BMI of high scorers was significantly higher than the BMI of low scorers.

Procedure

Subjects were asked to have breakfast, lunch, or dinner 1 to 3 hr before participating in the study. Ice cream consumption thus served as a ca-
loric overload and was not influenced by deprivation. After entering the laboratory, subjects were asked to complete a questionnaire. In this questionnaire, items of the RS were hidden between questions about demographic variables and items concerning general aspects of life (e.g., frequency of sporting, smoking and drinking habits, date of last menstruation, taking medicine), in order to keep the subjects blind to the purpose of the study. Subjects 1 to 20 were randomly assigned to the preload or no-preload condition; subjects 21 to 40 were assigned to one of these conditions on the basis of their RS score in relation to the median split score of the subsample of subjects already tested. Thus, being preloaded or not was determined by the median split score on the RS. Each of the four cells (RS high scorers/RS low scorers × with/without preload) included 10 subjects. Subjects in the preload condition were asked to drink two milkshakes—one vanilla and one chocolate—each containing 150 cal. Ten minutes later, they were presented with three dishes, each containing 600 g of ice cream (chocolate, vanilla, and strawberry). Subjects in the no-preload condition were offered only the ice cream. They were instructed to taste and rate the different flavors. Subjects were encouraged to eat as much ice cream as they wanted and needed to make good taste ratings. Each subject was left in isolation for 10 min. After that, the ice cream that was left over was reweighed and the subject completed the DEBQ. Then, the subject's weight and height were measured. Finally, before debriefing and payment for participation, we asked subjects to state their ideas on the purpose of the study and what they had eaten before participating in the study. All subjects had eaten their usual meal; there was no reason to believe that the groups differed in level of deprivation. Also, all subjects believed that it was a taste test. Nobody guessed that we measured the amount of ice cream eaten.

**RESULTS**

The median split scores for the different (sub)scales were as follows: RS/total, 12; RS/CD, 7; RS/WF, 4.5; DEBQ-restraint, 2.9; DEBQ-emotional total, 2.7; DEBQ-diffuse emotions, 3.0; DEBQ-clearly labeled emotions, 2.6; and DEBQ-external, 3.1. The results are depicted in Fig 1. For every subscale, a $2 \times 2$ ANOVA was carried out on the food intake data.\(^2\) Main factors were Group (Low vs. High Scorers) and Condition (Preload vs. No-Preload). Because low and high scorers on the RS, RS/WF, and DEBQ-external scales differed significantly in BMI, an analysis of covariance was carried out with BMI as the covariate. On neither of the questionnaire sub-

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\(^2\)Further details on this study will be published elsewhere.
scales were main effects found. For the RS, the ANCOVA showed a significant interaction effect \( F(1,39) = 4.97, p = .03 \). On none of the other subscales were interaction effects found. However, \( t \) tests showed that low scorers on all RS and DEBQ measures regulated for the preload. Regardless of the subscale used, they ate significantly less after a preload than without one. In contrast, high scorers never regulated or counterregulated after the preload, for \( t \) tests showed no difference in intake after a preload or without one.\textsuperscript{3}

**DISCUSSION**

Low scorers on all RS and DEBQ subscales ate significantly less ice cream in a preload condition than in a no-preload condition. Yet high RS and DEBQ scorers in a preload condition did not differ in ice cream intake from high scorers in the no-preload condition. High scorers, in other words, did not regulate their food intake. On the RS, and only on the RS, an analysis of covariance showed a significant Group × Condition interaction. However, here, too a \( t \) test analysis showed that, in high scorers, nonregulation rather than counterregulation took place. The finding of nonregulation instead of counterregulation is in line with the observation reported by Ruderman and Christensen (1983). However, the present findings are different from those of Wardle and Beales (1987), who found no difference in regulation between high and low DEBQ-restraint scorers. The finding of regulation of low-restraint scorers supports our suggestion (see Introduction) that the Wardle and Beales findings were derived from an atypical subject sample.

The fact that, globally, identical patterns were found on all analyses (cf. Fig. 1) could have been due to common variance of the different subscales. However, intercorrelations between the scales were surprisingly low (cf. Fig. 1). Contrary to our hypothesis, differences in regulation were not confined to high vs. low scorers on the disinhibitive scales, the RS, DEBQ-emotional subscale, and DEBQ-external subscale. Identical differences were observed on the inhibitive DEBQ-restraint subscale. It seems, therefore, that the occurrence of nonregulation is a feature of people preoccupied with caloric intake, for whatever reason. In passing, it may be noted that the similarity of the patterns shown in Fig. 1 indicates that the DEBQ subclassification lacks predictive validity when it comes to behavior in test situations such as the present one.

The observation that both successful and unsuccessful restrained eaters displayed the pattern of nonregulation seems a prima facie evidence for the disinhibition hypothesis of restraint theorists. However, we found non-regulation instead of counterregulation. Therefore, the crucial point of

\textsuperscript{3}Numerical details may be obtained from the first author.
Fig. 1. Grams of ice cream consumed by high scorers (HS) and low scorers (LS). Numbers of subjects in each condition of the subscales were as follows (HS preloaded, HS without preload, LS preloaded, LS without preload): RS—10, 10, 10, 10; RS/CD subscale—10, 10, 10, 10; RS/WF subscale—9, 11, 11, 9; DEBQ-restraint subscale—10, 9, 9, 10; DEBQ-diffuse emotions subscale—12, 7, 7, 12; DEBQ-clearly labeled emotions subscale—11, 8, 8, 11; DEBQ-emotions subscale—13, 6, 6, 13; and DEBQ-external subscale—9, 10, 10, 9. DEBQ data are missing for one low and one high scorer on the RS.
the disinhibition hypothesis is not unequivocally supported: disrupting the restraint or self-control of restrained eaters by a preload did not "disinhibit" them. The finding of nonregulation instead of counterregulation may be due to our low median split scores on the different scales. Median split scores in the studies by Herman and Mack (1975) and Spencer and Fremouw (1979) were, respectively, 17 and 16. In these studies counterregulation was found. Although Polivy (1976) and Hibscher and Herman (1977) found counterregulation in their restrained samples with median split scores of, respectively, 11.5 and 14, nonregulation was found in the study by Ruderman and Christensen (1983) and in our own study. Median split scores were, respectively, 13 and 12. In their study, Ruderman, Belzer, and Halperin (1985) found that for subjects with restraint scores below 17.3, consumption did not differ in the milkshake and no-milkshake conditions, whereas for those with scores above 17.3 it did. All in all, there is a trend for counterregulation to occur in studies with higher medians, and nonregulation in studies with a lower median.

How should nonregulation in people scoring high on the RS or DEBQ subscales be explained? A possible explanation for the observed nonregulation is the cognitive set of restrained subjects. It has been suggested (Polivy, 1976; Polivy & Herman, 1985; Ruderman, 1985, 1986; Ruderman & Wilson, 1979; Ruderman et al., 1985) that after disrupting dietary restraint by a preload, specific cognitive ideation occurs, a prototypical self-statement being, "I've blown it—I might as well continue to eat." However, contrary to this suggestion, it was observed that thinking aloud after a preload was thematically identical from restrained to unrestrained eaters. Retrospectively, too, preloaded restrained eaters did not recall more disinhibiting thoughts compared to nonpreloaded restrained eaters and preloaded as well as nonpreloaded unrestrained eaters (Jansen, Merckelbach, Oosterlaan, Tuiten, & van den Hout, 1988). Nevertheless, analysis of reported thoughts of restrained vs. unrestrained eaters during ice cream intake revealed a difference in perceived controllability. Restrained eaters in both conditions, independent from a disinhibiting preload, reported significantly more often that they could not control themselves during ice cream tasting (Jansen et al., 1988).

This perceived lack of control during eating may link the literature on nonregulation/counterregulation to addiction model of restrained eating. Wardle (1987b) pointed out that loss of control over food intake, together with food craving and preoccupation with eating, parallels addictions. Support for the fruitfulness of the addiction analogy is given by data showing that restrained eaters, just like addicts, are likely to score high on sensation-seeking measures and to habituate fast to neutral stimuli (Jansen, Klaver, Merckelbach, & van den Hout, 1989).
From the addiction analogy, it seems that, just like small doses of drugs increase craving in the addict, eating small amounts produces increased craving in restrained eaters. Craving for food may be experienced as lack of control over food intake and may result in nonregulation. Studies should be welcomed that evaluate the explanatory power of the addiction model when it comes to restrained eating in general and experimentally induced nonregulation in particular.

REFERENCES


