

**EFFECTS OF FALSE WEIGHT FEEDBACK ON SELF-ESTEEM,
MOOD, AND FOOD INTAKE IN RESTRAINED AND UNRESTRAINED
EATERS: IS THERE EVIDENCE FOR WEIGHT-RELATED SELF-
EVALUATION IN RESTRAINED EATERS?**

by

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**A thesis submitted in conformity with the requirements
for the Degree of Doctor of Philosophy
Graduate Department of Psychology
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The Effects of False Weight Feedback on Self-Esteem, Mood, and Food Intake in Restrained and Unrestrained Eaters: Is there evidence for weight-related self-evaluation in restrained eaters?
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ABSTRACT

It has been suggested that eating disorder patients derive personal worth from their weight and shape. Because people with eating disorders are usually dissatisfied with this aspect of their selves, they constantly see themselves in a negative light. Their devaluation of their body generalizes and detracts from their evaluation of other aspects of the self. This process is referred to as weight- and shape-related self-evaluation (WSRSE). This thesis proposes that restrained eaters also engage in WSRSE, but only when their weight and shape concerns are salient. A series of four studies was conducted, exposing restrained and unrestrained eaters to conditions intended to increase the salience of weight and shape concerns by providing information about their weight. Self-esteem, mood and food intake were measured. In Study 1 participants were asked to step on an accurate scale. This manipulation did not affect self-esteem or mood in restrained eaters. Participants in Study 2 were weighed as either five pounds heavier or lighter than their actual weight. Restrained eaters who were weighed heavier demonstrated WSRSE by reporting a lowering of self-esteem and a worsening of mood. These restrained eaters also ate more than participants in any of the other groups. Study 3 attempted to measure the extent to which the process of WSRSE generalized to other aspects of self-evaluation. The results did not generalize nor did they replicate the findings of Study 2. A closer examination of Studies 2 and 3 revealed a major procedural difference. Only in Study 2

were participants exposed to threatening body shape-related words in a task that took about 20 minutes to complete. In Study 4 all participants were weighed heavy and some were exposed to the same body shape words from Study 2. The restrained eaters who were exposed to the body shape words did not demonstrate WSRSE with respect to the self-esteem and mood measures, but they did engage in overeating. It is proposed that the overeating in Study 4 represents WSRSE, and that it was not detected by the self-report measures because either self-esteem and mood impairments are weak and require more statistical power, or time to process the weight gain is required before WSRSE can be detected.

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CHAPTER I

General Introduction

Overview: Self-evaluation in disordered eating.

It is well accepted that people with eating disorders engage in negative self-evaluation. It is common for these people to suffer from body dissatisfaction and to perceive themselves as fat even if they are normal weight or underweight (e.g., Fairburn, 1985; Williamson, Kelley, Davis, Ruggiero, & Blouin, 1985). They consistently see their body shape and weight in a negative light (American Psychiatric Association [APA], 1994). Moreover, they perceive other aspects of the self, not related to weight and shape, in a disparaging manner. For example, Bruch (1982) observed that patients with anorexia nervosa were severely self-critical and insecure, and that "every anorexic dreads that she is inadequate, low, mediocre, inferior, and despised by others. All her efforts are directed toward hiding the fatal flaw of her fundamental inadequacy" (p. 4). Individuals with eating disorders are particularly likely to report a negative self-image (Casper, Offer, & Ostrov, 1981; Dykens & Gerrard, 1986; Weinreich, Doherty, & Harris, 1985), low self-esteem (Katzman & Wolchik, 1984), low social confidence (Wagner, Halmi, & Maguire, 1987), depression (Cooper & Fairburn, 1992b; Goebel, Spalthoff, Schulze & Florin, 1989; Katzman & Wolchik, 1984; Mizes, 1988; Steiger, Goldstein, Mongrain, & Van der Feen, 1990; Strauss & Ryan, 1988; Williamson et al., 1985), and anxiety (Mizes, 1988; Thompson & Schwartz, 1982; Williamson et al., 1985). Eating disordered patients also tend to characterize themselves as self-critical (Steiger et al., 1990) and ineffective (Garner, Olmsted, & Polivy, 1983; Garner, Olmsted, Polivy & Garfinkel, 1984; Thompson, Berg, & Shatford, 1987). They are also more likely to commit cognitive errors and distortions about

the self and to endorse irrational beliefs (e.g., Garner & Bemis, 1982; Goebel et al., 1989; Katzman & Wolchik, 1984; Mizes, 1988; Mizes & Klesges, 1989; Phelan, 1987; Steiger et al., 1990; Strauss & Ryan, 1988).

Weight- and shape-related self-evaluation.

It has been suggested by many theorists that eating disordered patients devalue all aspects of their self-worth owing to negative perceptions of their weight and shape (Bruch, 1973, 1978; Casper, 1983; Crisp, 1983; Fairburn, 1985; Garner & Bemis, 1982, 1985; Garner & Garfinkel, 1981; Mizes, 1988; Vitousek & Hollon, 1990). Garner and Bemis (1982) suggested that patients with anorexia nervosa use weight and shape as the sole or predominant referent for inferring personal value. These patients are notable for their rigid beliefs about the importance of weight as the basis of self-esteem. Fairburn (1985) theorized that people with bulimia overestimate the importance of shape and weight. He further stated, that by judging their self-worth in terms of these attributes, bulimics are provided with a simple measure of strengths and weaknesses. "By showing that she can influence her shape and weight, and overcome her need to eat, the patient is demonstrating that she is capable of exerting control over her life. By concluding that she is fat, she is providing herself with a convenient excuse for a host of interpersonal problems" (p. 182). Similarly, Vitousek and Hollon (1990) stated that "[w]eight itself - the numbers on a scale, the inches on a tape measure - and all the mechanical aspects of calorie-counting and exercising involved in regulating it offer [eating disordered patients] a clear, clean template against which most of their daily activities can be evaluated. Weight control may be appealing to the eating disordered patient ... because quantifiable feedback about her progress toward it will be available every morning on the bathroom scale" (p. 208).

This linkage between self-esteem and weight and shape is reflected in the Diagnostic and Statistical Manual of Mental Disorders (DSM). In the fourth edition, "self-evaluation is unduly influenced by body shape and weight" has been given central status in the diagnosis of bulimia nervosa, and "undue influence of body weight or shape on self-evaluation" is one of three possible components of a criterion for anorexia nervosa (APA, 1994).

Recently, a self-report measure, the Shape and Weight Based Self-Esteem Inventory, was developed to measure this concept directly (Geller, Johnston, & Madsen, 1997). Participants were asked to select from a list of personal attributes (i.e., intimate or romantic relationships, body shape and weight, competence at school/work, personality, friendships, face, personal development, competence at activities other than school/work, and any other attribute that is not covered in the preceding list) the ones that are important to how they feel about themselves and to rank order them. Then, participants were asked to divide a circle into pieces, such that the size of each piece reflects how much their self-esteem is based on each of the ranked attributes. The shape- and weight-based self-esteem score is the angle of the shape and weight piece of the circle. The researchers found a mean angle of 58° for the weight and shape wedge in their non-clinical sample of women. They also found that a greater evaluation of the self on the basis of weight and shape was related to higher levels of depression and lower levels of overall self-esteem. This measure has not yet been used with samples of disordered or restrained eaters.

The concept of weight- and shape-related self-esteem is also consistent with the self-esteem literature. Researchers have indicated that individuals with low self-esteem are more likely than their high self-esteem counterparts to have adverse reactions to failure or

negative feedback (Brockner, Derr, & Laing, 1987; Campbell & Fairey, 1985). Furthermore, these differences in responding to negative feedback are mediated by the greater tendency of low than high self-esteem persons to overgeneralize the implications of negative feedback to other aspects of their identities (Kernis, Brockner, & Frankel, 1989). Because low self-esteem is common to both individuals with eating disorders and restrained eaters, negative feedback or dissatisfaction related to weight or shape could overgeneralize to encompass dissatisfaction with many or all aspects of the self.

Weight- and shape-related self-evaluation: Proposed difference between disordered and restrained eating.

One difference (among many) that has been proposed to differentiate between people with eating disorders and those who chronically diet is that dieters do not negatively evaluate all aspects of the self. Although dieters or restrained eaters do negatively evaluate weight- and shape-related attributes (or score as less satisfied than control participants), they do not normally generalize the negativity to other aspects of the self (Garner et al., 1984; Polivy, 1989; Polivy & Herman, 1987). Garner and his colleagues compared the responses of weight preoccupied women¹ with anorexia nervosa patients on the Eating Disorder Inventory (EDI; Garner et al., 1983). Results showed that the two groups were indistinguishable from each other on the following scales; body dissatisfaction, bulimia, perfectionism, and maturity fears. However, anorexics scored significantly higher (i.e., worse) than the weight-preoccupied women on all other subscales. It was shown that the

¹ University women and ballet dancers who scored at or above the anorexia nervosa patients' mean score on the Drive for Thinness subscale of the Eating Disorder Inventory.

ineffectiveness and interoceptive awareness subscales were the best at differentiating between the two groups. Cluster analysis of the EDI subscale scores revealed that the weight-preoccupied group could be further divided into two groups. The first cluster included women with high scores on all subscales (these scores were as high as those of the anorexic patients), whereas cluster two (most of the group) displayed a more benign profile, and scored high only on the drive for thinness, body dissatisfaction, and perfectionism subscales. Polivy and Herman (1987) concluded from these data that dieters may resemble those with eating disorders in that they both have excessive concerns about weight, shape, appearance, and eating. On the other hand, dieters may not display the more general ego deficits displayed by women suffering from an eating disorder (e.g., ineffectiveness). This difference has been offered in support of the contention that chronic dieters and eating disordered patients differ fundamentally, and do not lie on a continuum of eating pathology.

It is suggested that eating disordered patients continually evaluate themselves in terms of their weight and shape. That is, they are so preoccupied with their 'inferior' weight and shape that they are constantly in a state of negative self-evaluation. At any given time, they will judge most if not all aspects of the self as deficient because they are not satisfied with their weight and shape. Another possibility is that eating disordered patients may have fewer self-aspects, and include aspects that are restricted to domains associated with weight and shape. Patients may also be experiencing depression, anxiety, and other types of distress as a consequence of this chronic state of negative self-evaluation. It is proposed in this thesis that restrained eaters engage in this type of self-evaluation but to a more limited degree. Rather than always relying on their perceptions of their weight and shape to

gauge how they are doing in general, restrained eaters do this only under some conditions (i.e., when their weight and shape concerns have been made salient). Thus, eating disorder patients and restrained eaters may share a similar process of self-evaluation, but differ in the extent to which they use it.

The hypothesis stated above was originally derived from a study that measured self-evaluation in restrained and unrestrained women who were exposed to an ego-threat (Polivy & McFarlane, 1996). In the ego-threat condition, participants were told that they would have to prepare and present a speech in front of a group of peers. It is possible that the self-conscious restrained eaters pictured themselves standing in front of an audience and appearing fat or out of shape.² Thus, this threat may have elicited weight and shape concerns in restrained eaters. The results indicated that in the control condition (no ego threat) restrained eaters reported significantly lower state appearance self-esteem than did unrestrained eaters. However, their state social and performance self-esteem did not significantly differ from that of unrestrained eaters. Further, restrained eaters reported significantly lower trait self-esteem than did unrestrained eaters. After exposure to the ego-threat, restrained eaters scored significantly lower on social and performance state self-esteem than did restrained eaters in the control condition and ego-threatened unrestrained eaters. Moreover, when restrained eaters were told that they would have to present a speech, their level of trait self-esteem decreased significantly. This ego-threat did not affect state or trait self-esteem in unrestrained eaters.

² Many participants in this condition asked if they could remain sitting during speech presentation. This request was not recorded so there is no way of knowing if the requests came from restrained or unrestrained eaters.

In the control condition, restrained eaters negatively evaluated only weight and shape-related characteristics of themselves (i.e., appearance self-esteem), but after they were exposed to the ego-threat, they began to derogate other aspects of the self (i.e., social and performance self-esteem). Interestingly, the negative self-evaluations elicited from ego-threatened restrained eaters included attributes related to their current situation (i.e., state self-esteem) and also more enduring trait characteristics (i.e., trait self-esteem).

In summary, Polivy and McFarlane (1996) showed that specific concerns regarding body shape and weight (i.e., standing up in front of an audience and possibly appearing fat or out of shape) led to general concerns and negative self-evaluation in restrained eaters. It appears that restrained eaters engaged in weight- and shape-related self-evaluation but only after their concerns about weight and shape were made salient.

Literature comparing eating disordered patients and dieters: Primed versus unprimed weight and shape concerns.

It is predicted that when weight and shape concerns are not salient to restrained eaters, they should score as more adjusted than eating disordered patients. However, when restrained eaters' weight and shape concerns are salient, they should appear more similar to eating disordered patients on measures of self-esteem, anxiety, depression, and cognitive content and valence.

Williams, Chamove, and Millar (1990) classified 184 female participants into four groups: 1) eating disordered (either bulimia or anorexia nervosa), 2) dieters, 3) psychiatric controls, or 4) normal controls. Dieters were defined as "women deliberately restricting caloric intake with the aim of losing weight" (p. 329). Although the authors did not state when they determined dieting status, there was no obvious reason to suspect that dieters'

weight and shape concerns were primed. The psychiatric control participants were described as female patients displaying various psychological disorders, but no specific information about the disorders was provided. Participants were administered a variety of self-report measures including the Hostility and Direction of Hostility Questionnaire (HDHQ; Caine, Foulds, & Hope, 1967). The HDHQ consists of five subscales (i.e., urge to act out hostility, criticism of others, projected delusional hostility, self-criticism, guilt). Self-directed hostility (negative feelings towards the self) is measured by the sum of the self-criticism and the guilt subscales.

The results showed that the eating disordered group reported higher scores than the dieting and normal control groups on the self-criticism subscale, the guilt subscale and the self-directed hostility measure. However, the eating disordered group did not differ from the psychiatric control group on any of these measures. Although this finding suggests that guilt, self-criticism and self-directed hostility are not specific to eating disorders (i.e., they also occur in a general psychiatric population), they do differentiate between eating disordered patients and dieters in these circumstances.

Williams et al. (1993) studied anorexics, bulimics, obese dieters, non-obese dieters and normal controls. Eating disordered participants were selected from existing patient lists and diagnosed according to DSM-III-R criteria (APA, 1987). Obese dieters were on calorie-controlled diets under the supervision of British Health Service dieticians. Non-obese dieters were on calorie-controlled diets in conjunction with local community Weight Watchers classes. Normal controls were non-obese non-dieters with no history of eating disorders. Participants completed a battery of questionnaires that included a measures of self-esteem and self-directed hostility. The results indicated that the two eating disordered

groups reported significantly lower self-esteem and higher self-directed hostility than did the other three groups. Dieters (both obese and non-obese) did not differ from non-dieting controls on these measures. Thus, as predicted (if dieters' concerns regarding shape and weight were not primed) eating disordered patients scored as more disturbed than dieting individuals on these measures.

Using an *in vivo* thought-sampling procedure, Zotter and Crowther (1991) investigated the cognitions of three groups: 1) bulimic, 2) repetitive dieting, and 3) non-bulimic, non-dieting women. A large number of college women were screened during a mass testing session. Membership in the bulimic group required participants to meet the DSM-III-R criteria for bulimia nervosa (APA, 1987) and engage in purging via self-induced vomiting or laxative abuse at least once per week. To qualify as a repetitive dieter participants had to report dieting two or more times during the past year, dissatisfaction with their current weight, but no binge eating or purging behaviours. Participants completed the questionnaires determining group status prior to the study, and were not informed of the purpose of the study when contacted for participation. After an extensive training period, participants monitored their cognitions and activities every thirty minutes on two randomly selected days. All recorded cognitions were rated for their content (eating/weight-related or other), and affective tone (positive, negative, or neutral). Although it is likely that during part of the experimental time dieting participants were experiencing concerns with weight and shape (e.g., they had just weighed themselves or had eaten a forbidden food), it is also likely that dieters' concerns were not as prevalent as those of eating disordered participants. The researchers predicted that bulimic patients would report more negative cognitions in general, and more negative cognitions specific to eating and weight than would the dieting

participants.³

The bulimics reported a significantly greater proportion of negative cognitions than did either dieters or non-dieting controls. Further, the bulimics and the dieters reported a significantly greater proportion of eating and weight-related cognitions than did the non-dieting control group. Although the proportion of eating and weight-related cognitions did not differ between bulimics and dieters, a greater proportion of these thoughts in the bulimic group were characterized by negative affective tone than in the dieting group. Thus, bulimics were more likely than dieters to be characterized by negative thoughts in general and negative thoughts specifically related to their disorder.

Dykens and Gerrard (1986) reported two studies. Both studies included bulimics, repeat dieters, and non-dieting controls. Participants were classified as dieters if they reported (1) dissatisfaction with their current weight; (2) never, or rarely, experiencing an irresistible urge to binge; (3) never having purged; and (4) having been on one or more diets in the past year. In both studies, participants completed a questionnaire battery that included the Tennessee Self-Concept Scale (Fitts, 1965). According to the authors, this scale measures self-esteem in ten separate areas (viz., identity, acceptance, behaviour, physical, moral-ethical, personal, variability, conflict, family, social) and neuroticism. In the first study, group status was determined directly before participants completed this measure. Questioning participants about their dieting, of course, may well have rendered weight and shape concerns salient. Results of this study demonstrated that bulimics differed significantly from dieters on only one subscale. Specifically, bulimics reported lower

³

In contrast to what the authors predicted, we would not expect differences between eating disordered patients and dieters in terms of weight and shape cognitions (see Polivy & Herman, 1987).

physical self-esteem than did dieters (dieters reported lower physical self-esteem than did non-dieting controls). Bulimics and dieters were indistinguishable on the acceptance, behaviour, moral-ethical, personal, and variability-esteem and neuroticism subscales of this measure (the non-dieting control group reported significantly higher self-esteem and lower neuroticism than both the bulimics and dieters).

In the second study, group status was not determined until completion of the questionnaire, and therefore, the dieting group's weight and shape concerns were not primed. Another difference between the bulimic and dieting group emerged. Now, the bulimic group scored significantly lower than the dieters on the acceptance-esteem subscale, whereas the dieters did not differ from the controls on this measure. Neuroticism no longer distinguished dieters from non-dieting controls.

In the first study, the participants completed the personality measures after participating in a diagnostic interview that focussed on their eating habits and weight concerns, while in the second study, all of the measures were completed prior to the interview. Dykens and Gerrard (1986) suggested that the different results may be explained by the different procedures used in the two studies. However, they suggested that it was the bulimics who were primed in the first study and that they may have been displaying a denial or a reduction in reported symptoms, rendering them similar to the less pathological dieters. On the other hand, it is equally likely that when dieters were primed with concerns related to weight and shape (i.e., the diagnostic interview), they engaged in general negative self-evaluation, reporting more psychopathology, and thereby resembling bulimic patients more than in the unprimed study. A closer examination of the acceptance-esteem means support the latter interpretation.

Cooper and Fairburn (1992b) completed a study that directly primed the weight and shape concerns of participants by exposing them to behavioural tasks related to eating, weight, and shape. They included anorexia nervosa patients, bulimia nervosa patients, symptomatic dieters, non-symptomatic dieters and a non-dieting control group. Symptomatic dieters were people who had been making a serious attempt to lose weight for at least four weeks but who either currently or had in the past experienced some of the behavioural features of anorexia or bulimia nervosa. Non-symptomatic dieters were those who had been making a serious attempt to lose weight for at least four weeks but who did not show any of the core behavioural features of either eating disorder. Participants completed three tasks designed to elicit thoughts relevant to eating, weight and shape (i.e., eating a chocolate mint, weighing themselves, and looking at themselves in a full-length mirror). Participants were asked to report their thoughts during the behavioural tasks by thinking aloud and using a thought checklist. Thoughts were scored for content (eating-, weight- or shape-related) and valence (negative, positive, or neutral).

Results showed that patients in both groups had a greater percentage of negative thoughts related to eating, weight and shape than did the non-dieting control group. Patients with anorexia nervosa showed a greater concern with eating, while patients with bulimia nervosa demonstrated more concern with weight and appearance. In addition, several of the comparisons between the two dieting groups and the two patient groups were not significant, suggesting that the two dieting groups occupied a position intermediate between that of the normal controls and the two patient groups. This study supports the hypothesis that when weight and shape concerns are made salient, dieters more closely resemble those with eating disorders on dimensions such as thought content and valence.

In summary, most of the studies comparing eating disordered patients to dieting participants have revealed differences between the two groups on a variety of self-report measures. When compared to dieters, eating disordered patients reported lower self-esteem (Dykens & Gerrard, 1986; Williams et al., 1993), greater self-directed hostility (Williams et al., 1990, 1993), and greater self-criticism (Williams et al., 1990). Further, bulimics reported more negative cognitions than did dieters, both in general and specific to eating and weight (Zotter & Crowther, 1991). Interestingly, fewer differences were found in the studies that actually primed dieters' weight and shape concerns (Cooper & Fairburn, 1992b; Dykens & Gerrard, 1986). When group status was determined prior to data collection or participants were exposed to eating-, weight- and shape-related tasks, dieters were less distinguishable from eating disordered patients on a variety of self-esteem and cognitive measures.

Although there are difficulties with this group of experiments (inconsistent and sometimes questionable determination of dieting status), the data seem to suggest that eating disordered participants generally score as more maladjusted than do dieters on a variety of self-report measures. This seems to be true unless dieters are primed regarding their weight and shape concerns before completing the measures.

Displacement theory: General concerns about the self and negative affect can lead to specific concerns about weight and shape.

The weight- and shape-related self-evaluation hypothesis that is explored in this dissertation proposes that specific concerns regarding body shape and weight can lead to general negative self-evaluation (in restrained eaters in some circumstances, and chronically in eating disordered patients). Other authors have discussed the converse of

this relationship. Displacement theory maintains that general dissatisfaction or unhappiness with the self is transferred to specific dissatisfaction with the body. This theory is usually discussed in relation to individuals with eating disorders. Displacement of threatening feelings onto the body may (1) diminish the power of the negative feeling by localizing it, (2) allow an individual to avoid an overwhelmingly painful idea by changing its nature or (3) redefine the problem as one with a straightforward solution (i.e., dieting and losing weight). Once the negative feeling has been displaced onto the body, the feeling becomes less threatening and individuals believe that they can assert control over the feeling by changing their body (Harper-Giuffre & Mackenzie, 1992; Jasper, 1993). There is currently no empirical work to support displacement theory. However, the following (non-clinical) studies do examine the major component of displacement theory—general concerns or negative feelings are transferred to specific concerns about weight and shape.

Striegel-Moore, McAvay and Rodin (1986) hypothesized that for dieters any experience eliciting self-evaluation in general will lead to evaluations of shape and weight in particular. They predicted that shape and weight evaluation would be activated under circumstances of feedback regarding performance, even when this performance is unrelated to body size or eating. They administered a series of questionnaires to college students and concluded that women who felt fat were more likely to report that failures adversely affected how they felt about their bodies.

Eldredge, Wilson, and Whaley (1990) noted that Striegel-Moore and colleagues (1986) derived their conclusion from a one-item self-report measure, and that it remained to be demonstrated experimentally whether experiences of failure will induce feelings of fatness in women. To test the hypothesis, Eldredge and colleagues (1990) exposed

restrained and unrestrained eaters to either a failure or a success experience by having them solve a relatively simple or difficult series of analogies, intended to provoke feelings of success or failure. After completing the task, participants were shown a feedback sheet indicating success or failure relative to a fictitious sample of participants (intended to reinforce the easy-difficult manipulation). Participants engaged in another experimental task that consisted of viewing videotaped interactions of two individuals carrying on a conversation. Success participants received questions relevant to the content of the interactions, while the questions asked of failure participants required inferences that were not apparent from the observed interaction. Again participants received bogus feedback indicating success or failure, consistent with performance on the analogies. Participants then completed a battery of questionnaires that included three separate body image inventories. Although restrained eaters reported feeling significantly more dissatisfied with their bodies than did unrestrained eaters, there were no interactions with the experimental condition. Restrained eaters who experienced success expressed levels of body dissatisfaction equivalent to those of restrained eaters who experienced failure. Thus, contrary to the predictions of Striegel-Moore and colleagues (1986), the experience of failure did not lead restrained eaters to feel worse about their bodies. In other words, making them feel worse about their performance did not worsen their already negative evaluations of their bodies.

In a similar vein, Cohen-Tovee (1993) wondered if the induction of a depressed mood would increase weight and shape concerns and lower self-esteem in people placing a high personal value on weight and shape. The "importance of weight and shape" subscales of the Eating Disorder Examination (EDE; Cooper & Fairburn, 1986) were used to classify

participants as either high or low in concern with weight and shape. Each of the two EDE sections used may be rated on a scale from zero to six. The criterion for assignment to the high concern group was a rating of four or above on at least one section (a rating of four is given when weight or shape is definitely one of the main aspects of self-evaluation). The criterion for assignment to the low concern group was a rating of no more than one on both sections (i.e., weight and shape are not aspects of self-evaluation). Participants completed the EDE and were weighed at the beginning of the experiment. They were also asked to complete initial measures of self-esteem (the Self-Concept Questionnaire; Robson, 1989), weight and shape concerns (modified version of the Body Shape Questionnaire [BSQ]; Cooper, Taylor, Cooper, & Fairburn, 1987) and mood (the Beck Depression Inventory [BDI]; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961). A depressed mood was induced in all participants using a combination of music and printed statements, and the self-report measures were readministered. Results revealed that changes in self-esteem and mood were not significantly different between the two groups of participants. However, the change in weight and shape concerns was significantly larger for the high concern group. For those high in concern for weight and shape, induction of a depressed mood led to a greater increase in weight and shape concerns than for the group low in concern for weight and shape.

Although these results appear to support displacement theory, there are problems with the study. Participants were classified as high or low in concern for weight and shape on the basis of only two subscales of the EDE, and weight and shape concerns were measured on a modified BSQ. The validity of these measures, taken out of the context of the remainder of the interview/questionnaire, has not been established. Finally, no

control group of participants who were not exposed to the mood induction was included. It is possible that weight and shape concerns increased for those who were concerned with weight and shape for another reason, and not because of the depressed mood induction. Taken together, the results are mixed and do not seem to support displacement theory (Cohen-Tovee, 1993; Eldredge et al., 1990).

The hypothesis that is explored in this dissertation is the opposite of displacement theory. Instead of general concerns and negative affect leading to specific concerns about weight and shape, the weight-related self-evaluation hypothesis proposes that specific concerns about weight and shape led to general concerns and negative affect.

Literature on the effects of weighing, weight fluctuations and false weight feedback.

The main manipulations to be used in this dissertation are weighing and false weight feedback. These manipulations will be used to increase the salience of restrained eaters' concerns about their weight and shape. Researchers have only recently started to examine the effects of weighing and weight fluctuations on psychological well-being.

Tiggemann (1994) asked male and female university students to report their height and weight. Seven months later, participants reported their current weight and whether they had recently lost or gained any weight. They were also asked to rate how happy they felt about their weight. Although the data are based on self-reports, it is interesting to note that restrained eaters who lost weight were happier, while those who gained weight were unhappier, than those whose weight did not change. In contrast, weight change had little influence on the happiness of unrestrained eaters.

In another study, Ogden and Evans (1996) weighed normal weight males and females and randomly assigned them to a normative category based on a fictional height-

weight chart. Participants were told that they were underweight, average weight, or overweight. Unfortunately, participants in the overweight category were significantly heavier, had a significantly higher body mass index (BMI) and a significantly higher restraint score (as measured by the Dutch Eating Behaviour Questionnaire (DEBQ); Van Strien, Frijters, Bergens, & Defares, 1986) than did participants assigned to either the underweight or average weight groups. As a result, BMI was included as a covariate throughout the analyses. Participants completed self-report measures both before they were weighed and after they were assigned to a weight category. The findings revealed that participants who were told that they were "average weight" reported improvements in depression and self-esteem. The "underweight" group also showed improvements in depression; however, they showed some deterioration in self-esteem. Finally, participants who were told that they were "overweight" reported an increase in depression and a decrease in self-esteem. Body dissatisfaction and anxiety were also measured and were not affected by the manipulation of perceived weight category. The authors concluded that weighing individuals and comparing their weight to social norms contributes to a negative psychological state, but only for those who are told that they do not correspond to the appropriate weight norm.

One would predict from the Tiggemann (1994) study that the act of weighing and comparing would have differential effects based on the value people place on their weight. Surprisingly though, when Ogden and Evans (1996) analysed their data using gender and restraint (as measured by the DEBQ) as factors, there were no effects for either variable. To shed light on this finding, it is helpful to examine the measure used to determine restraint in this study. It has been suggested that the DEBQ detects successful and relatively new dieters, compared to the more unsuccessful chronic dieters identified by the Restraint

Scale, which includes items reflecting weight fluctuations (Heatherton, Herman, Polivy, King, & McGree, 1988; Laessle, Tuschl, Kotthaus, & Pirke, 1989). Indeed it has been shown that restrained eaters (as measured by the Restraint Scale) exhibit significantly more weight fluctuations than do unrestrained eaters (Heatherton, Polivy, & Herman, 1991; Tiggemann, 1994). It is likely, however, that successful dieters (as measured by the DEBQ) have not experienced frequent weight fluctuations. In fact, Wardle and Beales (1986) found that among women, the DEBQ correlated .72 with the entire Restraint Scale, but only .24 with the weight fluctuation factor of the Restraint Scale. Perhaps the successful dieters included in Ogden and Evans (1996) were less vulnerable to the psychological effects of weighing than are restrained eaters, because they were relatively new at dieting and had less experience with actual weight fluctuations.

Specific hypothesis.

The purpose of this dissertation, then, is to determine if restrained eaters engage in self-evaluation similar to that which has been proposed to exist in eating disordered patients. Specifically, is their general self-worth influenced by weight and shape concerns? And if so, has this been overlooked in the literature because salience of weight and shape concerns is necessary before general self-evaluation is negatively influenced in restrained eaters? It is hypothesized that weight- and shape-related self-evaluation (as seen in individuals with eating disorders) also exist in restrained eaters, but only when their weight and shape concerns are salient.

CHAPTER II

Information processing theory: Weight- and shape-related self-evaluation in disordered and restrained eating.

Vitousek and Hollon (1990) sought to extend the conceptualization of eating disordered self-evaluation (i.e., when self-worth is based on shape and weight) beyond self-statements, attitudes, and beliefs to incorporate the operation of cognitive schemata. Schematic processing is assumed to fulfil a function for the individual, in that it acts to simplify, organize, and stabilize experiences of the self and the external world. Vitousek and Hollon (1990) proposed that individuals with eating disorders exhibit disruptions in three categories of schemata: self-schemata, weight-related schemata, and weight-related self-schemata.

Markus (1977) defined a self-schema as "a cognitive generalization about the self, derived from past experience, that organizes and guides the processing of self-related information contained in the individual's social experiences" (p. 64). In other words, self-schemata are cognitive and affective representations regarding our physical characteristics, attitudes, preferences, skills, weaknesses, and behavioural regularities. These structures are hypothesized to develop from repeated similar categorization and evaluation of behaviour by oneself and by others. They are formed around those aspects of the self that come to be regarded as important and, as a result, self-schemata direct attention to behaviour that is indicative of these aspects (Markus, Hamill, & Sentis, 1987). Individuals with self-schemata in various domains (e.g., independence, creativity) demonstrate both confidence and consistency in their judgements in these areas. Moreover, in schema-relevant domains those with corresponding self-schemata are better able to predict and

recall their own behaviour and resist counter-schematic information than are those without these particular schemata (Markus, 1977; Markus, Crane, Bernstein, & Siladi, 1982; Markus et al., 1987; Mills, 1983). Vitousek and Hollon (1990) suggest that self-schemata are of particular interest in the study of clinical problems, since their tendency to favour internal consistency over external validation, assimilation over accommodation, and stability over change may serve to perpetuate negative views of the self. They proposed that the self-schemata of eating disordered individuals contain propositions about the self that are usually negative, including self-judgements such as inadequate, unlovable, unintelligent, unattractive and fat.

Weight-related schemata contain propositions about the meaning of body weight and eating in terms of the personal characteristics ascribed to those who are fat or thin. It has been hypothesized that eating disordered persons have assembled a dense associative network between the construct "thinness" and such constructs as "self-control," "virtue," "beauty," and "intelligence." On the other hand, being "fat" may mean that a person is "weak," "unlikable," "disgusting," and so on. The meanings of weight and shape are more elaborated, over-inclusive, inflexible, idiosyncratic, emotionally charged and personally relevant for people with eating disorders (Markus et al., 1987; Vitousek & Hollon, 1990).

Weight-related self-schemata combine views of the self with information about weight and are considered the core cognitive component of eating disorders (Vitousek & Hollon, 1990). Negative weight-related propositions combine with specific negative self-judgements about weight and shape. These schemata reflect one's judgement that one is fat (whether or not this judgement is accurate), and therefore bad and inadequate in all

areas of life. Weight-related self-schemata are the basis for the process whereby eating disordered individuals come to see weight and shape as the central and most important component for inferring personal worth.

[G]iven characteristic self-schemata (about personal worth, asceticism, perfectionism, maturity, etc.), and given characteristic weight-related schemata (about the private and public implications of thinness and fatness), linkage between these elements becomes a logical if not inevitable development for the future anorexic or bulimic. She finds a maladaptive solution to her suffering, confusion, and sense of inadequacy by identifying herself with her weight. Like the paranoid individual who concocts a delusional explanation for anomalous events or the religious individual who embraces a fundamentalist creed, she experiences relief in the schema-driven simplicity, lack of ambiguity, and comprehensiveness of the anorexic world-view (Vitousek & Hollon, 1990, p. 197).

Vitousek and Hollon (1990) propose that cognitive theory can help to explain the persistence of eating-disordered symptomatology.

Cognitive models have previously attributed the stability of pathological behaviour to tenacious core beliefs, positive and negative reinforcement, and the starvation syndrome, but have seldom explicitly addressed the possibility that schematic processing also acts to prolong symptoms in a relatively automatic fashion. There is ample evidence from cognitive psychology that the existence of a schema in a given domain tends to produce systematic errors in the processing of information relevant to that domain, through mechanisms such as overuse of the schema, selective attention and memory... Just as these mechanisms have been implicated in the maintenance of depressive and anxiety disorders, it is hypothesized that they may play a role in supporting the maladaptive behaviour associated with anorexia nervosa and bulimia nervosa (Vitousek & Hollon, 1990, p. 192).

Weight-related self-schemata may prolong symptoms in a relatively automatic fashion by affecting the way in which eating disordered individuals perceive and interpret their experiences. For example, an eating disordered individual may specifically attend to an ambiguous comment made by someone in the environment regarding her appearance (e.g., "you are looking very healthy"). An eating disordered schema-consistent

interpretation for this statement may be "you have gained weight" or "you are fatter."

Because negative propositions (e.g., disgusting, inadequate, stupid) are connected with fat and gaining weight, it is likely that the eating disordered patient will attempt to counter the negative feelings by engaging in maladaptive weight control methods such as dieting, fasting, purging, or exercising. In this way eating disordered symptomatology may be maintained and perpetuated by weight-related self-schemata.

Markus and colleagues (1987) applied schema theory with respect to body weight and shape to a non-clinical population. According to the authors, the body weight schema is of special interest because it is an example of a schema that is both universal and particular. It is a universal schema in that virtually everyone develops some type of basic knowledge organization pertaining to their body weight or shape. At the same time, there appear to be huge differences among people in this domain. Individuals range from those intensely concerned with their body weight and everything connected with it, to those who have very little interest in this aspect of the self. Those actively concerned with their body weight may be said to be schematic in this domain. On the other hand, those who hold only the very basic schema about body weight and are not actively concerned with their body weight are considered aschematic (or without a particular schema in this area). Markus et al. (1987) stated that "schematics are assumed to have integrated a large number of independent representations about body weight into a knowledge structure that is activated automatically when the individual attends to his or her body weight." Moreover, body weight schematics "should be much more worried about their weight, more willing to attempt dieting, more likely to agonize over the failures in dieting, and more worried that they are being stigmatized for their weight" (p. 52).

Markus and colleagues (1987) asked university students to evaluate themselves on a variety of semantic differential scales (e.g., underweight-overweight) and to rate the importance of each of the dimensions to their self-concept. Participants were classified as either schematic or aschematic for a body weight schema. Schematic individuals were those who were objectively overweight, indicated that "overweight" was self-descriptive and that this dimension was important to their self-evaluation. On the other hand, aschematic individuals were those who rated themselves in the middle range on the underweight-overweight scale, and who indicated that this dimension was unimportant to their self-evaluation. Participants were asked to respond to three types of stimuli (i.e., thin and fat adjectives, body silhouettes, pictures of food) with the response "me" or "not me."

The results demonstrated that schematic and aschematic individuals processed weight-related information differently. The authors found that schematic individuals endorsed "fat" adjectives more frequently and rapidly than aschematic participants, showed clearer and more consistent discriminations in responding to body silhouettes, and recorded longer latencies in judging the types of foods they would like to eat. This study demonstrated, in a non-clinical population, that individuals concerned with their body weight and whose weight and shape concerns were primed processed weight-related information differently from those unconcerned with their body weight. Although it is not clear why normal weight schematics were not included in the study, and even why objective or perceived body weight is part of the operationalization of schematicity, the results of this study suggest that weight-related self-schemata exist in non-eating disordered weight-concerned participants, possibly even in restrained eaters.

Weight- and shape-related self-evaluation (in cognitive terms).

Weight- and shape-related self-evaluation is cognitively represented by the weight-related self-schema (Vitousek & Hollon, 1990). It is possible that the weight-related self-schema, which is constantly employed by eating disordered patients to infer personal worth, may also exist in restrained eaters. Specifically, the weight-related self-schema may be temporarily activated in restrained eaters when their weight and shape concerns are accentuated and restrained eaters' self-evaluation may then be negatively influenced. In other words, dieters may possess a schema that has historically been thought to exist only in eating disordered individuals. The difference may be that this schema is always activated in eating disordered patients and constantly affects their self-evaluation, whereas in dieters the schema must first be activated before self-evaluation is affected.

Information processing biases.

Information processing refers to the way in which individuals perceive, attend to, and retrieve information from memory. These processes have been investigated and reported to be aberrant in a variety of clinical disorders, including generalized anxiety disorder (GAD) (e.g., Mathews & MacLeod, 1985; Mogg, Mathews, & Weinman, 1989), social phobia (e.g., Hope, Rapee, Heimberg, & Dombek, 1990; Mattia, Heimberg, & Hope, 1993), agoraphobia (e.g., Burgess, Jones, Robertson, Radcliffe, & Emerson, 1981; Nunn, Stevenson, & Whalen, 1984), panic disorder (e.g., McNally, Riemann, & Kim, 1990), obsessive-compulsive disorder (e.g., Foa, Ilai, McCarthy, Shoyer, & Murdock, 1993; Lavy, van Oppen, & van den Hout, 1994), posttraumatic stress disorder (PTSD) (e.g., Cassiday, McNally, & Zeitlin, 1992) and depression (e.g., Gotlib & McCann, 1984). In general, the typical finding is that patients exhibit information processing biases toward disorder-specific

information. For example, individuals with GAD are more likely than control participants to attend to worry-related words relative to neutral words (e.g., Mogg et al., 1989).

However, the discovery of information processing biases is not limited to clinical populations, and has also been found in non-disordered populations. Individuals high in trait anxiety (e.g., Nugent & Mineka, 1994) display information processing biases comparable to those exhibited by those with GAD. Further, participants who have experienced trauma but are not currently experiencing PTSD symptomatology evince an attentional bias similar to that displayed by PTSD patients (e.g., Cassiday et al., 1992). These findings suggest that such biases may not be specific to clinically anxious patients, but may also be evident in analogous non-clinical populations.

Eating disorders have recently been conceptualized in information processing terms (Vitousek & Ewald, 1992; Vitousek & Hollon, 1990; Vitousek & Orimoto, 1993). Vitousek and Hollon (1990) hypothesized that eating disordered individuals develop organized cognitive structures around the issue of weight and its implications for the self (i.e., weight-related self-schema). These cognitive structures may automatically prolong symptoms by affecting the way in which eating disordered patients perceive, interpret, and remember their experiences. For example, the authors suggest that eating disordered patients may process food- and weight-related information more easily and more quickly than non-disordered individuals and experience greater intrusion of weight-related content into unrelated or ambiguous situations. Recently, investigators have examined eating disordered patients and restrained eaters in cognitive experimental paradigms. Eating disordered patients are expected to display information processing biases towards weight- and shape-related material. This prediction is consistent with the diagnostic criterion "self-

evaluation is unduly influenced by body shape and weight" that is common to both anorexia nervosa and bulimia nervosa (APA, 1994). Other authors have discussed at length the intense preoccupation with weight and shape exhibited by these patients (e.g., Bruch, 1973; Fairburn, Cooper, & Cooper, 1986; Fairburn & Garner, 1988; Russell, 1979). Further, it seems reasonable to predict that information processing biases towards food- and eating-related information would also characterize these patients, who spend so much time thinking about, refusing, and bingeing on food.

However, it is not clear if similar information processing biases will occur in a comparable non-clinical population (i.e., restrained eaters). Although not considered disordered, restrained eaters demonstrate excessive concern with weight and shape (Garner et al, 1984; Polivy & Herman, 1987), and a preoccupation with food and eating (King, Polivy, & Herman, 1991; Ogden, 1992). Further, restrained eaters may be thought of as having a highly developed body-weight schema (Markus et al., 1987). These authors suggest that individuals who are actively concerned with their body weight will process weight-related information differently than those who are not. Nevertheless, many cognitive theorists contend that information processing biases are specific to pathological eating and are involved in the maintenance of the disorder. However, as in the anxiety literature, non-clinical analogue populations often display information processing biases that resemble clinical biases.

A review of the literature on information processing in disordered and restrained eating may shed light on the weight- and shape-related self-evaluation hypothesis explored in this dissertation. Specifically, it is predicted that individuals with eating disorders will demonstrate information processing biases toward weight- and shape-related information

under all conditions (indicating that the weight-related self-schema is in use), whereas restrained eaters should do so only when their weight and shape concerns are primed. Information processing measures will be utilized in this dissertation as manipulation checks to determine if weight and shape concerns were successfully made salient in restrained eaters following the weighing manipulations. If restrained eaters demonstrate information processing biases toward weight- and shape-related material only after the weighing manipulation, then the hypothesis that the weight-related self-schema is activated when concerns about weight are made salient will be supported.

Modified Stroop.

Many investigators have employed the modified⁴ Stroop (1935) procedure to investigate attentional biases. In this procedure, participants are shown words of varying emotional significance and asked to name the colours in which the words are printed while ignoring the meaning of the words. Delays in colour-naming occur when the word meaning attracts attention despite efforts to attend only to the colour of the word. The presentation of personally or emotionally significant material results in slower colour-naming. The Stroop effect is a classic example of automatic processing because even though participants are explicitly asked to ignore the meaning of the emotionally loaded word, they cannot help but be influenced by it. Colour-naming latency is compared between emotional and non-emotional words and between persons with and without the disorder. Eating disordered and restrained participants might be expected to exhibit an attentional bias causing them to take longer to colour-name words related to the emotionally significant topics of food,

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The original Stroop procedure uses colour words printed in conflicting colours.

eating, weight or shape. Since patients with eating disorders are prone to deny the severity of their illness, the non-introspective Stroop task is particularly attractive to researchers and clinicians.

Purposes and theoretical explanations for the modified Stroop effect.

One theory of the modified Stroop effect suggests that the attentional bias for target words reflects anxiety evoked by the meaning of these words and can thus be regarded as an index of psychopathology (Ben-Tovim, Walker, Fok, & Yap, 1989). Specifically, the greater the bias toward disorder-related material the greater the eating pathology, and similarly, reductions in this bias could reflect the recovery process. There is some evidence to support this notion. Cooper and Fairburn (1993) interviewed 75 bulimic patients using the Eating Disorder Examination (EDE; Cooper & Fairburn, 1986) and asked participants to complete a Stroop task and a variety of questionnaires (measuring overall level of psychopathology). Participants were asked to colour-name an original Stroop card (colour words printed in conflicting colours), a target Stroop card (i.e., fat, diet, thighs, cakes, hips), and a control Stroop card (neutral words matched with the target words).⁵ The authors computed a target interference score by subtracting the speed of colour-naming control words from the speed of colour-naming the target words. Multiple regression analysis showed that frequency of purging, not general level of psychopathology, was the best predictor of this interference index. This result suggests that an attentional bias toward food- and body-related information is more pronounced in eating disordered patients who purge.

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See section on methodological issues and stimuli matching.

Cooper and Fairburn (1994) reported on the same bulimic patients as in Cooper and Fairburn (1993). These participants were asked to perform the Stroop task again after they completed a successful treatment program.⁶ Pre- and post-treatment colour-naming latencies were compared using the target interference index. The results revealed that patients showed significantly less interference for the target words following treatment. The authors stated that improvement was substantial and the degree of post-treatment interference was similar to that experienced by normal non-dieting controls from another study (i.e., Cooper, Anastasiades, & Fairburn, 1992). The authors also indicated that the increased colour-naming speed of disorder-specific information demonstrated by the improved patients was probably not the result of practice since there was no improvement in the colour-naming speed of the words on the colour card. These results suggest that information processing biases are specific to symptomatic eating disordered patients. In fact, these biases toward combined food-, shape- and weight-related material seem to disappear in patients who have undergone successful treatment for bulimia.

The theory that the modified Stroop effect reflects anxiety and pathology predicts that only threatening stimuli such as forbidden foods (e.g., "chocolate") and negative shape-related words (e.g., "fat" but not "thin") will result in impaired colour-naming. However, in light of the finding that non-disordered fasting participants display an attentional bias toward food-related information (see Channon & Hayward, 1990; Lavy & van den Hout, 1993), Stroop interference does not necessarily seem to be a result of pathology.

⁶ Participants were participating in a treatment outcome study and received behavioral therapy, cognitive-behavioral therapy, or interpersonal therapy. All three treatments had a marked effect on the psychopathology of bulimia. Each resulted in a substantial reduction in the frequency of overeating and the level of eating disorder symptoms and general psychiatric symptoms (Fairburn et al., 1991b).

Channon and Hayward (1990) stated that the Stroop task provides "an objective index of current food restriction" (p.451). This hypothesis predicts that only physiologically deprived participants will exhibit Stroop interference in response to food-related cues. This view does not account for the attentional biases toward food-related cues displayed by non-deprived restrained eaters.⁷ In addition this theory does not address attentional biases toward body shape-related material found in both eating disordered and restrained eaters.

Another explanation of selective processing was offered by Lavy and van den Hout (1993). According to them, an attentional bias is related to an increased urge to act, as in the avoidance of threatening stimuli, or approach toward appetitive cues. This hypothesis claims that selective attention to food-related words may be triggered not only by physiological deprivation but, more generally, by stimuli that are desired strongly (e.g., psychological deprivation). This proposal accounts for the food-related attentional bias seen in fasting participants, eating disordered patients, and restrained eaters (who may be considered to be psychologically deprived of certain forbidden foods). Also, this theory predicts that eating disordered participants and dieters will display an attentional bias toward fat (avoidance of threatening cues) and thin (approach of positive cues) body shape-related words. Unfortunately, Lavy and van den Hout (1993) do not address the cognitive correlates of "an increased urge to act" or what exactly such an urge is or how it occurs.

One cognitive explanation for these effects may be derived from Vitousek and Hollon's (1990) description of the weight-related self-schema. Participants may be

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Although the name implies that restrained eaters are constantly restricting their food intake, years of research has demonstrated that this is not the case. Restrained eaters have been shown to break their diets and consume more than unrestrained eaters under certain circumstances (e.g., preload, ego-threat) and they do not seem particularly likely to lose weight over time (Heatherton et al., 1991).

manifesting a bias toward target stimuli because target words are part of a highly elaborated knowledge structure (i.e., the weight-related self-schema). The target stimulus automatically activates the corresponding node in the schema, and the activation spreads quickly to all connected nodes in the schema. Since this particular cognitive network is extremely complex and dense with interconnections, part of the available cognitive processing capacity is allocated to the spreading activation. This allocation leaves fewer cognitive resources available for colour-naming, which is impaired as a result. This theory predicts that any target stimulus included in the corresponding schema will result in slower colour-naming. Therefore, fat and thin body shape-related words will disrupt colour-naming, because both types of shape-related nodes are included in the schema. It is also possible that nodes representing forbidden and diet foods are located somewhere in the weight-related self-schema. For example, a dieter could easily associate "fat" with "ice cream," or "thin" with "rice cake" so that colour-naming a forbidden or diet food-related word will be impaired. In summary, this theory proposes that an attentional bias toward fat and thin body shape-related words and forbidden and diet food-related words will occur in both disordered and restrained eating depending on the activation of the weight-related self-schema.

Methodological issues (in the use of the modified Stroop).

Stimuli (relatedness). Semantic relatedness of the experimental stimuli should be considered. By definition the food-, eating-, weight-, and shape-related stimuli are semantically-related. It is therefore necessary to include a category of neutral stimuli that are also semantically-related. This way, if participants exhibit an information processing bias favouring the target stimuli over the semantically-related control stimuli, the bias cannot be attributed solely to the priming of that particular semantic category.

Stimuli (matching). It is necessary to equate the experimental stimuli with the target stimuli on a variety of dimensions. For example, if words are used it is advisable to match the target words with the control words on phonetics, part of speech, word length, number of syllables, and frequency of usage in the language (Carroll, Davis, & Richman, 1971).

Stimuli (presentation). Due to the possibility that massed presentation of all target words may evoke rumination about previous target words and capitalize on additional sources of interference, it has been suggested that card presentation of Stroop stimuli does not provide a pure measure of automatic attentional bias (McNally, Kaspi, Riemann & Zeitlin, 1990). As a result, stimuli should be presented individually and randomly onto a computer screen.

Control participants. Although the main comparison to detect information processing bias is determined by comparing latencies for target and control stimuli, it is also important to include an appropriate control group. For example, if the control group shows a bias toward fat-related words that is identical to the one displayed by the eating disordered patients it is no longer clear how meaningful or useful the bias is for understanding the information processing of eating disordered patients. The dieting status of control participants should be measured when investigating information processing biases. Ideally, separate groups of restrained eaters and unrestrained eaters should be included for comparison. However, most studies examining information processing biases in eating disordered patients use only one control group (i.e., non-eating disordered) and fail to measure dieting status. It is entirely possible that in a group of undifferentiated female control participants, a large proportion of participants may be restrained eaters. Because restrained eaters may also exhibit information processing biases, any comparison between

the control group and the eating disorder group may be of only limited utility in detecting information processing biases in the disordered group. Unrestrained eaters should comprise the critical comparison group when trying to detect information processing biases in both disordered and restrained eating.

Starvation and deprivation effects on processing food-related material. In 1950 Keys and his colleagues (Keys, Brozek, Henschel, Mickelson, & Taylor, 1950) demonstrated that food preoccupation could be induced in normal eaters by restricting food intake for several months. After losing approximately 25% of their body weight, the male participants found it increasingly difficult to concentrate on their usual activities. They were absorbed by persistent thoughts of food and eating; in fact, food became a principal topic of conversation, reading, and fantasy. Clearly, long-term food restriction is associated with increased preoccupation with food and eating. It is, therefore, necessary to control for degree of weight loss and starvation when investigating information processing biases in eating disordered individuals. This is particularly true for patients with anorexia nervosa who, by definition, must have experienced weight loss leading to a maintained body weight less than 85% of that expected (APA, 1994). However, there is reason to believe that even short-term deprivation can increase food preoccupation and interfere with the processing of food-related information.

Channon and Hayward (1990) had normal weight non-eating disordered participants complete a modified Stroop task. Sixteen males and 16 females were randomly assigned to either a fasting (i.e., 24 hours) or a non-fasting condition. When participants arrived in the laboratory they were asked to colour-name food words (i.e., food, dinner, baker, sugar, meal, butter, cream, toast, picnic, potato, cake, sandwich), body-size words (i.e., large,

figure, heavy, weight, shape, fat, stomach, massive, waist, monstrous, hips, bulky) and matched control words. Each category of words was presented on a separate Stroop card and colour-naming speed was determined for each card. It was predicted that the fasting group would take significantly longer to colour-name the food words, relative to the control words and the control group. A difference in colour-naming speed of the body-size words was not expected. The predictions were confirmed. Colour-naming times for the food words compared with the control words were significantly slowed for the fasting group, but not for the non-fasting group. Colour-naming latencies for body-size words did not differ between groups. Thus, after 24 hours of deprivation, normal weight non-eating disordered participants demonstrated an attentional bias toward food-related words.

In an attempt to improve on Channon and Hayward's (1990) methodology, Lavy and van den Hout (1993) found equivocal results regarding an attentional bias in normal, deprived participants. These authors first screened and excluded participants for both disordered and restrained eating. Participants who were assigned to the 24 hour fast believed that their urine would be checked for compliance with the fasting instructions. Further, Lavy and van den Hout included two semantically-related groups of words (i.e., holiday words and tool words) to use as a comparison with the food-related words. All words were matched in terms of length and number of syllables in the Dutch language. Lavy and van den Hout presented experimental stimuli from all categories randomly and individually onto a computer screen. The computer was connected to a voice activated microphone that recorded individual latencies for each word. The results revealed that fasting participants, compared with non-fasting participants, showed more colour-naming interference for food words than for holiday words. However, when tool words were used as

a control category, no attentional bias was found for the food words. This result is difficult to interpret, because there is no logical reason for deprived participants to respond more slowly than non-deprived participants to tool words.

Overall, both studies indicate that even short-term food restriction leads to significant increases in preoccupation with food in normal participants in at least some comparisons (Channon & Hayward, 1990; Lavy & van den Hout, 1993). Therefore, the effects of deprivation on information processing should be considered when testing eating disordered individuals (i.e., bulimics) and restrained eaters who restrict their intake periodically, even if they are not significantly underweight. Researchers should be aware of these potentially confounding effects and at the very least obtain weight, hunger, and dieting status measurements from control participants in order to compare them with the disordered group.

Caveat.

The following sections review the empirical evidence regarding information processing biases in disordered and restrained eating. As was discussed above, there are many methodological issues to consider. The ideal study would carefully consider the issues related to stimuli selection (matching and semantically relatedness), control participants, and deprivation status (both psychological and physiological). In addition, if a modified Stroop task is used then stimuli should be presented both individually and randomly. When reading the following sections, bear in mind that none of the studies has successfully addressed all of the issues and most studies suffer from serious methodological flaws.

Information processing in disordered eating.

Attentional bias. Attention refers to the selective aspects of perception; at any instant, an individual focuses on certain features of the environment to the relative exclusion of other features. Eating disordered patients should demonstrate an attentional bias toward food-, eating-, weight- and shape-related information. An attentional bias can be measured by obtaining shorter latencies to detect target information, or increased interference of target stimuli relative to other stimuli during an incidental task (e.g., colour-naming). The following studies have examined attentional bias in eating disordered patients.

Cooper and colleagues (1992) included 36 patients with bulimia and 18 female control participants in a modified Stroop experiment. The Stroop cards included a combined food and shape target Stroop (i.e., fat, diet, thighs, cakes, hips) and a matched control Stroop. Results indicated that the patients showed greater interference than control participants did when colour-naming the target card. Control words elicited a similar amount of interference in both groups. Thus, bulimic but not control participants demonstrated an attentional bias toward combined information relating to food, weight and shape.

Fairburn, Cooper, Cooper, McKenna, and Anastasiades (1991) recognized the potential confound with the control groups, and included males as control participants in an attempt to rule out normative concerns with eating, weight and shape. The assumption was that males are unlikely to experience this type of concern. Twenty-four female patients with bulimia, 50 female control participants, and 24 male control participants participated in a modified Stroop task. Participants were asked to colour-name a target Stroop card combining both shape and food-related words, and a matched control Stroop card. The total

time taken to colour-name each card was recorded. Results indicated that bulimic patients were slower than were the control participants to colour-name the target Stroop card, but there was no difference between the two groups in their colour-naming of the neutral card. The female and male control participants did not differ in their colour-naming speed on either of the cards. Thus, bulimic patients displayed an attentional bias toward the combined food and shape-related material. Fairburn and colleagues (1991) concluded that "bulimia nervosa appears to be associated with the selective processing of information related to eating, shape, and weight. It also seems that the normative degrees of concern about eating, shape and weight found amongst young women are not sufficient to interfere with information processing. Thus the phenomenon appears to be peculiar to those with a clinical eating disorder" (p. 421).

Cooper and Fairburn (1992a) decided to use two groups of "dieters" in their modified Stroop experiment. Dieters were recruited by advertisements asking for volunteers who had been making a "serious attempt to lose weight" for at least four weeks. These currently dieting participants were divided into two groups. They were classified as either having no history of eating disorder symptomatology or having a history of eating disorder symptoms. Dieting participants were excluded if they had ever met diagnostic criteria for either anorexia or bulimia. Participants included 12 patients with anorexia, 12 patients with bulimia, 12 dieters without a history of eating disorder symptoms, 12 dieters with a history of eating disorder symptoms and 12 currently non-dieting controls. Participants were asked to colour-name a combined food and shape target card and a matched control card. The colour-naming latencies revealed that the non-dieting controls and the dieters without eating disorder symptomatology showed a similar speed of colour-naming for both cards. On the

other hand, the symptomatic dieters, bulimics, and anorexics were significantly slower to colour-name target words than they were to colour-name control words.

Cooper and Fairburn (1992a) and Fairburn and colleagues (1991) concluded that an attentional bias toward information related to eating and shape appears to be specific to those with symptoms of an eating disorder. However, since these experiments did not differentiate restrained eaters (i.e., who may also exhibit a bias) from unrestrained eaters (i.e., the appropriate control group), this conclusion is clearly unwarranted. Another problem with these studies is that they combine food-related words with shape-related words on one target Stroop card. Some evidence has suggested that patients process each target category differently depending on their diagnosis of anorexia or bulimia (see below).

Channon, Hemsley, and de Silva (1988) used the modified Stroop task to investigate attentional bias in anorexia nervosa. These authors asked 20 female patients with anorexia and 20 female non-eating disordered control participants to colour-name separate food and body-size Stroop cards (and matched control cards). It was predicted that patients with anorexia would take significantly longer than would the controls to colour-name the food and body-size cards as compared to the control cards. The predictions were partially confirmed. Results revealed that colour-naming times in the food compared to the control condition were significantly slowed for both groups, but that effect was much greater for the patients than for the controls. However, colour-naming of the body-size card compared to control card did not differ between the groups. Thus, patients with anorexia nervosa demonstrated an attentional bias toward words related to food but not those related to shape.

Ben-Tovim and colleagues (1989) tested 17 patients with anorexia, 19 patients with

bulimia, and 38 non-eating disordered females in a modified Stroop experiment. Participants were asked to colour-name a food Stroop card and a body shape Stroop card (and matched control cards). The findings indicated that compared with controls, both patient groups demonstrated more interference when colour-naming food words, but only the bulimia nervosa patients displayed more interference when colour-naming shape words. This is consistent with Channon and colleagues' (1988) finding that anorexics exhibited an attentional bias only toward food-related material. These results suggest that bulimics display an attentional bias toward food-related and shape-related words, whereas anorexics demonstrate an attentional bias only toward food-related words.

Ben-Tovim and Walker (1991) tried to rule out normative concerns with weight and shape in their control group. These investigators had female control participants from a secondary school complete the EDI prior to participating in the study. The EDI subscale drive for thinness (DFT) was used as an indicator of weight and shape concerns. Control participants were classified as either having high-DFT or low-DFT, and were screened for eating disorders. Twenty-two patients with anorexia, 27 patients with bulimia, 29 high-DFT control participants, and 37 low-DFT control participants colour-named Stroop cards (i.e., a food card, a shape card, and matched neutral cards). Both patient groups showed significantly more interference for both the food- and the shape-related cards than did either control group. In contrast to Ben-Tovim et al. (1989), there were no differences between patients with anorexia and bulimia on any of the Stroop measures. Further, there were no differences in food- or shape-related colour-naming between the high-DFT and low-DFT control groups. Thus, both patient groups exhibited an attentional bias to both food and shape information, whereas non-patients with a high drive for thinness did not display an

attentional bias for either type of information. The authors concluded that an attentional bias to food- and shape-related material is specific to eating disordered patients.

Perpina, Hemsley, Treasure, and de Silva (1993) expressed their concern with considering control groups as homogenous. They suggested that "rather than categorical differences between the eating disorder population and controls, some aspect of pathology may be a shared dimension within the normal population" (p. 360). Eighteen patients with anorexia, 14 patients with bulimia, and 32 non-eating disordered female control participants were involved in a modified Stroop task. Participants colour-named a food Stroop card and a body-size Stroop card (and matched neutral cards). The EDI was administered after the modified Stroop task, and the DFT subscale was used as an indicator of weight and shape concerns (see also Ben-Tovim & Walker, 1991). However, these investigators also administered the Restraint Scale (Herman & Polivy, 1980) to determine dieting status.

As expected, the patient group (i.e., those with bulimia and anorexia combined) was slower than were controls in colour-naming both the body and the food cards. When the clinical sample was subdivided into diagnostic categories, those with bulimia were slower than were controls but only when colour-naming the body Stroop, and the those with anorexia were slower than were controls only when colour-naming the food Stroop. These results are consistent with Ben-Tovim et al. (1989) and Channon et al. (1988) and suggest that bulimia nervosa patients are most concerned with weight and appearance, whereas patients with anorexia nervosa are more concerned with eating and food-related issues.

All participants were then categorized into those with high or low DFT. Although there was no difference in colour-naming speed for the food-related words, the high DFT group was slower than was the low DFT group to colour-name the body-related words.

Participants were then classified as restrained or unrestrained eaters. Results indicated that colour-naming times of both the body-related and the food-related words compared with the control words were significantly slowed for the restrained group but not for the unrestrained group. However, restraint status was confounded with eating disorder diagnosis. The authors compared Stroop performance in anorexics, bulimics, restrained eaters, and unrestrained eaters. In this analysis, the anorexic group was significantly slower than was the unrestrained group to colour-name the food-related words, but no other differences were found.

Green, McKenna, and De Silva (1994) completed a modified Stroop study that included many improvements over the other studies discussed so far. They asked 20 patients with anorexia and 41 non-eating disordered control participants to complete a computerized Stroop task. The target stimuli consisted of separate sets of food and body-shape words. Control words were matched with the target words for length and word frequency and formed semantically-related categories [i.e., animals (bison, cow, wolves, rabbit, slugs), clothing (towels, skirt, glove, shorts⁸, outfit)]. Words were presented individually onto the computer screen and individual latencies were recorded.

The results for body shape words showed that the participants with anorexia exhibited a significant colour-naming impairment, whereas the control participants did not. Further, the patients demonstrated a significant decrease in interference over trials when colour-naming the body shape words, but they did not demonstrate this pattern for the

⁸ There certainly is some question as to how neutral the word 'shorts' is to an anorexic patient. However, this confound works contrary to the hypothesis (i.e., that there are differences in anorexic processing between food-related words and the clothing-related words). If anything, the threatening word 'shorts' would minimize the predicted differences.

semantically-related neutral matched control words (i.e., animals). The control group's colour-naming speed for both categories did not change over time. The authors suggested that patients with anorexia may habituate to the threatening connotations of the specific body-shape words presented repeatedly over time. The results also revealed colour-naming impairments of food-related words for the anorexic participants, and to a significantly lesser extent, the control participants. Differences in colour-naming across trials were not significant for either group. The fact that the patients with anorexia habituated to the body-shape related words, but not to the food-related words, supports the view that food-related stimuli evoke a more robust attentional bias in anorexics than do body shape-related words (Ben-Tovim et al., 1989; Channon et al., 1988; Perpina et al., 1993).

Cooper, Clark and Fairburn (1993) directly tested the notion that bulimics may process information differently if they are primed with their weight and shape concerns first. They measured 24 bulimic patients' colour-naming speed, self-statements, and food consumption by means of a taste test and a self-reported food diary. A control group was not included. These authors predicted that bulimics who were exposed to word pairs connected to their shape and weight concerns would show greater interference for target stimuli, more negative self-statements, and less immediate eating but more long-term eating than would bulimics shown matched neutral word pairs. All participants were asked to colour-name a combined target Stroop card (i.e., fat, diet, thighs, cakes, hips) and a matched control card. Then they were asked to record their thoughts onto an audiotape for five minutes. The experimental group was then asked to read and think about the weight

and shape-related word pairs⁹, whereas the control group was asked to do the same with the neutral word pairs. Participants completed the modified Stroop task and recorded their self-statements again. They also participated in a "taste-test" where their food intake was measured, and were asked to keep a 24-hour food diary that included an estimate of objective and subjective binges.

As predicted, experimental participants reported more negative thoughts and tended to eat less during the taste test than did the control participants. The two groups did not differ with respect to objective binges. Inconsistent with the predictions, the control participants reported significantly more subjective binges than did the experimental participants in the 24 hours following the experiment. Also, there were no differences between the two groups on the Stroop task. The group exposed to the weight- and shape-related word pairs did not show greater interference toward the disorder-specific words than did the control group. This is not really surprising, considering the present hypothesis that weight and shape concerns are chronically activated in eating disordered patients. According to this proposal, it is unlikely that activating an already-activated concern will have any additional effects on information processing.

Information processing in restrained eating.

Attentional bias. Mahamedi and Heatherton (1993) exposed 47 restrained and unrestrained eaters to a preload manipulation and a modified Stroop task. Before participants completed the colour-naming task, one half of the participants were randomly assigned to drink a 15-oz chocolate milkshake. Participants were asked to colour-name a

⁹ The experimental word pairs were as follows: fat-disgusting; overweight-revolting; stomach-horrible; chocolate-fattening; shape-ugly; thin-confident; control-successful; diet-good; weight loss-happy; slim-attractive.

food Stroop and a body-size Stroop card (and matched control cards). The authors predicted that restrained eaters would show greater interference on the food and body words than would unrestrained eaters, and that the preload would increase interference on target words for restrained eaters but not for unrestrained eaters. Restraint status (as measured by the Restraint Scale), hunger, and weight were measured after the Stroop task.

There were no significant effects with respect to the food Stroop. However, all participants who were preloaded increased their interference in response to the body-shape words. Although the interaction was not significant, the effect was attributable primarily to the restrained participants. (A planned comparison showed that the preload led to increased interference on the body words for restrained eaters but only marginally so for unrestrained eaters.) Thus, relative to unrestrained eaters, restrained eaters displayed somewhat greater interference to body-related words but only after consuming a high-calorie preload. Restrained eaters did not exhibit an attentional bias toward food words in either condition. The authors speculated that the food words used may not have been particularly meaningful to restrained eaters (e.g., food, dinner, meal, toast, picnic, potato, sandwich), and that it may be possible to reveal an attentional bias toward more threatening food words.

In a second study, Mahamedi and Heatherton (1993) changed the food Stroop to include fattening and forbidden food words (Knight & Boland, 1989). The food words were; fudge, cookies, candy, sugar, pie, butter, cream, chips, pastry, donut, cake, and pudding. Forty-eight participants were exposed to the same procedure as in the first study, with the exception of the altered food words. The results were similar to those of the first study. There were still no differences with respect to restraint or preload condition on the food

Stoop. Further, there was another significant effect of condition on body word interference, such that preloaded participants displayed more interference than did non-preloaded participants. Once again, although the interaction was not significant, the influence of preload on body-shape word interference was significant for restrained eaters but not for unrestrained eaters. Thus, in both studies, a preload produced increased interference on Stroop performance only for body-shape words, and this effect occurred primarily for restrained eaters. In summary, restrained eaters displayed a weak attentional bias (compared to unrestrained eaters) to words related to body-shape but only after consuming a high-calorie preload. Further, restrained eaters did not exhibit an attentional bias toward food words in either condition.

Ogden and Greville (1993) asked 54 female students to participate in a computerized modified Stroop experiment. Participants were categorized as either restrained or unrestrained eaters according to a median split on the restrained eating section of the DEBQ. All participants were asked to colour-name food Stroop words and body-shape words (and matched control words) before and after eating either a high (i.e., Twix chocolate bar) or low (i.e., cream cracker) calorie preload.

Results were analysed by computing the difference between the colour-naming times for the target words and their control words before and after the preload. Results indicated that before the preload, groups did not differ in their ability to colour-name food words. However, restrained eaters took longer to colour-name the food words after the high calorie preload than after the low calorie preload, and longer than the unrestrained eaters in the either condition. For the body shape words, all participants in the high calorie preload condition, regardless of restraint, demonstrated colour-naming interference. However,

restrained eaters showed a greater increase in their time to colour-name the body size words after the high calorie preload than after the low calorie preload, and a greater increase than did the unrestrained eaters in either condition. Thus, these results suggest that restrained eaters may exhibit an attentional bias toward both food and body-related words, but only after a high-calorie preload. These findings are generally consistent with those reported by Mahamedi and Heatherton (1993).

Schmidt and Telch (1991) included 47 restrained and 33 unrestrained eaters in their modified Stroop experiment. Participants were administered the Restraint Scale during a massed testing session and were classified as either exhibiting high restraint (score greater than 14) or low restraint (score less than 10). Participants were contacted by phone and asked to refrain from eating for around three hours prior to participation in the study. Hunger and weight were measured when participants arrived in the lab. Participants then completed a computerized Stroop task. The task included three target word categories (i.e., shape, food, and general dieting) and matched control words. After the initial Stroop test, participants were randomly assigned to a preload condition (i.e., 16-oz milkshake), a mood induction condition (i.e., reading depressing self-referent statements for 20 minutes), a mood induction-preload combination, or a control condition. The Stroop procedure was repeated by all participants. The authors predicted that high restraint participants would show an attentional bias towards the target words compared to low restraint individuals. Moreover, given the evidence that dietary preloads and negative mood states disinhibit restrained eaters (e.g., Herman & Mack, 1975; Polivy, Herman & McFarlane, 1994), they suggested that exposing these participants to a preload and/or a negative mood induction may result in an even greater attentional bias toward the target words.

Baseline measures demonstrated that restrained and unrestrained eaters were significantly slower on the experimental screens compared to the control screens. Relative to unrestrained eaters, restrained eaters were significantly slower when colour-naming the food and the body-shape words, but not the dietary words. Colour-naming ability for the target words was not affected by the preload, the mood manipulation, or the combination of both, for either the restrained or unrestrained eaters. The authors concluded that an attention bias toward food- and shape-related information was observed in restrained eaters relative to unrestrained eaters under normal circumstances and that none of the priming manipulations had an additional effect.

A serious problem exists with this conclusion. All participants were weighed at the beginning of the experiment in order to exclude overweight participants from the experiment. Therefore, during the "baseline" Stroop task, restrained participants' weight and shape concerns may have already been made salient by the process of being weighed.¹⁰ Once their concerns were activated, an additional priming manipulation (i.e., preload or mood induction) ought not to affect the already existing attentional bias displayed by the restrained eaters. Accordingly, the results of this study are consistent with the notion that restrained eaters will show selective processing of eating- and weight-related information after (and only after) their weight and shape concerns have been primed.

Schmidt and Telch (1995) attempted to improve on their previous modified Stroop study with restrained and unrestrained eaters. However, they repeated their earlier mistake. Once again dieters' weight and shape concerns were primed before the

¹⁰ It is not clear if participants were weighed or self-reported their weight. Either technique of weight assessment would probably activate concerns with weight/shape/food in restrained eaters.

experiment. The experimenters administered the Restraint Scale prior to the experiment and screened participants for weight status. As a result, restrained eaters answered questions concerning their weight and dieting history and reported their weight to the experimenter before a single measure was obtained. Participants were also asked to fast for three hours or to achieve a moderate degree of hunger before participating in the Stroop colour-naming task. Three types of target stimuli (i.e., body-shape, food, general dieting) and matched control stimuli were presented in blocked format on a computer screen.

Restrained and unrestrained eaters did not differ with respect to their relative colour-naming speed on either the food Stroop or the general dieting Stroop. However, restrained eaters were significantly slower than were unrestrained eaters on the body-shape Stroop.¹¹ Thus, restrained eaters displayed a cognitive bias toward body shape-related information, after their weight and shape concerns were activated.

Overduin, Jansen, and Louwse (1995) included 51 female participants in their modified Stroop experiment. Participants were classified as restrained or unrestrained based on a median split of 10 on the Restraint Scale. All participants were asked not to eat for three hours prior to the experimental session. When they arrived in the lab, participants were randomly assigned to consume either 60 g of bavaroise pudding, or nothing. Participants in the pudding condition were asked to concentrate on its colour, smell, and taste. After practising the Stroop with neutral words, participants were asked to colour-name words that were eating-related, shape-related, and office-related (i.e., semantically-related control group). The words were presented individually and randomly onto a

¹¹ In their first study, Schmidt and Telch (1991) demonstrated an attentional bias for both food- and body-related words in restrained eaters.

computer screen, and the participant's voice was detected by a voice activated microphone that recorded individual response latencies. In the control condition, restrained eaters showed significantly greater Stroop interference for eating-related words than did unrestrained eaters. However, after pudding consumption unrestrained eaters demonstrated relatively greater interference for the eating-related words, whereas restrained eaters' processing was not affected by the manipulation. Surprisingly, there were no effects at all for the body-shape words.

Once the Stroop was done, participants were asked to complete an ice cream taste-rating questionnaire and were presented with three bowls of ice cream. The researchers pointed out that tasting the ice cream would be helpful in completing the questionnaire and that the participant was allowed to eat as much as she wanted or thought necessary. After 15 minutes, the experimenter returned and asked participants to complete the Restraint Scale. The food intake data showed no main effects for restraint or pudding condition. However, there was a significant interaction between the two factors. Oddly enough, in the pudding condition, the restrained eaters ate less than in the control condition. The ice cream consumption of the unrestrained eaters was unaffected by the pudding preload. Thus, it appears that restrained eaters, but not unrestrained eaters, regulated their intake in response to the pudding. This outcome contradicts previous findings that have shown that unrestrained eaters usually compensate by eating less after a preload, whereas restrained eaters eat more after a preload (e.g., Herman & Mack, 1975; Hibscher & Herman, 1977; Polivy, 1976; Spencer & Fremouw, 1979). In these studies, the preload is perceived by participants as palatable and fattening and usually consists of a 15 oz milkshake. However, the pudding in this experiment was not rated as very palatable by the participants (i.e., only

57 on a 100-point scale) and may not have been perceived as high calorie. Further, the amount of pudding offered to participants was much smaller (i.e., 60 g) than were the preloads used in traditional counterregulation experiments. Therefore, it is possible that the restrained eaters were not disinhibited by the pudding; in the absence of disinhibition, restrained eaters may be expected to show normal regulation (though consumption should be at a reduced level overall; Herman & Polivy, 1984).

Although Overduin and colleagues (1995) should be recognized for their significant improvement in the Stroop procedure (i.e., random presentation of the stimuli, voice activated microphone), there is a serious problem with this study. Previous studies investigating differences between restrained and unrestrained eaters have used a score of 15 as the cutoff. Specifically, those who score below 15 are considered unrestrained eaters, whereas those who score 15 or above are considered restrained eaters (e.g., Polivy et al., 1994). In this study, a median split was conducted to determine restraint status. As a result, the mean score on the Restraint Scale for the restrained eaters was only 15. Thus, it appears that the restrained eaters in this study are perhaps less restrained than were the restrained eaters in prior studies, possibly obscuring restraint category differences in colour-naming target words relative to control words. These serious problems throw the results obtained from this study into question.

Memory bias. Graf and Schacter (1985) identified two types of memory. Explicit memory involves conscious recollection of previous experience. It is accessed by traditional memory tests (e.g., recall, recognition) that require elaborate and effortful processing. On the other hand, implicit memory is revealed when performance on a task is affected despite the absence of conscious recollection of a prior learning experience. It is

accessed by priming tests (e.g., word completion) involving automatic activation that is independent of elaborate encoding, effort, or conscious recollection at testing. It is predicted that an individual exhibiting disordered eating should display facilitated memory (both explicit and implicit) for shape, weight, food and eating-related information relative to both neutral information and control participants.

King and colleagues (1991) included 35 restrained eaters, 31 unrestrained eaters, 24 obese people, and 6 patients with anorexia in their memory experiment. All participants first completed a free-response measure of the accessibility of weight and food-related constructs. Here participants were asked to list four types of information: (1) five things they spend the most time thinking about, (2) five activities they most enjoyed, (3) aspects of their own physical appearance that are noticed by others, and (4) aspects of others' physical appearance that they themselves notice on a regular basis. Next, participants read a one-page description of the physical appearance and behaviour of a target person. There were three versions of this essay, differing in the order in which sentences describing the target person were arranged. The essay consisted of 16 items of information, four items each about the target person's weight (e.g., she tries to exercise to keep her weight down), eating activities (e.g., one of her favourite pastimes is trying out new restaurants), age (e.g., she has a number of wrinkles around her eyes), and sewing activities (e.g., she takes a sewing class one night a week). Participants were then given five minutes to complete as many word fragments as they could in a word completion task. This task was used strictly as a filler task and did not contain any reference to eating or physical appearance. Thus, implicit memory was not assessed. The participants were then asked to reproduce the essay as completely as possible. Restraint status was measured at the end of the experiment.

The accessibility measure was scored by noting the frequency of certain words reflecting weight (e.g., weight, slim), food (e.g., food, recipes), eating (e.g., diet, eating), and food preparation (e.g., cooking, baking). Each participant was then assigned a score representing the total frequency of these weight and food-related words. Results indicated a significant positive correlation between restraint and the frequency of such words in the free response task for both the clinical (i.e., obese and anorexic patients) and non-clinical populations.

The written reproductions of the essay were scored for recall of the 16 descriptors. The mean number of target items (i.e., weight/eating), and the mean number of control items recalled (i.e., age/sewing) were calculated for each participant. The data from non-clinical and clinical samples were analysed separately. Restrained eaters displayed significantly better relative recall for the weight/food items than did the unrestrained eaters. Specifically, the restrained eaters recalled more weight items than did the unrestrained eaters. The two groups did not differ in their recall of the food items. Thus, restrained eaters exhibited a unique memory bias toward weight-related information.

Due to the small number of eating disordered participants in this experiment, no conclusive statements can be made regarding memory bias in anorexia nervosa. Future memory research should include bulimic patients, and assess a potential implicit memory bias in disordered and restrained eaters.

Summary.

Although there is not enough evidence to comment on a memory bias in eating disordered patients, it appears that an attentional bias exists in this population. Specifically, many researchers have found that eating disordered patients, relative to controls, exhibit an

attentional bias on the modified Stroop task toward disorder-specific material (Ben-Tovim & Walker, 1991; Ben-Tovim et al., 1989; Channon et al., 1988; Cooper et al., 1992; Cooper & Fairburn, 1992a; Fairburn et al., 1991; Green et al., 1994; Perpina et al., 1993). In studies where food- and shape-related target words are presented separately, there is some indication that anorexia nervosa and bulimia nervosa patients display attentional biases toward different disorder-related information. In some studies, anorexics display an attentional bias toward food-related but not shape-related information (Ben-Tovim et al., 1989; Channon et al., 1988; Perpina et al., 1993), whereas bulimics display a specific attentional bias toward shape-related information (Perpina et al., 1993). One study found that anorexics habituated to body shape-related but not to food-related words when colour-naming target words over many trials (Green et al., 1994). Taken together, these results suggest that anorexic patients display a unique attentional bias toward eating- and food-related information, whereas bulimic patients exhibit a specific attentional bias toward weight- and shape-related material. On the other hand, a comparable number of studies found that anorexics display an attentional bias for both food-related and shape-related material (Ben-Tovim & Walker, 1991; Green et al., 1994), and that bulimics also demonstrate both types of attentional biases (Ben-Tovim et al., 1989; Ben-Tovim & Walker, 1991). Moreover, a study examining both types of clinical patients did not reveal a difference between anorexic and bulimic processing (Cooper & Fairburn, 1992a). Firm conclusions regarding specific processing in anorexia and bulimia nervosa cannot be drawn.

Although there is some evidence to suggest that restrained eaters exhibit a memory bias toward diet-related material (King et al., 1991), there is insufficient evidence to make

any conclusive statements regarding memory biases in restrained eaters. More research is required in this area. Restrained eaters do, however, appear to display an attentional bias under some circumstances. In two studies by the same authors, restrained eaters exhibited an attentional bias towards shape-related material only after consuming a high calorie preload (Mahamedi & Heatherton, 1993). Another study showed an attentional bias in restrained eaters for both shape- and food-related material following a preload (Ogden & Greville, 1993). It is reasonable to expect that high calorie preloads will activate weight and shape concerns in dieters, and subsequently affect their processing of target information. In initially inconsistent findings, restrained eaters demonstrated an attentional bias toward shape- (Schmidt & Telch, 1995), and toward both shape- and food-related information (Schmidt & Telch, 1991) without a preload or other priming manipulation. In these studies, it appeared that restrained eaters were exhibiting an information processing bias toward target material in a situation where their weight and shape concerns were not emphasized. However, a procedural anomaly may explain the inconsistency. Participants were weighed at the beginning of both experiments. Therefore, it is likely that concerns with weight and shape were primed at baseline in restrained eaters who had been weighed. Thus, it is perhaps not surprising that these weighed restrained eaters exhibited information processing that was similar to the preloaded restrained eaters. In all of these studies, weight and shape concerns were highlighted, and it is possible that the activation of the weight-related self-schema was interfering with the ability to colour-name the target words.

In summary, eating disordered participants exhibit an attentional bias toward disorder-related material. Further, under some circumstances, a similar attentional bias can be observed in the non-clinical population of restrained eaters. We propose that

processing by restrained eaters appears to resemble processing by disordered eaters only when restrained eaters' concerns are made salient either by a high-calorie preload or by being asked to step on the scale (or by some similar procedure). It seems that weight- and food-related concerns in eating disordered patients are chronically activated. That is, the patients are so preoccupied with these issues that they are always selectively processing; at any time they will attend to food- and weight-related material in their environment to the exclusion of other information. On the other hand, although restrained eaters also share these concerns, they are not chronically activated but require activation to display selective processing of environmental stimuli. The literature is consistent with the hypothesis proposed in this dissertation. In order to test this hypothesis directly, the information processing biases of disordered and restrained eaters should be measured before and after exposure to a priming manipulation. The priming manipulation could take the form of a preload, or simply weighing participants before they participate in the information processing task.

CHAPTER III

STUDY 1: Effects of weighing on self-evaluation and mood in restrained and unrestrained eaters.

This study was conducted to determine if restrained eaters engage in weight- and shape-related self-evaluation when they are provided with information about their weight. Weighing participants and providing them with accurate feedback about their weight was used in an attempt to increase the saliency of weight and shape concerns. The weighing manipulation is particularly interesting as a priming technique due to its ecological validity. Dieting is characterized by frequent weighing, and weight change is the main indicator used to determine the success or failure of a diet. In fact, most organized diet centers require weekly weigh-ins. Eating disordered patients are also asked to participate in structured weigh-ins to monitor their progress. This is particularly important when patients are on a weight-gain program. It has been suggested that for many women the scale is an emotional barometer, and that morning weigh-ins can influence self-evaluation and mood for the rest of the day (Garner, Rockert, Olmsted, Johnston, & Coscina, 1985).

If weight- and shape-related self-evaluation does exist in the form of a weight-related self-schema, then stepping on a scale should activate this cognitive network in restrained eaters. To determine if concerns were indeed made salient by the scale and the weight information, an information processing task was administered after the weighing manipulation; a word-stem completion task was used as the manipulation check. It was predicted that restrained eaters who were weighed would complete more stems with weight- and shape-related target words than would restrained eaters who were not weighed, and than unrestrained eaters in either condition.

Self-evaluation was measured by state and trait self-esteem self-report measures. It was predicted that restrained eaters would report lower total state and trait self-esteem than would unrestrained eaters, and that restrained eaters who were weighed would report lower total state and trait self-esteem than would any of the other groups. In addition, it was predicted that restrained eaters who were weighed would report lower performance, social, and appearance state self-esteem than any of the other groups. (Weight- and shape-related self-evaluation requires aspects of the self not related to weight and shape to be evaluated negatively.) In an attempt to include another measure of performance self-esteem, participants were asked to estimate how well they thought they would perform on a verbal analogy task. It was predicted that restrained eaters who were weighed would report that they would do less well than any of the other groups. Finally, it was predicted that weight- and shape-related self-evaluation would produce negative affect, and that restrained eaters who were weighed would report greater negative affect than any of the other groups.

Method

Participants

Fifty-two female undergraduates volunteered for this study in exchange for one course credit. All participants were tested individually between 11:00 a.m. and 6:00 p.m. during one hour intervals. As in previous studies, participants scoring 15 or higher on the Restraint Scale (Herman & Polivy, 1980) were considered restrained eaters, while those scoring below 15 were considered unrestrained eaters.

Materials

Scale. A Detecto balance-beam scale was used for weighing participants. A ruler

attached to the scale was used to measure height.

Word stem completion task. The word-stem completion task was a list of 34 three letter word stems. Twenty-eight of the stems could be completed with a negative shape-related target word or at least one other word not related to shape that had a higher word frequency in the English language than the target word (e.g., HEA__ could be completed as HEAVY or HEAT or HEARD or HEAD, OBE__ could be completed as OBESSE or OBEY or OBEDIENCE; see Appendix 1).

Importance of weight and shape questions. Question 1: When evaluating yourself as a person how important is weight to you? Question 2: When evaluating yourself as a person how important is shape to you? Both questions were followed by the responses 1 (not at all important), 2 (slightly important), 3 (important), 4 (very important), 5 (one of the most important aspects of myself), and 6 (the most important aspect of myself). These questions were based on the importance of weight and shape subscales of the Eating Disorder Examination (Cooper & Fairburn, 1986; see Appendix 2).

Other self-report measures. The State Self-Esteem Scale (Heatherton & Polivy, 1991), the Janis-Field Trait Self-Esteem Scale (Janis & Field, 1959), the Spielberger State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Luschene, 1970), the Eating Disorder Inventory (Garner et al., 1983) and the Restraint Scale (Herman & Polivy, 1980) were completed by all participants.

Procedure

Participants arrived in the laboratory, believing that they were participating in an experiment concerning the connection between cognitive abilities and mood. Upon arrival participants completed a consent form that listed a wide variety of possible cognitive tasks

that they might be asked to perform. Each participant was told that she had been assigned to do two short cognitive tasks (i.e., a word-stem completion and a verbal analogy task) and that she would be asked to complete a variety of self-report measures. In reality, participants were randomly assigned either to be weighed at the outset or the conclusion of the experiment. Participants who were weighed at the beginning of the experiment were told that "the lab is in the process of compiling a huge data bank of information about university students including information such as height, weight, age, and area of study." Height and weight were measured and read aloud. Participants were then asked to complete the first cognitive task—the word stem-completion task. They were told to complete each of the word stems with the first word that came to mind and to finish the task as quickly as possible because their performance was being timed. After the word-stem completion task, participants were asked to complete the first set of self-report measures (i.e., state self-esteem, trait self-esteem, state and trait anxiety). At this time participants were told "there is no time for the second cognitive task, but I would still like to get an idea about how you perform on this type of task. So I am going to ask you to estimate how you think you would have done. The task is a verbal analogy test. An example of a verbal analogy is: prognosis is to illness as forecast is to blank. And you would have to fill in the blank. In this case the answer is weather. So could you estimate how many verbal analogies you think you would get right out of 20?" Once participants estimated their performance, they were asked to complete the Restraint Scale, the Eating Disorder Inventory, and the importance of weight and shape questions. Participants who had not been weighed were now weighed and everyone was debriefed and asked not to discuss the experiment with their classmates.

Results

Distribution of participants

Please refer to Table 1.

Manipulation check

It was predicted that restrained eaters would complete the word stems with more weight-related target words than would unrestrained eaters. In addition, it was predicted that restrained eaters who were weighed at the beginning of the experiment would complete the word stems with more weight-related target words than would restrained eaters who were not weighed. To determine if the manipulation was successful a 2 (restrained, unrestrained) X 2 (weighed-beginning, weighed-end) analysis of variance (ANOVA) was performed on the number of word stems completed with target words. There were no significant effects. In fact, the means were in the direction opposite to what was predicted. Unrestrained eaters completed non-significantly more word stems with target words than did restrained eaters (see Table 2).

A 2 X 2 ANOVA was also performed on the length of time it took participants to complete the word-stem task. There were no significant effects. However, the direction of the means indicated that restrained eaters took slightly longer to complete the word stems ($M=105.73$ seconds) than did unrestrained eaters ($M = 99.0$ seconds). The word-stem completion task was unable to detect any differences in the saliency of weight and shape concerns in participants.

Self-esteem

Total state self-esteem was analysed in a 2 (restrained, unrestrained) X 2 (weighed-beginning, weighed-end) ANOVA. The main effect for restraint approached significance,

$F(1,48)=3.12, p=.08$. Restrained eaters reported lower total state self-esteem ($M=67.69$) than did unrestrained eaters ($M=72.96$). The main effect for weighing condition and the interaction between the two variables did not reach significance (see Table 3).

A similar analysis was performed on each state self-esteem subscale (i.e., appearance, performance, social). For the appearance state self-esteem subscale, there was a main effect of restraint, such that restrained eaters reported a lower score ($M=17.23$) than did unrestrained eaters ($M=20.46$), $F(1,48)=9.18, p<.01$. No other effects were significant.

Trait self-esteem was also analysed in a 2 X 2 ANOVA. There was a significant main effect of restraint, such that restrained eaters reported lower trait self-esteem ($M=104.6$) than did unrestrained eaters ($M=117.4$), $F(1,48)=5.05, p<.05$. No other effects were significant.

Importance of weight and shape in self-evaluation

Each question was analysed in a 2 X 2 ANOVA. A main effect was revealed for restraint on the weight question. Specifically, restrained eaters stated that weight was more important to self-evaluation ($M=3.6$) than did unrestrained eaters ($M=2.3$), $F(1,48)=20.90, p<.001$. An interaction between restraint and weighing condition also emerged, $F(1,48)=4.55, p<.05$. Restrained eaters reported that their weight was more important to self-evaluation when they were weighed ($M=3.9$) than when they were not weighed ($M=3.2$), $t(48)=2.0, p<.05$. However, importance of weight did not differ between unrestrained eaters who were weighed ($M=2.5$) and those who were not weighed ($M=2.2$).

There was also a main effect for restraint on the importance of shape question. Restrained eaters saw shape as a more important factor in self-evaluation ($M=3.9$) than did

unrestrained eaters ($M=2.7$). The interaction between restraint and weighing condition approached significance, $F(1,48)=2.9$, $p=.09$. For restrained eaters, importance of shape was nonsignificantly higher when they were weighed ($M=4.08$) than when they were not weighed ($M=3.69$), whereas for unrestrained eaters importance of shape was nonsignificantly lower when they were weighed ($M=2.4$) than when they were not weighed ($M=3.08$).

Estimated performance on verbal analogies

Estimated number of verbal analogies one would finish correctly was analysed in a 2 X 2 ANOVA. There were no significant effects.

Anxiety

State and trait anxiety were analysed in two 2 X 2 ANOVAs. There were no significant effects (see Table 4 and 5).

Eating Disorder Inventory

Each subscale of the Eating Disorder Inventory (i.e., drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, maturity fears) was analysed in a series of 2 X 2 ANOVAs. Restrained eaters reported significantly higher drive for thinness, bulimia, body dissatisfaction, ineffectiveness, and lower interoceptive unawareness than did unrestrained eaters, $F_s(1,48)>4.34$, $p_s<.05$. There were no other effects.

Discussion

As predicted, restrained eaters reported significantly lower state and trait self-esteem than did unrestrained eaters. Restrained eaters reported that weight and shape are more important to them when evaluating themselves as a person than did unrestrained eaters. In addition, weight was more important to self-evaluation in the group of restrained eaters who were weighed. However, contrary to predictions, restraint status did not interact with weighing condition to influence self-evaluation or anxiety. Restrained eaters who were weighed and those who were not weighed reported equal amounts of state self-esteem (i.e., total, performance, social, appearance), trait self-esteem, expected performance on the cognitive/verbal task, state anxiety and trait anxiety.

There were no differences between the number of weight- and shape-related target words provided on the word stem completion task produced by the various groups. Thus, the word-completion task did not indicate that weight and shape concerns were most salient for the restrained eaters who were weighed. The failure of the manipulation check could reflect either a problem with the measure (e.g., inadequate at detecting schema activation or allowed for cognitive avoidance) or that the manipulation was not entirely successful. It is possible that the weighing manipulation did not increase restrained eaters' weight and shape concerns. In other words, the process of being weighed accurately may not have invoked significant weight- and shape-related self-evaluation in restrained eaters. It may be that stepping on a scale and being provided with accurate feedback is insufficient for weight- and shape-related self-evaluation to become paramount; some type of weight fluctuation may be necessary to achieve the predicted effect.

When restrained eaters were asked about weight- and shape-related self-esteem

directly, they indicated more than did unrestrained eaters that both weight and shape are more important to self-evaluation. The combination of being weighed and then asked to indicate the importance of weight when evaluating the self led restrained eaters to report more importance for weight than if they were not weighed. It may be the that the link between actually being weighed at the beginning of the experiment and the direct nature of the weight question was too obvious and resulted in a strong demand characteristic to report more importance of weight. Presumably this demand would apply more to restrained eaters than to unrestrained eaters.

The main effects of restraint on the importance of weight and shape questions, and the interaction between restraint and weighing condition on the importance of weight question illustrate, to some extent, the existence of weight- and shape-related self-evaluation in restrained eaters, and indicate that this line of research warrants further investigation.

CHAPTER IV

STUDY 2: Effects of false weight feedback on self-evaluation, mood, and food intake in restrained and unrestrained eaters.

The purpose of this study was to extend Study 1 by including a stronger manipulation of "being weighed" and a measure of food intake. In addition, the modified Stroop task was initially employed as a manipulation check (i.e, to detect the activation of a weight-related self-schema). However, the Stroop was unsuccessful at detecting weight- and shape-related self-evaluation displayed by the restrained eaters and is described separately in chapter five.

Restrained eaters are prone to weight fluctuations. Since at least 50% of female body weight consists of water, most of the weight lost during the initial phase of dieting is due to dehydration. This is particularly true for diets involving extreme reductions in overall calories or carbohydrates (Apfelbaum, 1976; Van Itallie, & Yang, 1977). The result is immediate but deceptive success, because most of the weight lost reflects a loss of water. After the first week or so, there is a remarkable slowing of weight loss that is sometimes even followed by weight gain. Periods of caloric restriction followed by bouts of overeating contribute to the frequent weight fluctuations experienced by dieters (Heatherton et al., 1991; Polivy & Herman, 1985). Given that restrained eaters experience frequent weight fluctuations, we decided not only to weigh participants, but to manipulate the scale so that it read heavier or lighter than the person's actual weight. This manipulation of false negative or positive feedback seems to represent a more potent emulation of the outcomes feared and hoped for by dieters and may elucidate the weight- and shape-related self-evaluation process in restrained eaters.

The present study examined the immediate effects of false weight feedback on restrained and unrestrained eaters. It was predicted that restrained eaters, but not unrestrained eaters, would be affected by false weight feedback. In line with weight- and shape-related self-evaluation, lower weight feedback was expected to enhance mood and self-worth, whereas higher weight feedback was expected to depress mood and self-worth.

Weight and shape concerns were also measured. Ogden and Evans (1996) did not find any changes on their measure of body dissatisfaction after false weight feedback. They suggested that body dissatisfaction may be a stable trait that remains constant after exposure to state manipulations such as weighing. It was predicted that there would be a main effect for weight and shape concerns, with restrained eaters scoring higher on this measure than unrestrained eaters. However, it was not clear how these weight and shape concerns would interact with the false weight feedback.

In addition to its impact on mood and self-evaluation, the present study examined the effects of false weight feedback on eating behaviour. It has been demonstrated that restrained eaters significantly increase their intake of food when they experience changes in affect, including both positive and negative mood (e.g., Cools, Schotte, & McNally, 1992; Polivy et al., 1994). To the extent that high or low weight feedback produces negative or positive affect, it was predicted that restrained eaters would increase their food intake in both false weight feedback conditions.

Method

Participants

One hundred and three female undergraduates volunteered for this study in exchange for course credit. All participants were tested individually between 11:00 a.m. and

6:00 p.m. during one-hour intervals. As in previous studies, participants scoring 15 or higher on the Restraint Scale (Herman & Polivy, 1980) were considered restrained eaters, while those scoring below 15 were considered unrestrained eaters.

Materials

Scale. A Detecto balance-beam scale was used for weighing participants. A screw located on the back of the scale was adjusted so that participants could be weighed either five pounds heavier or five pounds lighter than their actual weight. A ruler attached to the scale was used to measure the height of the participants.

Cookies. English Bay double chocolate, English Bay oatmeal raisin, and Monsieur Felix & Mr. Norton chocolate chip cookie dough was purchased by the experimenter. Bite-size cookies were prepared for each experimental day.

Visual analogue mood scales. A series of eighteen mood states was listed in visual analogue format (i.e., pleased, distressed, confident, bored, guilty, anxious, upset, happy, nervous, satisfied, calm, sad, elated, angry, depressed, concerned, disappointed, and regretful). Participants were asked to rate the extent to which they were currently feeling each mood state on a scale ranging from 1 (not at all) to 7 (extremely) (see Appendix 3).

Visual analogue self-image scales. A series of sixteen self-image dichotomies were listed in visual analogue format (i.e., strong-weak, proud-ashamed, in control-out of control, able-unable, attractive-unattractive, a good person-a bad person, active-passive, moral-immoral, virtuous-sinful, healthy-unhealthy, intelligent-unintelligent, popular-unpopular, successful-unsuccessful, hard working-lazy, thin-fat, tall-short). Participants were asked to rate how they currently saw themselves for each dichotomy on a scale ranging from 0 (negative attribute, e.g., weak) to 10 (positive attribute, e.g., strong) (see Appendix 4).

Other self-report measures. The State Self-Esteem Scale (Heatherton & Polivy, 1991), the Restraint Scale (Herman & Polivy, 1980), and the Body Shape Questionnaire (Cooper et al., 1987) were also administered.

Procedure

Participants arrived at the laboratory believing that they were involved in an experiment concerning the connection between cognitive and perceptual abilities. Upon arrival, participants completed a consent form that listed a wide variety of possible perceptual and cognitive tasks that they might be asked to perform. All participants were told that they had been assigned to the condition where colour-naming ability (i.e., cognitive) and taste perception ability (i.e., perceptual) would be compared. At this time participants were informed that the experimenter would also be collecting normative data from participants "because the lab is in the process of compiling a huge data bank of information about university students. This will include information such as height, weight, age, and area of study." In reality, participants had been randomly assigned to one of the following three conditions: weighed five pounds heavier than their actual weight, weighed five pounds lighter than their actual weight, or weighed accurately but not until the end of the experiment (i.e., control condition). Random assignment was determined before participants arrived in the lab and the scale was adjusted to weigh accordingly.

Participants were then told the following cover story to ensure that they believed that the laboratory scale was accurate and that their weight was actually five pounds heavier or lighter than expected. Also, doubt was instilled in participants regarding their own scale at

home to offset the fact that some of them may have weighed themselves that morning.¹²

I am going to start by obtaining a measure of your height and weight for the normative data bank. So in a minute I'll ask you to step on the scale. The reason we don't just ask people their weight is that we have found in the past that people are often inaccurate when reporting their weight. This is true because most people use their bathroom scale to weigh themselves, and because these scales are bumped around, they are often knocked off balance. Another problem is that the floor where people weigh themselves is usually a little uneven; as a result your scale at home is not a very accurate measure of your true weight. This is a typical precision scale that you would see in any doctor's office and is therefore much more accurate than a bathroom scale [pointing to the scale]. This scale is aligned every morning and is extremely precise. In order to maximize the accuracy of the measure, I would like you to remove your shoes/boots, jacket, sweater, and also take off any heavy pieces of jewelry before you step on the scale.

Participants were then weighed according to their experimental condition, either five pounds heavier or lighter than their actual weight. The experimenter read aloud the weight and height of the participant and recorded the measurements. Participants in the control condition did not learn that they would be weighed until after they were debriefed.

At this point all participants were asked to complete the visual analogue mood scales

¹²

The present procedure cannot distinguish between participants who believe that their own scales are inaccurate and that they weigh more/less than they thought, and participants who believe that they have gained or lost weight since they last weighed themselves. However, it is reasonable to assume that these participants share a similar experience and they were grouped together for the purposes of this experiment.

to determine their current level of affect. Participants were then asked to complete a modified Stroop colour-naming task. After the Stroop task, participants were given a manipulation booster that involved the "normative data questionnaire" consistent with the cover story. This questionnaire asked participants to write down their weight and height (obtained by the experimenter) as well as their age, year at the university and area of study. This questionnaire also asked participants to report when they had last weighed themselves and how much they weighed at that time. If a discrepancy existed between what they weighed in the experiment and what they weighed when they last weighed themselves, participants were asked to list possible reasons for this discrepancy (see Appendix 5).¹³ Participants were also asked to complete the state self-esteem and the visual analogue self-image scales.

Participants were then asked to complete the "perceptual taste test" and were presented with three heaping plates of freshly baked cookies, three taste-rating forms, and a glass of water. Participants were asked to rate each cookie type on the dimensions listed on the rating forms (e.g., sweet, bitter). They were instructed to have as many cookies as was necessary to achieve accurate ratings. The importance of the cookie ratings was emphasized repeatedly. Participants were informed that "this is a standardized task so you will be given a full ten minutes to complete it. If you are done early, please feel free to help yourself to cookies - in fact we have tons - but just make sure that you don't change any of your taste ratings." When the taste rating task was over, the plates of cookies were

¹³ Most of the participants reported reasons such as a change of eating or exercise habits. None of the participants indicated on the normative data questionnaire that they were suspicious about the scale. Only one participant vocalized concern and disbelief about her weight, stating that she had been weighed on an official scale for a karate tournament on the previous day. This participant was not included in the analysis.

removed and weighed to determine the amount of cookies consumed. Participants then completed a final set of self-report measures, including the Restraint Scale, and the Body Shape Questionnaire. Participants were debriefed and asked not to discuss the experiment with their classmates. Finally, the accurate weight and height of control participants was measured.

Results

Distribution of participants and restraint score

Although it is possible that the weight manipulation could have influenced restrained eaters' restraint score (i.e., reporting higher restraint after being weighed heavier), it is equally possible that completing the Restraint Scale first could affect the mood, self-worth and the eating behaviour of restrained eaters. Since the latter possibility was considered much more detrimental to the study, participants completed the Restraint Scale after the main dependent measures were obtained. Moreover, if the Restraint Scale were affected by the weight manipulation in the predicted direction one would expect more restrained eaters in the weighed heavy condition than in the weighed light condition. This was not the case (see Table 6).

Manipulation check

Participants were weighed either five pounds heavier or five pounds lighter than their actual weight. To determine if this manipulation was perceived as intended, a difference score was computed by subtracting participants' manipulated weight from their self-reported weight. A 2 (restrained, unrestrained) X 2 (weighed heavy, weighed light) ANOVA was performed on this difference score. Participants in the weighed heavy condition had a significantly lower difference score ($M = -6.97$ lbs., $SD = 5.74$) than participants in the

weighed light condition ($M = 1.02$ lbs., $SD = 7.22$), $F(1,63) = 25.25$, $p < .001$. On average, those who were weighed heavy reported that they weighed approximately seven pounds lighter, whereas those who were weighed light reported that they weighed approximately one pound heavier. The weighed heavy manipulation appears to have been successful; however, the weighed light manipulation does not appear to have had as powerful an effect. The main effect of restraint and the interaction between restraint and weight manipulation were not significant (see Table 7).

Self-esteem

Total state self-esteem was analyzed in a 2 (restrained, unrestrained) X 3 (control, weighed heavy, weighed light) ANOVA. Although state self-esteem did not differ between restrained and unrestrained eaters in the control condition, the main effect for restraint was significant, $F(1, 97) = 15.05$, $p < .001$. Overall, restrained eaters reported lower total state self-esteem ($M = 66.14$, $SD = 10.71$) than did unrestrained eaters ($M = 73.63$, $SD = 9.21$). The main effect for weight manipulation did not reach significance. However, the interaction between restraint and weight manipulation was significant, $F(2,97) = 3.79$, $p < .05$. As expected, unrestrained eaters' total state self-esteem was not affected by either of the weight manipulations. Also in line with the predictions, restrained eaters who were weighed five pounds heavier reported significantly lower total state self-esteem than did those in the control condition, $t(97) > 2.0$, $p < .05$. When restrained eaters were weighed five pounds lighter their total state self-esteem did not change significantly from the control condition, however their state self-esteem was also not different from restrained eaters who were weighed-heavy (see Table 8).

A similar analysis was performed on each state self-esteem subscale (i.e.,

appearance, social, performance). For the appearance state self-esteem subscale, there was a main effect of restraint [$F(1,97)=29.9, p<.001$] and a significant interaction between restraint and weight manipulation, $F(2,97)=3.56, p<.05$. These effects mirrored the above effects for total state self-esteem. Specifically, restrained eaters reported significantly lower appearance state self-esteem than did unrestrained eaters, and their already low appearance self-esteem was significantly lower when they believed that they weighed five pounds heavier, $t(97)>2.0, p < .05$. No other differences existed with respect to appearance self-esteem. For the social state self-esteem subscale a similar pattern of results occurred. Restrained eaters reported significantly lower social self-esteem than did unrestrained eaters [$F(1,97)=9.06, p<.01$], and restrained eaters' social self-esteem decreased when they were weighed five pounds heavier, $F(2,97)=3.08, p=.05$. Finally, there were no significant effects for the performance state self-esteem subscale.

Self-image

A 2 X 3 multivariate analysis of variance (MANOVA) was performed on the visual analogue self-image scale. The MANOVA for restraint was significant, Hotellings $F(16,81) = 4.42, p<.001$. The univariate analysis indicated that restrained eaters endorsed certain dichotomies more negatively than did unrestrained eaters. Specifically, restrained eaters saw themselves as significantly more weak, ashamed, out of control, bad, passive, unhealthy, lazy, sinful, unattractive, and fat, $F_s(1,96) > 3.94, p_s<.05$. The MANOVAs for weight condition and the interaction between restraint and weight condition did not reach significance.

Mood

A 2 X 3 MANOVA was performed on the visual analogue mood scale. Main effects

for restraint and weight condition did not reach significance. However, the MANOVA representing the interaction between the variables revealed a weak effect for all moods combined, Hotellings $F(36, 154) = 1.33, p = .12$. Due to the previous research indicating that mood is affected by weight fluctuations and inaccurate feedback (Tiggemann, 1994; Ogden & Evans, 1996), and because mood plays an important role in interpreting the consumption data, the univariate analyses were examined.

The univariate analyses revealed a significant effect for anxiety, $F(2, 95) = 3.51, p < .05$. Post-hoc t tests indicated that restrained eaters reported feeling significantly more anxious when they were weighed either five pounds lighter or five pounds heavier than if they were not weighed at all, $t_s(95) > 2, p_s < .05$. In contrast, ratings of anxiety for unrestrained eaters were unaffected by the weight manipulation (see Table 9). Additionally, restrained eaters who were weighed five pounds heavier reported feeling more depressed (see Table 10), sad, guilty, upset, nervous, regretful and disappointed, and less pleased and calm than each of the other groups, $F_s(2, 95) > 3.25, p_s < .05; t_s(95) > 2.0, p_s < .05$.

Weight and shape concerns

A 2 X 3 ANOVA was performed on the Body Shape Questionnaire. As predicted, there was a significant main effect for restraint, $F(1, 97) = 67.42, p < .001$. Specifically, restrained eaters ($M = 113.74, SD = 30.77$) reported more weight and shape concerns than did unrestrained eaters ($M = 70.33, SD = 23.04$). There were no other significant effects.

Food intake

Cookies were weighed in grams both before and after the "taste test." A difference score determined the amount that each subject ate and a 2 X 3 ANOVA was performed on total grams eaten. There were no significant main effects. However, a significant

interaction revealed that restrained eaters who were weighed five pounds heavier ate significantly more than any of the other groups, $F(2,97)=3.55, p<.05$; $t(97)>2.0, p < .05$. The unrestrained eaters in each group and the restrained eaters in the weighed light and control conditions did not differ from one another with respect to amount consumed (see Table 11).

Discussion

In the weighed heavy condition, restrained eaters reported being eight pounds above their expected weight. In response to this perceived higher weight, restrained eaters reported lower self-esteem, lower positive moods, and greater negative moods than did restrained eaters in the control condition. Along with total self-esteem, both appearance and social self-esteem decreased in restrained eaters who believed they weighed more than they expected. Furthermore, restrained eaters in the weighed heavy condition rated themselves as more anxious, depressed, sad, guilty, upset, disappointed, and less pleased and calm than most other groups. This is consistent with the hypothesis that weight- and shape-related self-evaluation occurs in restrained eaters only after their weight and shape concerns are primed.

It is interesting to note that in this study restrained eaters reported significant increases in anxiety in both the weighed heavy and the weighed light conditions. This is also consistent with the finding that total state self-esteem does not differ between restrained eaters who are weighed heavy and those who are weighed light. It appears that for restrained eaters simply stepping on the scale may be a distressing event. However, it is not until the numbers have been processed and a higher weight is perceived that general self-deprecation and a worsening of mood occurs. This is in contrast to the results of Study

1 where there was no difference in reported anxiety between restrained eaters who were weighed and those who were not weighed. The different methods of measuring anxiety may account for this discrepancy.

As predicted, restrained eaters revealed more weight and shape concerns than did unrestrained eaters. However, unlike most of the other self-report measures obtained from restrained eaters, weight and shape concerns were not intensified for those who were weighed heavy. This is consistent with both Ogden and Evans (1996) and with Polivy and Herman (1992), who found no changes in body dissatisfaction after a ten-week group program intended to raise women's consciousness about the costs and side-effects of dieting.

In addition, restrained eaters who were weighed heavy ate significantly more food during the subsequent "taste test" than each of the other groups. It is likely that this effect is mediated by the negative affect produced by being weighed heavy (i.e., anxiety, depression, guilt, regret, disappointment, sadness). Previous studies have shown that negative affect leads to a disinhibition of restraint in dieters that in turn leads to elevated intake of available food (e.g., Herman & Polivy, 1975; Polivy et al., 1994; Ruderman, 1985). Although anxiety was elevated in restrained eaters who were weighed five pounds lighter, none of the other affective states were influenced by this lower weight. Overall, then, restrained eaters who were weighed light were not as dysphoric as were restrained eaters who were weighed heavy. This difference may explain why, despite feeling more anxious, restrained eaters who were weighed light were able to maintain dietary restraint and avoid overeating.

Unrestrained eaters were not markedly affected by false weight feedback in either

direction. For the most part, their self-esteem, self-image, and mood remained stable regardless of whether they thought they weighed five pounds heavier, five pounds lighter, or if they were not weighed. Surprisingly, restrained eaters who were weighed five pounds lighter did not react positively to the weight decrease. Most of their self-report measures did not differ from those of restrained eaters who had not been weighed. This is inconsistent with Tiggemann (1994), who found that restrained eaters were happier when they reported losing weight than if they reported gaining weight or no change. However, it is not clear from Tiggemann's data exactly how much weight restrained eaters believed they had lost. Participants reported only that they lost "a little" weight or "a lot" of weight. Perhaps dieters must perceive themselves to weigh significantly less before they will feel happier.

Another possible explanation for the lack of positive reaction to a lighter weight in restrained eaters is that restrained eaters did not perceive this manipulation to be a lower weight. As the manipulation check demonstrated, all participants underestimated their weight and claimed that they were only one pound lighter when in fact they were weighed five pounds lighter. When restraint was taken into consideration, it was determined that restrained eaters who were weighed five pounds lighter did not see themselves as lighter at all; these participants believed that their false lower weight corresponded to their current weight. Thus, adjusting the scale to weigh five pounds lighter was not enough for restrained eaters to perceive a lowered weight. As a result, their psychological state was not positively affected. To determine if restrained eaters' mood, self-esteem and self-image are positively influenced by a lighter weight it would be necessary to increase the participants' perceived weight decrease.

Although it was unfortunate for the current study, it is interesting that the weighed

light manipulation was not as effective for restrained eaters as it was for unrestrained eaters. The difference between restrained and unrestrained eaters' estimated weight was not significant in this study; however, a recent study has showed that restrained eaters underestimate their weight to a greater extent than do unrestrained eaters (McFarlane, McCabe, Polivy, & Olmsted, 1997). Finally, it is possible that restrained eaters (or perhaps all women to some extent) weigh themselves first thing in the morning, without clothing, and before any food is eaten. Since clothing itself weighs as much as a few pounds and body weight can fluctuate over the day, it is possible that participants were not underestimating their weight, but were accurately reporting what they read on the bathroom scale that morning.

It appears that restrained eaters who are weighed heavy experience lowered self-worth and a worsening of mood that may lead them to relinquish their dietary restraint and overeat.

CHAPTER V

Study 2b: Effects of false weight feedback on information processing in restrained and unrestrained eaters.

A modified Stroop task was used in Study 2 as a manipulation check. The purpose was to determine if colour-naming interference could detect the cognitive correlates of weight- and shape-related self-evaluation (i.e., the activation of the weight-related self-schema). Previous studies have shown an attentional bias (delayed colour-naming) toward food- and shape-related material in restrained eaters, but only after their weight and shape concerns have been primed either by weighing (Schmidt & Telch, 1991, 1993) or by consuming a high calorie preload (Mahamedi & Heatherton, 1993; Ogden & Greville, 1993). Any stimulus included as a node in the weight-related self-schema should result in slower colour-naming. It was expected that both fat and thin body shape-related words would disrupt colour-naming, because both types of shape-related nodes are included in the schema. It is also possible that nodes representing forbidden and diet foods are located somewhere in the weight-related self-schema. For example, a dieter could easily associate "fat" with "ice cream" or "thin" with "rice cake" so that colour-naming a forbidden or diet food word will be impaired. Therefore, it was predicted that an attentional bias toward fat and thin body shape-related words and forbidden and diet food words will occur in restrained eaters who have been weighed and given false weight feedback.

Method

Target words

Five categories of words were used. Forbidden food (i.e., fudge, chocolate, candy,

chips, pie, cookie, cream, pastry, donut, cake), diet food (i.e., apple, lettuce, pear, tomato, peas, peach, carrot, celery, fruit, salad), fat shape (i.e., fat, obese, chubby, hefty, plump, flabby, huge, cellulite, pudgy, stout), thin shape (i.e., thin, slender, lean, slight, skinny, slim, lithe, narrow, petite, toned) and household/furniture (i.e., couch, chair, shelf, lamp, desk, stool, bench, cabinet, curtain, carpet). Length of word and frequency of usage in the English language did not significantly differ for each category (Carroll et al., 1971).

Computer presentation

The words were individually and randomly presented on a computer screen. Reaction time was measured by a voice-activated microphone. There were five trials. Each trial presented each word only once (5 x 50 words). Words were presented in red, green, blue, yellow, or white.

Procedure

Participants were randomly assigned to be weighed five pounds heavier or five pounds lighter than their actual weight, or not to be weighed at all. Participants were then told that it was time for the cognitive task and were seated in front of the computer. They were given the following instructions.

In this task you will see words written in different colours on the computer screen. Your task is to ignore the meaning of the words and to name out loud as quickly and as accurately as possible, the colours in which the words are printed. So, for example, if you see the word HOUSE printed in the colour green, you will say green, or if you see the word BOOK printed in the colour red, you will say red. The colours in which the words are printed are red, green, blue, yellow, and white. This microphone will be used to register your responses. Therefore, please speak loudly and clearly.

At this point participants were shown the colours on the computer screen and given a

chance to practice the task. Once the practice task was done participants were given the following instructions.

Now we are ready to begin the actual colour-naming task. This part is just like the practice session except there are different words. Your task is still the same; name the colour in which each word is printed and ignore the meaning of the word. So as soon as you see the first word, name the colour. Ready?

Once the participant indicated that she was ready the first trial begun. Participants were allowed short breaks between each trial. Errors were recorded by the experimenter.

Results

Colour-naming errors were excluded from the analysis because it is not clear exactly what these errors represent (C. MacLeod, personal communication, March, 1996). A 2 (restrained, unrestrained) X 3 (weighed-heavy, weighed-light, not weighed) X 5 (forbidden, diet, fat, thin, furniture) ANOVA was performed on average time to colour-name words (in milliseconds). Results revealed a significant main effect of restraint status such that restrained eaters were significantly faster at colour-naming ($M=637.6$, $SD=70.2$) than were unrestrained eaters ($M=684.1$, $SD=68.3$), $F(1,97)=10.68$, $p < .001$. There was also a significant main effect of word category, $F(4,388)=36.67$, $p < .001$. Simple contrasts revealed that the neutral control words (furniture words) were colour-named significantly faster ($M=650.7$, $SD=73.52$) than any of the other word types, $F_s(1,97) > 18$, $p_s < .001$. Thin shape words ($M=661.1$, $SD=69.3$) and forbidden food words ($M=664.7$, $SD=72.6$) were colour-named significantly faster than were diet food words ($M=670.7$, $SD=72.1$), $F_s(1,97) > 8.5$, $p_s < .01$. Finally, fat shape words were colour-named significantly slower than all other word

categories ($M=677.1$, $SD=74.7$), $F_s(1,97) > 9.4$, $p < .005$. Thus, fat shape words resulted in the greatest amount of colour-naming impairment for all participants. No other effects were significant, including the predicted interaction between restraint, weighing condition and word type.

Overall, restrained eaters were significantly faster at the colour-naming task than were unrestrained eaters, as shown by the significant main effect of restraint. To control for this, a difference score was computed by subtracting the speed of colour-naming the neutral control category from each of the target categories. A 2 (restrained, unrestrained) x 3 (weighed heavy, weighed light, not weighed) x 4 (forbidden food-control, diet food-control, fat shape-control, thin shape-control) ANOVA was performed on this difference score. The results revealed a significant main effect of word type, $F(3,291)=17.97$, $p < .001$, mirroring the pattern described above; thin shape ($M=10.34$, $SD=25.86$), forbidden foods ($M=13.95$, $SD=23.22$), diet foods ($M=19.99$, $SD=22.31$), and fat shape ($M=26.33$, $SD=23.30$). An interaction between word type and restraint status approached significance, $F(3,291)=2.3$, $p = .08$. Interestingly, it appears that this marginal effect can be accounted for by the thin shape words. Unrestrained eaters colour-named thin shape words significantly faster ($M=5.72$, $SD=23.78$) than did restrained eaters ($M=16.78$, $SD=27.52$), $t(291)=3.38$, $p < .05$. No other differences between restrained and unrestrained eaters in colour-naming speed were significant (see Figure 1).

Discussion

The results of the modified Stroop task did not support the prediction (i.e., weight-related self-schema is activated in restrained eaters who are weighed), nor were they consistent with the literature reviewed in Chapter 2. The predicted interaction between

restraint status, weighing condition, and word type was not significant. In fact, the priming manipulation did not seem to make any differences in colour-naming. Despite this, the self-esteem and mood data from Study 2 supported the hypothesis that restrained eaters did engage in weight-related self-evaluation once their weight and shape concerns were made salient (by being weighed heavy). Therefore, it appears that the Stroop task was insufficient at detecting the underlying cognitive schema that accounts for this type of self-evaluation, or that the schema does not exist.

Restrained eaters were much better at the colour-naming task than unrestrained eaters. This was unexpected, but consistent with the research that shows that restrained eaters perform better relative to unrestrained eaters on tasks when there are no distractions (Herman, Polivy, Pliner, Munic, & Threlheld, 1978). Although it could be argued that the target words were distracting (or should have been for restrained eaters), the laboratory was quiet and allowed individuals to concentrate on the task of colour-naming.

Fat shape words caused the greatest amount of impairment, however there were no differences based on restraint status. One explanation is that the words used in this category are associated with a great deal of negativity and stigma for many people regardless of restraint status. Research has shown that a fat body shape is associated with many other negative concepts (e.g., lazy, dirty, stupid, sloppy, ugly; Allon, 1975; Staffieri, 1972). Thus, when fat words are presented they may activate these other connected concepts (or nodes) for all individuals. Words that have many connections require more cognitive resources to maintain the spreading activation. As a result, less cognitive capacity is available for colour-naming and colour-naming is impaired. Due to many connections with other concepts, fat words may have caused significant colour-naming impairment for

both restrained and unrestrained eaters. However, this is not consistent with the existing literature that shows fat word colour-naming differences between restrained and unrestrained eaters once weight and shape concerns have been primed (Mahamedi & Heatherton, 1993; Ogden & Greville, 1993; Schmidt & Telch, 1991, 1995).

A significant difference between restrained and unrestrained eaters' colour-naming was revealed on the thin shape words. Restrained eaters showed greater interference for these words than did unrestrained eaters. The present study is the first of its kind to have included thin body shape words. In line with the above argument regarding spreading activation, it appears that thin body shape words may have richer associations with other concepts (presumably positive) for restrained eaters than for unrestrained eaters. Although society does send plenty of messages that thinness is equated to beauty, happiness, and success, restrained eaters seem to adopt this philosophy more than do unrestrained eaters.

There were no differences with respect to restraint on colour-naming speed for either of the food categories. Both restrained and unrestrained eaters demonstrated the same amount of interference for both forbidden foods and diet foods. This is consistent with other studies that failed to show a bias toward food-related material in restrained eaters (Mahamedi & Heatherton, 1993). Interestingly, diet foods resulted in greater impairment than forbidden food words for both restrained and unrestrained eaters. This may indicate that diet foods are part of a more complex network of associations than forbidden foods and that if even safer foods were used (e.g., rice cake, cottage cheese) differences between restrained and unrestrained eaters may emerge. Further research is warranted in this area.

CHAPTER VI

STUDY 3: Effects of false weight feedback on self-evaluation, mood, and food intake in restrained and unrestrained eaters.

In Study 2 restrained eaters displayed weight-related self-evaluation impairment when they were weighed five pounds heavier than their actual weight. This was shown by a lowering of self-esteem and a worsening of mood in these participants. Study 3 was conducted to extend these findings to evaluations of real behaviour. A similar attempt was made in Study 1 (i.e., estimation of performance on a verbal analogy task); however, participants were weighed accurately and weight-related self-evaluation impairment was not evident in restrained eaters. Thus, it is not clear if estimations of performance will be affected by a perceived weight increase in restrained eaters. Three tasks were chosen to represent different abilities; intellectual ability (i.e., anagram task), social ability (i.e., social skills task), and an ambiguous task so that participants would have no prior performance expectations (i.e., mental rotation task). It was predicted that restrained eaters who were weighed heavy would estimate their performance on each task more negatively than would the other groups.

It was clear from Study 2 that participants perceived the weighed-heavy manipulation as a significant increase in weight. However, due to the tendency of people to underestimate their weight, the weighed-light manipulation was not successful. On average, restrained eaters who were weighed light reported the lighter weight to reflect their weight accurately. Thus, it remains to be seen if a perceived weight decrease will affect restrained eaters' self-evaluation and mood. It was predicted that restrained eaters would evaluate themselves in a more positive light and experience an improved mood if they

perceive themselves to weigh less. Therefore, we decided to strengthen the weighed-light manipulation and weigh participants who were assigned to this condition as ten pounds lighter than their actual weight.

Method

Participants

Sixty-six female undergraduates volunteered for this study in exchange for course credit. All participants were tested individually between 11:00 a.m. and 6:00 p.m. during one-hour intervals. Five participants were excluded from the study for scoring either above 30 on the Beck Depression Inventory (Beck et al., 1961) ($n=2$) or above the clinical cutoff on the Eating Disorder Inventory (Garner et al., 1983) ($n=3$). As in previous studies, participants scoring 15 or higher on the Restraint Scale (Herman & Polivy, 1980) were considered to be restrained eaters, while those scoring below 15 were considered to be unrestrained eaters.

Materials

Scale. A Detecto balance-beam scale was used for weighing participants. A screw located on the back of the scale was adjusted so that participants could be weighed either five pounds heavier or ten pounds lighter than their actual weight. A ruler attached to the scale was used to measure the height of the participants.

Cookies. English Bay double chocolate, English Bay oatmeal raisin, and Monsieur Felix & Mr. Norton chocolate chip cookie dough was purchased by the experimenter. Bite-size cookies were prepared for each experimental day.

Self-esteem scales. State self-esteem was measured using the State Self-Esteem

Scale (Heatherton & Polivy, 1991), and trait self-esteem was determined by the Janis-Field Trait Self-Esteem Inventory (Janis & Field, 1959).

Mood scales. Mood was measured using a variety of self-report questionnaires. State anxiety and state depression was measured using the Affect Rating Scale (Atkinson & Polivy, 1976). Trait anxiety was measured using the Spielberger Trait Anxiety Inventory (Spielberger et al., 1970), whereas trait depression was measured using the Beck Depression Inventory (Beck et al., 1961).

Other self-report measures. The Restraint Scale (Herman & Polivy, 1980), the Body Shape Questionnaire (Cooper et al., 1987), and the Eating Disorder Inventory (Gamer et al., 1983) were also administered.

Procedure

Participants arrived at the laboratory believing that they were in an experiment concerning the connection between cognitive and perceptual abilities. On arrival, participants completed a consent form that listed a wide variety of possible perceptual and cognitive tasks that they might be asked to perform. All participants were told that they had been assigned to the condition where mental rotation and verbal abilities (i.e., cognitive) and taste perception ability (i.e., perceptual) would be compared. At this time participants were informed that the experimenter would also be collecting normative data from participants "because the lab is in the process of compiling a huge data bank of information about university students. This will include information such as height, weight, age, and area of study." In reality, participants had been randomly assigned to one of the following three conditions: weighed five pounds heavier than their actual weight, weighed ten pounds lighter than their actual weight, or weighed accurately but not until the end of the experiment

(i.e., control condition). Random assignment was determined before participants arrived in the lab and the scale was adjusted to weigh accordingly.

Participants were then told the following cover story to ensure that they believed that the laboratory scale was accurate and that their weight was actually five pounds heavier or ten pounds lighter than expected. Also, doubt was instilled in participants regarding their own scale at home to offset the fact that some of them may have weighed themselves that morning.

I am going to start by obtaining a measure of your height and weight for the normative data bank. So in a minute I'll ask you to step on the scale. The reason we don't just ask people their weight is that we have found in the past that people are often inaccurate when reporting their weight. This is true because most people use their bathroom scale to weigh themselves, and because these scales are bumped around, they are often knocked off balance. Another problem is that the floor where people weigh themselves is usually a little uneven; as a result your scale at home is not a very accurate measure of your true weight. This is a typical precision scale that you would see in any doctor's office and is therefore much more accurate than a bathroom scale [pointing to the scale]. This scale is aligned every morning and is extremely precise. In order to maximize the accuracy of the measure, I would like you to remove your shoes/boots, jacket, sweater, and also take off any heavy pieces of jewelry before you step on the scale.

Participants were then weighed according to their experimental condition, either five pounds heavier or ten pounds lighter than their actual weight. The experimenter read aloud the

weight and height of the participant and recorded the measurements. Participants in the control condition were not weighed until after they were debriefed. At this point all participants were asked to complete the mood and self-esteem scales.

Participants were then asked to perform three "cognitive tasks." Before each task participants were asked to estimate how well they thought they would do on the task, compared to other people, using a scale from 1 (not at all well) to 7 (extremely well) (pre-expectation rating). After each task, participants were asked to estimate how well they thought they had done on the task, compared to other people, on a scale from 1 (not at all well) to 7 (extremely well) (post-expectation rating). The first task was the mental rotation task and required participants to circle the letters N and D which were backwards, upside down and embedded in other distracting letters. Participants had two minutes to circle as many target letters as possible (see Appendix 6). The second task was the word generation task. Participants were asked to generate words, four letters or longer, from longer words that were provided. Participants had three minutes to produce as many words as possible (see Appendix 7). The third task was the social skills task. Here, participants were asked to respond to questions that were posed by an experimental assistant. They were told that their task was to answer the questions and make a good impression on the assistant who was asking the questions. The questions included: Tell me about yourself? What are your career goals? What are your outside interests? What are your weaknesses? What are your strengths? The assistant, who was blind to the experimental condition, then rated each participant on the following dimensions: To what extent was this person successful at making a good impression? To what extent did you find this person interesting? To what extent did you find this person to be friendly? To what extent would

you like this person as a friend? To what extent would you like this person as a co-worker? To what extent did this person engage in eye contact when answering questions? To what extent did this person appear to be nervous? To what extent did this person seem enthusiastic when answering the questions (see Appendix 8)?

After the "cognitive tasks," participants who were weighed were given a manipulation booster that consisted of the "normative data questionnaire." This questionnaire asked participants to write down their weight and height (assessed by the experimenter) as well as their age, year at the university and area of study. This questionnaire also asked participants to report when they had last weighed themselves and how much they weighed at that time. If a discrepancy existed between what they weighed in the experiment and what they weighed when they last weighed themselves, participants were asked to list possible reasons for this discrepancy (see Appendix 5).

Participants were then asked to complete the "perceptual taste test" and were presented with three heaping plates of freshly baked cookies, three taste rating forms, and a glass of water. Participants were asked to rate each cookie type on the dimensions listed on the rating forms (e.g., sweet, bitter). They were instructed to have as many cookies as necessary to achieve accurate ratings. The importance of the cookie ratings was emphasized repeatedly. Participants were informed that "this is a standardized task so you will be given a full ten minutes to complete it. If you are done early, please feel free to help yourself to cookies - in fact we have tons - but just make sure that you don't change any of your taste ratings." When the taste rating task was over, the plates of cookies were removed and weighed to determine the amount of cookies consumed. Participants then completed a final set of self-report measures, including the Restraint Scale, the Body Shape

Questionnaire, and the Eating Disorder Inventory. Participants were debriefed and asked not to discuss the experiment with their classmates. Finally, the accurate weight and height of control participants was measured.

Results

Distribution of participants and restraint score

Refer to Table 12.

Manipulation check

Participants were weighed either five pounds heavier or ten pounds lighter than their actual weight. To determine if this manipulation was perceived as intended, a difference score was computed by subtracting participants' manipulated weight from their self-reported weight. Thus, someone weighed "heavy" in the lab should have a negative score, and those weighed "light" should have a positive score. A 2 (restrained, unrestrained) X 2 (weighed heavy, weighed light) ANOVA was performed on this difference score. Participants in the weighed heavy condition had a significantly lower difference score ($M = -6.38$ lbs., $SD = 6.87$) than did participants in the weighed light condition ($M = 4.21$ lbs., $SD = 8.18$), $F(1,36) = 19.72$, $p < .001$. In other words, participants who were weighed five pounds heavier in the lab stated that when they last weighed themselves they weighed about six pounds lighter. On the other hand, participants who were weighed ten pounds lighter in the lab reported that they weighed about four pounds heavier. The weight manipulation, then, appears to have been successful. The main effect of restraint and the interaction between restraint and weight manipulation were not significant (see Table 13).

Self-esteem

Total state self-esteem was analyzed in a 2 (restrained, unrestrained) X 3 (control,

weighed heavy, weighed light) ANOVA. None of the effects reached significance. Since predictions were made a priori, the means were subjected to a series of t tests. However, none of the means differed from one another (see Table 14).

A similar analysis was performed on each state self-esteem subscale (i.e., appearance, social, performance). For the appearance state self-esteem subscale, there was a main effect of restraint, such that restrained eaters reported lower appearance state self-esteem ($M = 18.04$, $SD = 4.43$) than did unrestrained eaters ($M = 20.94$, $SD = 3.39$), $F(1,55)=9.31$, $p<.01$. In addition, there was a main effect of weighing condition, indicating that those who were weighed heavy had lower appearance state self-esteem ($M = 18.05$, $SD = 4.11$) than those who were not weighed ($M = 21.58$, $SD = 3.54$), $F(2,55)=4.51$, $p<.05$. The interaction between restraint and the weighing condition was not significant. A series of t tests did not uncover any further differences between the means. There were no significant effects for the social and performance state self-esteem subscales.

Total trait self-esteem was analyzed in a 2 (restrained, unrestrained) X 3 (control, weighed heavy, weighed light) ANOVA. A main effect for restraint was revealed, such that restrained eaters reported lower total trait self-esteem ($M = 108.56$, $SD = 16.28$) than did unrestrained eaters ($M = 118.71$, $SD = 19.12$), $F(1,55)=4.65$, $p<.05$. No other effects were significant. A series of t tests did not uncover any further differences between the means.

Anxiety

State anxiety was analyzed in a 2 (restrained vs. unrestrained) X 3 (control vs. weighed heavy vs. weighed light) ANOVA. A main effect for weight condition was revealed, such that those who were weighed heavy reported more state anxiety ($M = 40.05$, $SD = 7.73$) than did those who were not weighed ($M = 32.38$, $SD = 7.68$), $F(2,55) = 4.54$, $p<.05$.

There were no other significant effects. Since predictions were made a priori, the means were subjected to a series of t tests. Restrained eaters reported higher state anxiety levels when they were weighed five pounds heavier ($M = 43.89$, $SD = 7.22$), than when they were weighed ten pounds lighter ($M = 35.20$, $SD = 10.53$) or not at all ($M = 32.38$, $SD = 8.94$), $t(55) > 2$, $p < .05$. For unrestrained eaters, state anxiety levels did not differ with respect to weighing condition (see Table 15).

Trait anxiety was analyzed in a 2 (restrained, unrestrained) X 3 (control, weighed heavy, weighed light) ANOVA. There were no significant effects. The means were subjected to a series of t tests. Although trait anxiety seemed to mirror the pattern displayed by state anxiety, significant differences between means were not obtained (see Table 16).

Depression

State depression was analyzed in a 2 X 3 ANOVA. There were no significant effects. Since predictions were made a priori, the means were subjected to a series of t tests. No differences emerged. However the pattern of means was consistent with anxiety, and depicting a unique increase in affect for restrained eaters who were weighed heavy (see Table 17).

Trait depression was analyzed in a 2 X 3 ANOVA. A main effect for restraint emerged, such that restrained eaters reported significantly higher trait depression ($M = 10.70$, $SD = 5.93$) than did unrestrained eaters ($M = 6.82$, $SD = 5.16$), $F(1,55) = 7.41$, $p < .01$. There were no other significant effects. When the means were subjected to a series of t tests no other differences were evident. However the pattern of means was consistent with anxiety and state depression, reflecting a unique increase in affect for restrained eaters who

were weighed heavy (see Table 18).

Tasks

A 2 X 3 ANOVA was performed on the pre-expectation rating, the post-expectation rating, and the actual score for each of the three tasks (i.e., mental rotation, social skills, word generation). There were no significant effects for either the mental rotation task or the social skills task. In addition there were no significant effects for the pre-expectation or the post-expectation ratings for the word generation task. However, there was a significant main effect of restraint on the score of the word generation task, $F(1,55) = 5.37, p < .05$. Specifically, restrained eaters generated significantly more words ($M=16.15, SD=6.44$) than did unrestrained eaters ($M=13.00, SD=4.26$) on the word generation task.

Weight and shape concerns

A 2 X 3 ANOVA was performed on the Body Shape Questionnaire. As predicted, there was a significant main effect for restraint, $F(1,55)=29.67, p < .001$. Specifically, restrained eaters ($M=113.70, SD=34.26$) reported more weight and shape concerns than did unrestrained eaters ($M=71.82, SD=25.43$). There were no other significant effects.

Eating Disorder Inventory

A 2 X 3 ANOVA was performed on each of the subscales of the EDI. There were a series of main effects of restraint status, indicating that restrained eaters scored as more maladjusted than did unrestrained eaters on a number of subscales (i.e., bulimia, body dissatisfaction, drive for thinness, and interoceptive awareness), $F_s(1,55) > 5.19, p_s < .05$. No other effects were significant.

Food intake

Cookies were weighed in grams both before and after the "taste test." A difference

score determined the amount that each subject ate and a 2 X 3 ANOVA was performed on total grams eaten. Although there were no significant effects, restrained eaters in the weighed heavy condition ate non-significantly less than restrained eaters in the other two conditions (see Table 19).

Discussion

Although restrained eaters reported lower self-esteem than did unrestrained eaters, their self-esteem was not affected by the weighing manipulation. In contrast to the findings from Study 2, the self-evaluation of restrained eaters who were weighed heavy did not become more negative. In contrast to the predictions, the self-evaluation of restrained eaters who were weighed ten pounds lighter did not become more positive. In addition, task performance estimations did not illustrate weight-related self-evaluation changes in restrained eaters. The mood measures, to some extent, did replicate the mood data from Study 2. Restrained eaters who were weighed-heavy reported significantly more state anxiety than did any of the other groups. They also reported slightly more trait anxiety, trait depression and state depression than did the other groups.

A closer look at the methodology between Studies 2 and 3 revealed differences that might account for the discrepant self-esteem results. In Study 2, participants were asked to complete a modified Stroop task immediately after the weighing manipulation. This task exposed participants to fat and thin shape-related words. Each participant colour-named 20 different weight- and shape-related words five times each for a total of 100 target words. The modified Stroop task took approximately 20 minutes to complete. Participants were then asked to complete the self-esteem measures. In Study 3 participants did not complete

the modified Stroop task, and were asked to complete the self-esteem measures immediately after the weighing manipulation.

At least two possibilities exist. First, it is possible that exposure to the target words was a necessary condition to evoke weight-related self-evaluation in restrained eaters. The combination of being weighed heavy and being exposed to words like fat, obese, and flabby may have placed the weight increase in a negative context for restrained eaters. They may have applied these negative labels to themselves, which in turn lowered their self-esteem. Second, participants in Study 2 were given a longer chance to think about the weight increase before being asked to report their self-esteem. Perhaps a substantial time interval is necessary to elicit weight-related self-esteem decrements in restrained eaters. Or, that negative self-evaluation is operating in restrained eaters, but they require time to articulate clearly what is happening to their self-esteem. Either way, time to process their weight increase and the negative implications associated with the increase may eventually lower reported self-esteem. If this was the case, immediate reporting of self-esteem would not detect the self-esteem impairment.

The food intake pattern from Study 2 did not replicate. If anything, restrained eaters who were weighed heavy ate less than did the other groups. In the present study there was a series of three tasks completed by participants before the intake data were collected. These tasks took about 20 minutes to complete and included reporting on strengths, interests and career goals. In addition, restrained eaters actually performed significantly better than did unrestrained eaters on one of the tasks (i.e., word generation). It is possible that completion of these tasks reduced any negative affect experienced by restrained eaters and contaminated the intake data.

CHAPTER VII

STUDY 4: Effects of exposure to weight- and shape-related material on self-evaluation, mood, and food intake in restrained and unrestrained eaters who are weighed heavy.

This study was conducted in an attempt to shed light on the inconsistencies between Studies 2 and 3. In Study 2, restrained eaters who were weighed five pounds heavier than their actual weight reported a lowering of self-esteem and a worsening of mood. Furthermore, these restrained eaters ate significantly more food than did the other groups. The results of Study 2 strongly supported the hypothesis that restrained eaters engage in negative weight-related self-evaluation when their weight and shape concerns are made salient. However, Study 3 did not replicate these findings (with the exception of the mood measures). The results of Study 3 revealed no changes in self-esteem as a result of the weighed-heavy manipulation. In addition, restrained eaters who were weighed heavy actually ate slightly less than did the other groups.

In retrospect, the methodology of the two studies varied considerably and may account for the discrepant results. Participants in Study 2 completed the modified Stroop task that exposed them to weight- and shape-related stimuli. Those in Study 3 did not complete this task and were therefore not exposed to the target stimuli. One hypothesis is that exposure to body shape-related words is necessary for negative weight- and shape-related self-evaluation to occur in restrained eaters who are weighed heavy in the laboratory. Therefore, this study manipulated exposure to weight- and shape-related material.

All participants were weighed five pounds heavier than their actual weight and were

randomly assigned to weight- and shape-related stimuli exposure or not. The exposure condition asked participants to read aloud 100 weight- and shape-related words. This procedure attempted to approximate the modified Stroop task by using the same words and the same number of exposures. It was predicted that restrained eaters would show negative weight-related self-evaluation (i.e., decreased self-esteem) only when they were weighed heavy and exposed to the weight- and shape-related words. It was predicted that, restrained eaters who were weighed heavy and exposed to the target stimuli would report greater negative affect (as in Studies 2 and 3), and would eat more than the other groups owing to the negative affect (as in Study 2).

Method

Participants

Fifty-three female undergraduates volunteered for this study in exchange for course credit. All participants were run individually between 11:00 a.m. and 6:00 p.m. during one-hour intervals. Participants scoring 14 or higher on the Restraint Scale (Herman & Polivy, 1980) were considered restrained eaters, while those scoring below 14 were considered unrestrained eaters.¹⁴

Materials

Scale. A Detecto balance-beam scale was used for weighing participants. A screw located on the back of the scale was adjusted so that participants could be weighed five pounds heavier than their actual weight. A ruler attached to the scale was used to measure

¹⁴ Owing to the low number of restrained eaters, a cutoff of 14, instead of the usual 15 for restrained eaters, was used in this study.

the height of the participants.

Cookies. English Bay double chocolate, English Bay oatmeal raisin, and Monsieur Felix & Mr. Norton chocolate chip cookie dough was purchased by the experimenter. Bite-size cookies were prepared for each experimental day.

Conditions. Participants were randomly assigned to one of three conditions (i.e., weight- and shape-related word read, neutral word read, word generation). The weight- and shape-related word read condition consisted of 100 weight- and shape- related words and 50 furniture-related words (total 150 words). Ten fat shape-related words (i.e., fat, obese, chubby, hefty, plump, flabby, huge, cellulite, pudgy, stout), ten thin shape-related words (i.e., thin, slender, lean, slight, skinny, slim, lithe, narrow, petite, toned), and ten furniture words (i.e., couch, chair, shelf, lamp, desk, stool, bench, cabinet, curtain, carpet) were each listed five times on a single piece of paper. The words appeared in random order in the form of five columns (see Appendix 9). The neutral word read condition consisted of 150 neutral words. Ten building material-related words (i.e., wood, brick, stone, steel, cement, concrete, aluminum, glass, metal, plastic), ten pet-related words (i.e., dog, cat, hamster, rabbit, turtle, monkey, canary, horse, fish, mouse), and ten furniture words (same as above) were each listed five times on a single piece of paper. The words appeared in random order in the form of five columns (see Appendix 10). Participants were ask to read the words aloud as quickly as possible. The word generation task required participants to generate words, four letters or longer, from longer words that were provided. Participants had three minutes to produce as many words as possible (see Appendix 7).

Self-esteem scales. State self-esteem was measured using the State Self-Esteem Scale (Heatherton & Polivy, 1991), and trait self-esteem was determined by the Janis-Field

Trait Self-Esteem Inventory (Janis & Field, 1959).

Mood scales. State anxiety and depression were measured by the Affect Rating Scale (Atkinson & Polivy, 1976). Trait anxiety was measured using the Spielberger Trait Anxiety Inventory (Spielberger et al., 1970), whereas trait depression was measured using the Beck Depression Inventory (Beck et al., 1961).

Other self-report measures. The Restraint Scale (Herman & Polivy, 1980), and the Body Shape Questionnaire (Cooper et al., 1987) were also administered.

Procedure

Participants arrived at the laboratory believing that they were participating in an experiment concerning the connections between cognitive and perceptual abilities. Upon arrival, participants completed a consent form that listed a wide variety of possible perceptual and cognitive tasks that they might be asked to perform. Participants were told that they had been randomly assigned to the condition that would be comparing word reading (or word generation, depending on what condition they were in) to taste perception. At this time participants were informed that the experimenter would also be collecting normative data from participants "because the lab is in the process of compiling a huge data bank of information about university students. This will include information such as height, weight, age, and area of study." In reality, all participants were weighed five pounds heavier than their actual weight.

Participants were then told the following cover story to ensure that they believed the laboratory scale was accurate and that their weight was actually five pounds heavier than expected. Also, doubt was instilled in participants regarding their own scale at home to offset the fact that some of them may have weighed themselves that morning.

I am going to start by obtaining a measure of your height and weight for the normative data bank. So in a minute I'll ask you to step on the scale. The reason we don't just ask people their weight is that we have found in the past that people are often inaccurate when reporting their weight. This is true because most people use their bathroom scale to weigh themselves, and because these scales are bumped around, they are often knocked off balance. Another problem is that the floor where people weigh themselves is usually a little uneven; as a result your scale at home is not a very accurate measure of your true weight. This is a typical precision scale that you would see in any doctor's office and is therefore much more accurate than a bathroom scale [pointing to the scale]. This scale is aligned every morning and is extremely precise. In order to maximize the accuracy of the measure, I would like you to remove your shoes/boots, jacket, sweater, and also take off any heavy pieces of jewelry before you step on the scale.

Participants were then weighed five pounds heavier than their actual weight. The experimenter read aloud the weight and height of the participant and recorded the measurements. Participants were then asked to perform their "cognitive task." Depending on the condition to which they were assigned, they read weight- and shape-related words, read neutral words, or generated words.

After the "cognitive task," participants were given a manipulation booster that consisted of the "normative data questionnaire." This questionnaire asked participants to write down their weight and height (assessed by the experimenter) as well as their age, year at the university and area of study. This questionnaire also asked participants to report

when they had last weighed themselves and how much they weighed at that time. If a discrepancy existed between what they weighed in the experiment and what they weighed when they last weighed themselves, participants were asked to list possible reasons for this discrepancy (see Appendix 5). At this time participants were asked to complete state and trait self-esteem, state and trait anxiety, and state and trait depression measures.

Participants were then asked to complete the "perceptual taste test" and were presented with three heaping plates of freshly baked cookies, three taste rating forms, and a glass of water. Participants were asked to rate each cookie type on the dimensions listed on the rating forms (e.g., sweet, bitter). They were instructed to have as many cookies as was necessary to achieve accurate ratings. The importance of the cookie ratings was emphasized repeatedly. Participants were informed that "this is a standardized task so you will be given a full ten minutes to complete it. If you are done early, please feel free to help yourself to cookies - in fact we have tons - but just make sure that you don't change any of your taste ratings." When the taste rating task was over, the plates of cookies were removed and weighed to determine the amount of cookies consumed. Participants then completed a final set of self-report measures, including the Restraint Scale, and the Body Shape Questionnaire. Participants were debriefed and asked not to discuss the experiment with their classmates.

Results

Distribution of participants and restraint

Refer to Table 20. All analyses were first completed as a series of 2 (unrestrained, restrained) X 3 (neutral word read, weight- and shape-related word read, word generation) ANOVAs. The restrained eaters in the word generation group differed from the restrained

eaters in the other control group (neutral word read), and the experimental group (weight/shape word read) on trait measures of depression and anxiety. This indicated that random assignment was not successful and that these restrained eaters were fundamentally different from the other restrained eaters in the experiment. Thus, the word generation group did not represent a second control group as intended, and was excluded from the analysis.¹⁵

Weighed five pounds heavier (check)

All participants were weighed five pounds heavier than their actual weight. To determine if the weight increase was perceived as intended, a difference score was computed by subtracting participants' manipulated weight from their self-reported weight.¹⁶ A 2 (restrained, unrestrained) X 2 (neutral word read, weight/shape word read) ANOVA was performed on this difference score. The main effect for condition was significant, indicating that the participants who read the weight- and shape-related words obtained a lower difference score ($M = -8.31$ lbs, $SD = 5.65$) than those who read the neutral words ($M = -4.69$ lbs., $SD = 4.57$), $F(1,31) = 4.55$, $p < .05$. Thus, the weight increase combined with the threatening nature of the fat words led all participants to underestimate their weight, whereas if they were exposed to the neutral words they were accurate in reporting their weight. The effect for restraint approached significance, indicating that restrained eaters obtained a lower difference score ($M = -8.22$ lbs., $SD = 3.62$) than did unrestrained eaters

¹⁵ In contrast to Study 3, restrained and unrestrained eaters did not differ with respect to performance on the word generation task. Thus, this group did not perform differently, and did not represent a meaningful alternative control group. Excluding this group did not change the pattern of the results appreciably.

¹⁶ Two participants did not provide a self-reported weight.

($M = -4.78$ lbs., $SD = 6.26$), $F(1,31) = 3.45$, $p = .07$. Although unrestrained eaters were accurate, this is consistent with the finding that restrained eaters underestimate their weight significantly more than do unrestrained eaters (McFarlane et al., 1997). The interaction was not significant. On average, participants reported that they weighed approximately six pounds lighter when they last weighed themselves ($M = -6.45$ lbs., $SD = 5.37$). Thus, weighing participants five pounds heavier was successfully perceived as an increase in weight for all participants (see Table 21).

Self-esteem

Total state self-esteem was analyzed in a 2 (restrained, unrestrained) X 2 (neutral word read, weight/shape word read) ANOVA. There were no significant effects (see Table 22). A similar analysis was performed on each state self-esteem subscale (i.e., performance, social, appearance). For the appearance state self-esteem subscale there was a main effect of restraint, such that restrained eaters reported lower appearance state self-esteem ($M = 18.18$, $SD = 4.52$) than did unrestrained eaters ($M = 22.05$, $SD = 4.65$), $F(1, 33) = 6.26$, $p < .05$. There was also a main effect of restraint for the performance state self-esteem subscale, such that restrained eaters reported higher performance state self-esteem ($M = 31.06$, $SD = 2.88$) than did unrestrained eaters ($M = 28.3$, $SD = 3.84$), $F(1,33) = 6.14$, $p < .05$. No other effects were significant with respect to state self-esteem.

Trait self-esteem was analyzed in a 2 X 2 ANOVA. No effects were significant; Unrestrained eaters ($M = 120.20$, $SD = 24.32$) and restrained eaters ($M = 118.94$, $SD = 22.86$) reported a similar level of trait self-esteem.

Mood

State anxiety, trait anxiety, state depression, and trait self-esteem were analyzed in a

series of 2 X 2 ANOVAs. No effects were significant (see Tables 23-26).

Weight and shape concerns

Total shape and weight concern was analyzed in a 2 X 2 ANOVA. The results revealed a main effect of restraint, such that restrained eaters reported more shape and weight concerns ($M=97.77$, $SD=35.44$) than did unrestrained eaters ($M=57.65$, $SD=13.88$), $F(1,33)=20.28$, $p<.001$. No other effects were significant.

Food intake

Cookies were weighed in grams both before and after the "taste test."¹⁷ A difference score determined the amount that each subject ate and a 2 X 2 ANOVA was performed on total grams eaten. There were no significant main effects. However, a significant interaction revealed that restrained eaters who were exposed to the weight- and shape-related words ate significantly more than any of the other groups, $F(1,32)=7.20$, $p<.05$; $t's(32) > 2.0$, $p's<.05$. The unrestrained eaters in both conditions and the restrained eaters in the neutral word read condition did not differ from one another with respect to amount consumed (see Table 27).

Discussion

Although restrained eaters reported lower appearance state self-esteem than did unrestrained eaters, they did not report lower total state self-esteem than did unrestrained eaters. In fact, total state self-esteem scores were considerably higher in Study 4 than in Studies 1, 2 and 3 for all participants, and the performance subscale was responsible for this inflated state self-esteem in both restrained and unrestrained eaters. Moreover,

¹⁷ One participant did not complete the taste test because she was highly lactose intolerant and refused to eat the cookies.

restrained eaters reported higher performance state self-esteem than did unrestrained eaters, and there were no significant differences between restrained and unrestrained eaters with respect to trait self-esteem. The standard finding of lower trait self-esteem in restrained eaters than unrestrained eaters was not obtained. One possible explanation for the higher self-esteem scores is that Study 4 was conducted at the beginning of the summer holidays, whereas all of the other studies were run during the school year. Perhaps self-esteem is higher once the school year is over and assignments and exams have been completed. Or, summer students may represent a fundamentally different group of students than those who are accessible during the school year. In particular they may choose to take summer classes because they are more studious and eager to graduate than their counterparts who prefer to take the summer off, and thus they may be a higher self-esteem group overall.

None of the self-esteem or mood measures interacted with exposure to weight- and shape-related stimuli. At first glance, it does not appear that weight-related self-evaluation impairment occurred specifically in restrained eaters who were exposed to the weight- and shape-related material. However, exposure to target material was necessary to induce restrained eaters who were weighed heavy to overeat. The combination of observing a weight increase and being exposed to words like fat, obese, and flabby led restrained eaters to break their diets and overeat (as in Study 2). One could speculate that this effect represents distress-induced overeating, and that restrained eaters were upset in the condition that reminded them of the negative implications of their weight increase. In contrast to this interpretation, the mood measures indicated that restrained eaters reported similar levels of anxiety and depression whether they were exposed to weight- and shape-

related stimuli or not. Thus, it is not entirely clear why restrained eaters who were weighed heavy and exposed to weight- and shape-related material were the only ones who overate.

One possibility is that negative weight-related self-evaluation did occur specifically in these restrained eaters (i.e., a worsening of mood and a lowering of self-esteem that leads to distress-induced overeating), but that the self-report measures were unable to detect it. The effects on mood and self-esteem may have been obscured by the use of summer students who have higher than usual self-esteem. Higher self-esteem may render restrained eaters less susceptible to self-esteem and mood impairment and make the effects even more subtle and difficult to detect with self-report measures. Perhaps weight-related self-evaluation was operating in these restrained eaters, but not to the point where it could be identified by our insensitive measures. In addition, the number of participants recruited for this study was less than in previous studies, and it was necessary to split restraint at 14 rather than the usual 15, which also may make it more difficult to detect effects that are weak.

Another possibility is that the process of negative weight-related self-evaluation may require a time interval before it can be articulated by restrained eaters or before it begins in restrained eaters. A time period may allow restrained eaters who are weighed-heavy and given a negative context regarding their weight to connect their weight increase with the negative implications of weight gain. If this was the case, then the self-report measures would not be able to detect negative weight-related self-evaluation because they were administered directly after the exposure to weight- and shape-related material. However, the time it took to complete the self-report measures and the manipulation booster (where participants were asked to list reasons why they gained weight) may have eventually

initiated the process of negative weight-related self-evaluation. Thus, it is possible that despite the lack of an impairment in mood or self-esteem measures, negative weight-related self-evaluation did occur. This would account for the overeating by restrained eaters who were weighed-heavy and who were provided with a negative context for their weight increase.

CHAPTER VIII

General Discussion

The weight-related self-evaluation hypothesis.

The purpose of this thesis was to determine if female restrained eaters engage in the self-evaluation process that is proposed to exist in those who are diagnosed with an eating disorder (i.e., weight- and shape-related self-evaluation). Weight- and shape-related self-evaluation occurs when individuals measure their entire self based on their weight and shape. Theoretically, this process could work in both directions. If an individual is dissatisfied or disappointed with her weight or shape, and values this aspect of herself as important, she should evaluate other aspects of herself more negatively and report lower overall self-esteem (i.e., negative weight- and shape-related self-evaluation). On the other hand, if an individual is satisfied with her weight or shape, and values this aspect of herself as important, she should evaluate other aspects of herself more positively and report higher overall self-esteem (i.e., positive weight- and shape-related self-evaluation). It was also predicted that mood would be affected by weight- and shape-related self-evaluation, such that negative moods (e.g., anxiety, depression) would occur with negative weight- and shape-related self-evaluation, and positive moods (e.g., calm, happy) would occur with positive weight- and shape-related self-evaluation. Unlike eating disordered patients whose weight and shape concerns are chronically salient, it is proposed that restrained eaters' weight and shape concerns may or may not be salient at any given time. Thus, it was predicted that restrained eaters would engage in weight-related self-evaluation only when their weight and shape concerns were salient. To test this hypothesis, restrained and unrestrained eaters were exposed to a number of scale and feedback manipulations

intended to increase the saliency of their weight and shape concerns.

Summary of the studies (mood and self-esteem).

In Study 1 participants were randomly assigned to have an accurate measure of their weight taken at the beginning or the end of the experiment. Restrained eaters' self-esteem and mood were not affected; thus this manipulation did not appear to affect self-evaluation. In an attempt to strengthen the weighing manipulation, Study 2 assigned participants to be weighed five pounds heavier than their actual weight, five pounds lighter than their actual weight, or to be weighed accurately at the end of the experiment. Participants were given false weight feedback consistent with the weight manipulation. Restrained eaters who were weighed as five pounds heavier reported lower state self-esteem (i.e., total, appearance, social) and greater negative moods (i.e., anxiety, depressed, sad, guilty, upset, nervous, regretful, disappointed) than did restrained eaters in the control condition. These results illustrate that restrained eaters do engage in negative weight-related self-evaluation, but only when their weight and shape concerns are made salient by experiencing an increase in weight. On the other hand, restrained eaters did not engage in positive weight-related self-evaluation when they experienced a decrease in weight. If anything, it appears that the weighed light manipulation may have had a slightly negative affect on the mood and self-esteem of restrained eaters.

The goal of Study 3 was to determine to what extent negative weight-related self-evaluation generalizes to other aspects of self-evaluation (i.e., performance estimations), and to determine if positive weight-related self-evaluation could be elicited in restrained eaters who perceived a larger weight decrease. Participants were assigned to be weighed ten pounds lighter than their actual weight, five pounds heavier than their actual weight, or

to be weighed accurately at the end of the experiment. Restrained eaters still did not demonstrate positive weight-related self-evaluation in the weighed light condition. Anecdotally, positive weight-related self-evaluation does not seem to occur for eating disordered patients either. Although it is the case that any weight increase is usually regarded with a significant amount of distress, a weight decrease is often disregarded as "insignificant" or "not enough" (L. Nemiroff, personal communication, February 11, 1998). The mood data supported the notion that a weight increase leads to increased negative affect in restrained eaters. However, restrained eaters who were weighed-heavy did not report impairment in self-esteem (inconsistent with Study 2).

An examination of the methodologies of Studies 2 and 3 revealed some important differences. Study 2 included the modified Stroop task as a manipulation check before the crucial self-esteem measures were collected. On the other hand Study 3 did not include the modified Stroop task and collected the self-esteem measures immediately after weighing participants. The modified Stroop task asked participants to colour-name 100 words that were related to fat body shapes (e.g., fat, obese, flabby) and thin body shapes (e.g., thin, slender, toned) and took approximately 20 minutes to complete. Participants were given breaks between each of the five trials. Thus, the restrained eaters who demonstrated impaired self-esteem in Study 2 were weighed heavy, exposed to 100 body shape-related words and given a significant amount of time perhaps to connect their weight increase with words like fat and flabby. Presumably in the real world, such an obvious context would not be necessary to evoke negative weight- and shape-related self-evaluation. Simply seeing a weight gain on the bathroom scale would probably start the process of negative self-evaluation and a worsening of mood. In contrast, observing a weight increase in the

laboratory may not mean to the dieter that she has gained weight; it may merely mean that her scale is inaccurate and that she weighs more than she thought, but she has not really changed. This less threatening interpretation may require that dieters be directly reminded of the negative implications associated with a higher weight before negative weight-related self-evaluation is evoked.

Study 4 was conducted to test one hypothesis put forth to account for the inconsistencies between Study 2 and Study 3 (i.e., weight-related self-evaluation requires a weight increase and a negative context for the increase). All participants were weighed five pounds heavier than their actual weight. They were then assigned to a condition where they were asked to read aloud the same body shape words that participants were exposed to in Study 2 or to a control condition. It was predicted that restrained eaters would demonstrate negative weight-related self-evaluation only when they were given a negative context for their weight increase. In contrast to the predictions, restrained eaters did not report lower self-esteem and higher anxiety and depression when they were asked to read the body-shape words compared to the control condition. Unfortunately, the time taken to read aloud the 100 words averaged only one minute per person which does not really approximate the exposure to these words in Study 2 (i.e., 20 minutes).

One hypothesis is that time to make a connection between the weight increase and the negative implications associated with the increase is required for weight-related self-evaluation to occur in restrained eaters in a laboratory setting. A similar hypothesis is that negative evaluations are indeed in operation, but restrained eaters need time to be able to clearly articulate impairments in self-esteem and mood. Finally, it is possible that weight-related self-evaluation may be a weak effect, and that our measures were unable to detect

mood impairments in Study 4, and self-esteem impairments in Studies 3 and 4. Although the state self-esteem measure remained consistent throughout the four studies, the state mood measures in Studies 3 and 4 (i.e., the Affect rating scale) differed from the ones used in Study 2 (i.e., visual analogue scales). The only study able to detect both self-esteem and mood impairment was Study 2 which included almost double the number of participants of each of the other studies. Study 2 included many participants because it contained a modified Stroop task, and it is common practice to include 20 participants per cell in a Stroop experiment because the Stroop effect is difficult to detect. Perhaps this amount of power is also required to detect negative weight- and shape-related self-evaluation in restrained eaters in the laboratory. Or, alternatively it may be necessary to include more sensitive measures of self-esteem and mood. Further research is warranted to test these hypotheses directly.

Food Intake.

Food Intake was measured in Studies 2, 3, and 4. It was predicted that false weight feedback would lead to weight-related self-evaluation which would in turn affect food intake in restrained eaters. It has been demonstrated that restrained eaters significantly increase their intake of food when they experience changes in affect, including both positive moods (e.g., Cools et al., 1992) and negative moods (e.g., Polivy et al., 1994). Because negative moods were expected to occur with negative weight-related self-evaluation (after a perceived weight gain), and positive moods were expected to occur with positive weight-related self-evaluation (after a perceived weight loss), it was predicted that either process could lead to overeating by restrained eaters. Given that there was no evidence for positive weight-related self-evaluation, it is not surprising that restrained eaters' intake was not

affected by being weighed lighter in any of the studies. In Study 2, restrained eaters who were weighed heavy demonstrated negative weight-related self-evaluation (by reporting lower self-esteem and greater negative affect), and also ate significantly more than any of the other groups of participants. It appeared that the negative affect (e.g., anxiety, depression) associated with perceiving a weight increase led restrained eaters to abandon their dietary restraint and overeat. This pattern of results for the intake data did not replicate in Study 3. However, this is consistent with the suggestion that the three tasks (i.e., the social skills task, the mental rotation task, the word generation task) completed before the taste rating reduced the negative affect that was displayed by the restrained eaters who were weighed-heavy and interfered with distress-induced overeating. In Study 4 restrained eaters overate only when they were weighed heavy and were exposed to body shape-related words (e.g., fat, obese, flabby). It is hypothesized that negative weight-related self-evaluation occurred in restrained eaters who had been weighed heavy and exposed to a negative context regarding their weight increase, but was undetected except for the fact that they overate during the taste test.

Weight and shape concerns.

Weight and shape concerns were measured throughout the four studies with the Body Dissatisfaction subscale of the Eating Disorder Inventory (Study 1, Study 3) and the Body Shape Questionnaire (Study 2, Study 3, Study 4). Each study found significant main effects for restraint, such that restrained eaters reported significantly higher body dissatisfaction or weight and shape concerns than did unrestrained eaters. None of the studies found an interaction between restraint and weighing condition in terms of weight and shape concerns. This is consistent with Ogden and Evans (1996), who did not find any

changes on their measure of body dissatisfaction after false weight feedback, and with Polivy and Herman (1992) who found no changes in body dissatisfaction after a ten-week group program intended to raise women's consciousness about the costs and side-effects of dieting. These results suggest that body dissatisfaction is a stable construct that is not susceptible to acute manipulations. Alternatively, the measurement of weight and shape concerns in restrained eaters may be a reactive measure. Once you ask restrained eaters to report on their weight and shape concerns, the concerns obviously become salient even in dieters who are not currently concerned with weight and shape. Weight and shape concerns may exist on some type of continuum in the natural world of the dieter, and once they reach a certain threshold negative weight-related self-evaluation may occur. The problem is that as soon as one tries to measure weight and shape concerns using self-report, the concerns are immediately made salient.

Information processing.

Two attempts were made to measure weight and shape concerns or the activation of the weight-related self-schema using less reactive cognitive measures. Neither the word-stem completion task nor the modified Stroop task supported the hypothesis that restrained eaters have a weight-related self-schema, and that this schema is activated after weight and shape concerns are primed. Despite the lack of evidence for a corresponding cognitive mechanism, negative weight-related self-evaluation was clearly demonstrated in Study 2. It is possible that the cognitive tasks used (i.e., the word-stem completion task, the modified Stroop task) were not able to detect restrained eaters' weight and shape concerns because the effects reflecting concerns may be more subtle than the effects uncovered in the clinical literature. Therefore, it may be necessary to use more sensitive methodology to elucidate

the cognitive correlates of this self-evaluative process. However, there appears to be a delicate balance between a task that is sensitive enough to detect the weight-related self-schema in restrained eaters and one that will automatically prime the concerns as they are being measured.

Implications.

It appears that under some circumstances restrained eaters who are weighed-heavy experience lowered self-worth and a worsening of mood that may lead them to relinquish their dietary restraint and overeat. In the laboratory it is necessary to provide restrained eaters with a negative context for their weight gain. For patients with bulimia nervosa it is possible that such an experience could lead to a binge eating episode. Thus, the seemingly benign and frequent act of stepping on the scale and perceiving a weight gain appears to contribute to potentially harmful psychological and behavioural consequences. These findings suggest that restrained eaters and eating disordered patients do themselves a disservice by continuously weighing themselves, and that such a maladaptive activity should be avoided. For eating disordered patients who require weighing it is recommended that weigh-ins occur within a controlled therapeutic setting so that patients can be assisted to cope with the emotional consequences of weight gain.

Conclusion.

In conclusion, restrained eaters engage in weight- and shape-related self-evaluation under some circumstances. However, this process seems to work only in the negative direction; bad news regarding their weight leads restrained eaters to evaluate themselves negatively in general. There is no evidence to indicate that good news regarding weight leads restrained eaters to evaluate themselves in a positive light. As predicted, it appears

that negative weight- and shape-related self-esteem is evoked when restrained eaters' weight and shape concerns are made salient by being weighed five pounds heavier than their actual weight. However, being weighed heavy does not seem to be sufficient to evoke weight- and shape-related self-evaluation in restrained eaters in the laboratory. Restrained eaters must also be given a negative context for their weight gain. In addition, negative weight-related self-evaluation in the laboratory is a weak effect and requires a large number of participants, sensitive measures of self-esteem and mood, or time to process the weight increase and the negative implications associated with the increase. When these conditions are met, restrained eaters report self-esteem and mood impairments. Moreover, distress-induced overeating is a correlate of the negative mood that occurs during the process of negative weight- and shape-related self-evaluation.

Thus, it appears that restrained eaters do engage in self-evaluation similar to that which has been proposed to exist in eating disordered patients, and that they do so only after the negative consequences of weight gain are made salient. Further research is required to determine exactly when restrained eaters engage in negative weight-related self-evaluation in the laboratory. In addition, weight- and shape-related self-evaluation in people who have eating disorders should be examined. The hypothesis that people with eating disorders continuously negatively evaluate themselves in terms of their dissatisfaction with their weight and shape is not empirically supported in the literature. Finally, the process of weight- and shape-related self-evaluation needs to be examined in a natural environment. Although weight- and shape-related self-evaluation occurred in the laboratory only after a number of conditions were met, it is likely that this process occurs more easily without the distraction of being in an experiment, and when the dieter believes

that she has actually gained weight. For the dieter, stepping on the bathroom scale and noticing a weight gain or trying on a pair of jeans and noticing that they fit tighter than usual may be enough to lower self-esteem and increase negative moods for the rest of the day.

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TABLES

Table 1
Study 1: Distribution of participants.

	CONTROL	WEIGHED ACCURATELY	TOTAL
UNRESTRAINED EATERS	12	14	26
RESTRAINED EATERS	13	13	26
TOTAL	25	27	52

Table 2
Study 1: Effects of weighing on number of negative weight-related word completions.

	CONTROL	WEIGHED ACCURATELY	TOTAL
UNRESTRAINED EATERS <u>M</u> <u>n</u>	5.08 12	4.07 14	4.56 26
RESTRAINED EATERS <u>M</u> <u>n</u>	3.92 13	4.23 13	4.08 26
TOTAL <u>M</u> <u>n</u>	4.50 25	4.15 27	4.32 52

Table 3
Study 1: Effects of weighing on total state self-esteem in restrained and unrestrained eaters.

	CONTROL	WEIGHED ACCURATELY	TOTAL
UNRESTRAINED EATERS <u>M</u> <u>n</u>	73.58 12	72.43 14	72.96 26
RESTRAINED EATERS <u>M</u> <u>n</u>	68.77 13	66.61 13	67.69 26
TOTAL <u>M</u> <u>n</u>	71.08 25	69.63 27	70.33 52

Table 4

Study 1: Effects of weighing on state anxiety in restrained and unrestrained eaters (anxiety was measured on the State Anxiety Inventory).

		CONTROL	WEIGHED ACCURATELY	TOTAL
UNRESTRAINED EATERS	$\frac{M}{n}$	37.75 12	36.79 14	37.23 26
RESTRAINED EATERS	$\frac{M}{n}$	41.85 13	40.08 13	40.96 26
TOTAL	$\frac{M}{n}$	39.88 25	38.37 27	39.10 52

Table 5

Study 1: Effects of weighing on trait anxiety in restrained and unrestrained eaters (anxiety was measured by the Trait Anxiety Inventory).

		CONTROL	WEIGHED ACCURATELY	TOTAL
UNRESTRAINED EATERS	$\frac{M}{n}$	42.52 12	41.79 14	42.11 26
RESTRAINED EATERS	$\frac{M}{n}$	45.46 13	44.77 13	45.11 26
TOTAL	$\frac{M}{n}$	44.04 25	43.22 27	43.61 52

Table 6
Study 2: Distribution of participants and restraint score.

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	10.05	9.64	10.00	9.88
	<u>SD</u>	3.44	3.63	2.99	3.33
	<u>n</u>	20	22	18	60
RESTRAINED EATERS	<u>M</u>	18.67	20.23	19.53	19.44
	<u>SD</u>	3.27	2.13	4.19	3.33
	<u>n</u>	15	13	15	43
TOTAL	<u>M</u>	13.74	13.57	14.33	13.87
	<u>SD</u>	5.45	6.06	5.97	5.78
	<u>n</u>	35	35	33	103

Table 7
Study 2: Manipulation check (difference between manipulated weight and self-reported weight in pounds).

		WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	-6.09	2.11	-2.30
	<u>SD</u>	5.27	4.92	6.53
	<u>n</u>	21	18	39
RESTRAINED EATERS	<u>M</u>	-8.38	-.30	-4.05
	<u>SD</u>	6.38	9.29	8.92
	<u>n</u>	13	15	28
TOTAL	<u>M</u>	-6.97	1.02	-3.04
	<u>SD</u>	5.74	7.22	7.61
	<u>n</u>	34	33	67

Table 8

Study 2: Effects of false weight feedback on total state self-esteem in restrained and unrestrained eaters.

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS					
	<u>M</u>	71.50	75.45	73.78	73.63
	<u>SD</u>	9.04	8.31	10.42	9.21
	<u>n</u>	20	22	18	60
RESTRAINED EATERS					
	<u>M</u>	71.07	62.38	64.47	66.14
	<u>SD</u>	10.73	7.92	11.52	10.71
	<u>n</u>	15	13	15	43
TOTAL					
	<u>M</u>	71.31	70.60	69.55	70.50
	<u>SD</u>	9.65	10.29	11.74	10.49
	<u>n</u>	35	35	33	103

Table 9

Study 2: Effects of false weight feedback on anxiety in restrained and unrestrained eaters.
Anxiety is rated from 1 (not at all anxious) to 7 (extremely anxious).

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS					
	<u>M</u>	2.75	2.55	2.89	2.72
	<u>SD</u>	1.29	1.41	1.41	1.35
	<u>n</u>	20	22	18	60
RESTRAINED EATERS					
	<u>M</u>	2.00	3.46	3.40	2.93
	<u>SD</u>	1.36	1.33	1.40	1.50
	<u>n</u>	15	13	15	43
TOTAL					
	<u>M</u>	2.43	2.86	3.12	2.81
	<u>SD</u>	1.36	1.43	1.41	1.41
	<u>n</u>	35	35	33	103

Table 10

Study 2: Effects of false weight feedback on depression in restrained and unrestrained eaters.
Depression is rated from 1 (not at all depressed) to 7 (extremely depressed).

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	1.95	1.72	2.22	1.95
	<u>SD</u>	1.00	1.08	1.73	1.28
	<u>n</u>	20	22	18	60
RESTRAINED EATERS	<u>M</u>	1.80	3.15	2.07	2.30
	<u>SD</u>	1.08	2.03	1.10	1.52
	<u>n</u>	15	13	15	43
TOTAL	<u>M</u>	1.89	2.26	2.15	2.10
	<u>SD</u>	1.02	1.63	1.46	1.39
	<u>n</u>	35	35	33	103

Table 11

Study 2: Effects of false weight feedback on food intake in restrained and unrestrained eaters
(amount of cookies eaten in grams).

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	75.20	74.63	72.89	74.30
	<u>SD</u>	47.17	43.89	38.33	42.73
	<u>n</u>	20	22	18	60
RESTRAINED EATERS	<u>M</u>	61.20	113.08	63.07	77.53
	<u>SD</u>	33.32	68.33	29.75	50.60
	<u>n</u>	15	13	15	43
TOTAL	<u>M</u>	69.20	88.91	68.42	75.65
	<u>SD</u>	41.83	56.50	34.53	45.97
	<u>n</u>	35	35	33	103

Table 12
Study 3: Distribution of participants and restraint score.

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u> <u>SD</u> <u>n</u>	7.09 3.73 11	10.67 3.37 12	6.82 4.42 11	8.26 4.14 34
RESTRAINED EATERS	<u>M</u> <u>SD</u> <u>n</u>	18.50 3.89 8	18.44 2.24 9	18.20 1.81 10	18.37 2.60 27
TOTAL	<u>M</u> <u>SD</u> <u>n</u>	11.89 6.86 19	14.00 4.88 21	12.24 6.72 21	12.74 6.16 61

Table 13
Study 3: Manipulation check (difference between manipulated weight and self-reported weight in pounds).

		WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u> <u>SD</u> <u>n</u>	-5.00 4.63 12	5.00 5.59 10	-4.5 7.11 22
RESTRAINED EATERS	<u>M</u> <u>SD</u> <u>n</u>	-8.22 9.05 9	3.33 10.65 9	-2.44 11.28 18
TOTAL	<u>M</u> <u>SD</u> <u>n</u>	-6.38 6.87 21	4.21 8.18 19	-1.35 9.1 40

Table 14

Study 3: Effects of false weight feedback on total state self-esteem in restrained and unrestrained eaters.

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	77.27	69.05	70.27	72.26
	<u>SD</u>	10.64	9.85	12.43	11.22
	<u>n</u>	11	12	11	34
RESTRAINED EATERS	<u>M</u>	68.25	67.89	70.30	68.89
	<u>SD</u>	8.00	10.94	9.91	9.45
	<u>n</u>	8	9	10	27
TOTAL	<u>M</u>	73.47	68.81	70.29	70.77
	<u>SD</u>	10.43	10.09	11.02	10.53
	<u>n</u>	19	21	21	61

Table 15

Study 3: Effects of false weight feedback on state anxiety in restrained and unrestrained eaters (anxiety was measured by the Affect Rating Scale).

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	31.73	37.17	35.45	34.85
	<u>SD</u>	7.07	7.04	9.81	8.14
	<u>n</u>	11	12	11	34
RESTRAINED EATERS	<u>M</u>	32.38	43.89	35.20	37.26
	<u>SD</u>	8.94	7.22	10.53	10.01
	<u>n</u>	8	9	10	27
TOTAL	<u>M</u>	32.38	40.05	35.33	35.92
	<u>SD</u>	7.68	7.73	9.90	9.01
	<u>n</u>	19	21	21	61

Table 16

Study 3: Effects of false weight feedback on trait anxiety in restrained and unrestrained eaters (anxiety was measured by the Trait Anxiety Inventory).

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	39.27	42.08	39.45	40.32
	<u>SD</u>	11.11	9.07	11.72	10.40
	<u>n</u>	11	12	11	34
RESTRAINED EATERS	<u>M</u>	41.88	47.00	43.60	44.22
	<u>SD</u>	10.51	11.43	8.75	10.05
	<u>n</u>	8	9	10	27
TOTAL	<u>M</u>	40.37	44.19	41.43	42.05
	<u>SD</u>	10.64	10.19	10.38	10.35
	<u>n</u>	19	21	21	61

Table 17

Study 3: Effects of false weight feedback on state depression in restrained and unrestrained eaters (depression was measured by the Affect Rating Scale).

		CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS	<u>M</u>	29.55	33.42	32.91	32.00
	<u>SD</u>	5.75	7.50	8.51	7.33
	<u>n</u>	11	12	11	34
RESTRAINED EATERS	<u>M</u>	32.13	39.00	34.4	35.26
	<u>SD</u>	6.36	8.15	10.74	8.91
	<u>n</u>	8	9	10	27
TOTAL	<u>M</u>	30.63	35.81	33.62	33.44
	<u>SD</u>	5.98	8.10	9.42	8.16
	<u>n</u>	19	21	21	61

Table 18

Study 3: Effects of false weight feedback on trait depression in restrained and unrestrained eaters (depression was measured by the Beck Depression Inventory).

	CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS				
<u>M</u>	5.45	6.92	8.09	6.82
<u>SD</u>	4.70	4.10	6.59	5.16
<u>n</u>	11	12	11	34
RESTRAINED EATERS				
<u>M</u>	9.13	13.00	9.90	10.70
<u>SD</u>	5.36	5.61	6.57	5.93
<u>n</u>	8	9	10	27
TOTAL				
<u>M</u>	7.00	9.52	8.95	8.54
<u>SD</u>	5.19	5.60	6.48	5.80
<u>n</u>	19	21	21	61

Table 19

Study 3: Effects of false weight feedback on food intake in restrained and unrestrained eaters (amount of cookies eaten in grams).

	CONTROL CONDITION	WEIGHED HEAVY	WEIGHED LIGHT	TOTAL
UNRESTRAINED EATERS				
<u>M</u>	66.18	59.42	56.81	60.76
<u>SD</u>	38.16	23.64	23.60	28.49
<u>n</u>	11	12	11	34
RESTRAINED EATERS				
<u>M</u>	69.50	41.56	63.30	57.89
<u>SD</u>	24.27	25.33	35.23	30.51
<u>n</u>	8	9	10	27
TOTAL				
<u>M</u>	67.58	51.76	59.90	59.49
<u>SD</u>	32.27	25.42	29.13	29.19
<u>n</u>	19	21	21	61

Table 20
Study 4: Distribution of participants and restraint score.

		NEUTRAL WORD READ	WORD GENERATION	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS					
	<u>M</u>	8.27	6.88	7.56	7.64
	<u>SD</u>	2.53	3.14	5.10	3.60
	<u>n</u>	11	8	9	28
RESTRAINED EATERS					
	<u>M</u>	18.00	20.89	18.78	19.27
	<u>SD</u>	4.41	6.21	3.27	4.77
	<u>n</u>	8	9	9	26
TOTAL					
	<u>M</u>	12.37	14.29	13.17	13.24
	<u>SD</u>	5.66	8.69	7.11	7.19
	<u>n</u>	19	17	18	54

Table 21
Study 4: Effects of word-type on the difference between self-reported and manipulated weight in restrained and unrestrained eaters who were weighed heavy (in pounds).

		NEUTRAL WORD READ	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS				
	<u>M</u>	-3.20	-6.75	-4.78
	<u>SD</u>	4.19	8.03	6.26
	<u>n</u>	10	8	18
RESTRAINED EATERS				
	<u>M</u>	-6.56	-9.69	-8.22
	<u>SD</u>	4.57	1.64	3.62
	<u>n</u>	8	9	17
TOTAL				
	<u>M</u>	-4.69	-8.31	-6.45
	<u>SD</u>	4.57	5.64	5.36
	<u>n</u>	18	17	35

Table 22

Study 4: Effects of word-type on total state self-esteem in restrained and unrestrained eaters who were weighed heavy.

	NEUTRAL WORD READ	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS			
<u>M</u>	78.73	79.00	78.85
<u>SD</u>	11.81	10.07	10.78
<u>n</u>	11	9	20
RESTRAINED EATERS			
<u>M</u>	79.38	74.67	76.88
<u>SD</u>	11.83	9.71	10.69
<u>n</u>	8	9	17
TOTAL			
<u>M</u>	79.00	76.83	77.95
<u>SD</u>	11.49	9.85	10.63
<u>n</u>	19	18	37

Table 23

Study 4: Effects of word-type on state anxiety in restrained and unrestrained eaters who were weighed heavy (anxiety was measured by the Affect Rating Scale).

	NEUTRAL WORD READ	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS			
<u>M</u>	32.45	31.11	31.85
<u>SD</u>	6.65	10.86	8.57
<u>n</u>	11	9	20
RESTRAINED EATERS			
<u>M</u>	34.00	36.33	35.24
<u>SD</u>	12.15	5.34	8.96
<u>n</u>	8	9	17
TOTAL			
<u>M</u>	33.11	33.72	33.41
<u>SD</u>	9.09	8.72	8.80
<u>n</u>	19	18	37

Table 24

Study 4: Effects of word-type on trait anxiety in restrained and unrestrained eaters who were weighed heavy (anxiety was measured by the Trait Anxiety Inventory).

	NEUTRAL WORD READ	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS			
<u>M</u>	37.55	41.00	39.10
<u>SD</u>	8.10	12.58	10.21
<u>n</u>	11	9	20
RESTRAINED EATERS			
<u>M</u>	41.50	36.22	38.71
<u>SD</u>	13.50	6.12	10.29
<u>n</u>	8	9	17
TOTAL			
<u>M</u>	39.21	38.61	38.92
<u>SD</u>	10.55	9.91	10.11
<u>n</u>	19	18	37

Table 25

Study 4: Effects of word-type on state depression in restrained and unrestrained eaters who were weighed heavy (depression was measured by the Affect Rating Scale).

	NEUTRAL WORD READ	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS			
<u>M</u>	31.82	32.00	31.90
<u>SD</u>	8.24	8.05	7.94
<u>n</u>	11	9	20
RESTRAINED EATERS			
<u>M</u>	33.63	31.22	32.35
<u>SD</u>	11.29	4.06	8.09
<u>n</u>	8	9	17
TOTAL			
<u>M</u>	32.58	31.61	32.11
<u>SD</u>	9.39	6.19	7.90
<u>n</u>	19	18	37

Table 26

Study 4: Effects of word-type on trait depression in restrained and unrestrained eaters who were weighed heavy (depression was measured by the Beck Depression Inventory).

		NEUTRAL WORD READ	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS	<u>M</u>	7.64	8.22	7.90
	<u>SD</u>	6.73	5.33	5.99
	<u>n</u>	11	9	20
RESTRAINED EATERS	<u>M</u>	6.50	4.11	5.24
	<u>SD</u>	8.37	4.54	6.51
	<u>n</u>	8	9	17
TOTAL	<u>M</u>	7.16	6.17	6.68
	<u>SD</u>	7.26	5.25	6.29
	<u>n</u>	19	18	37

Table 27

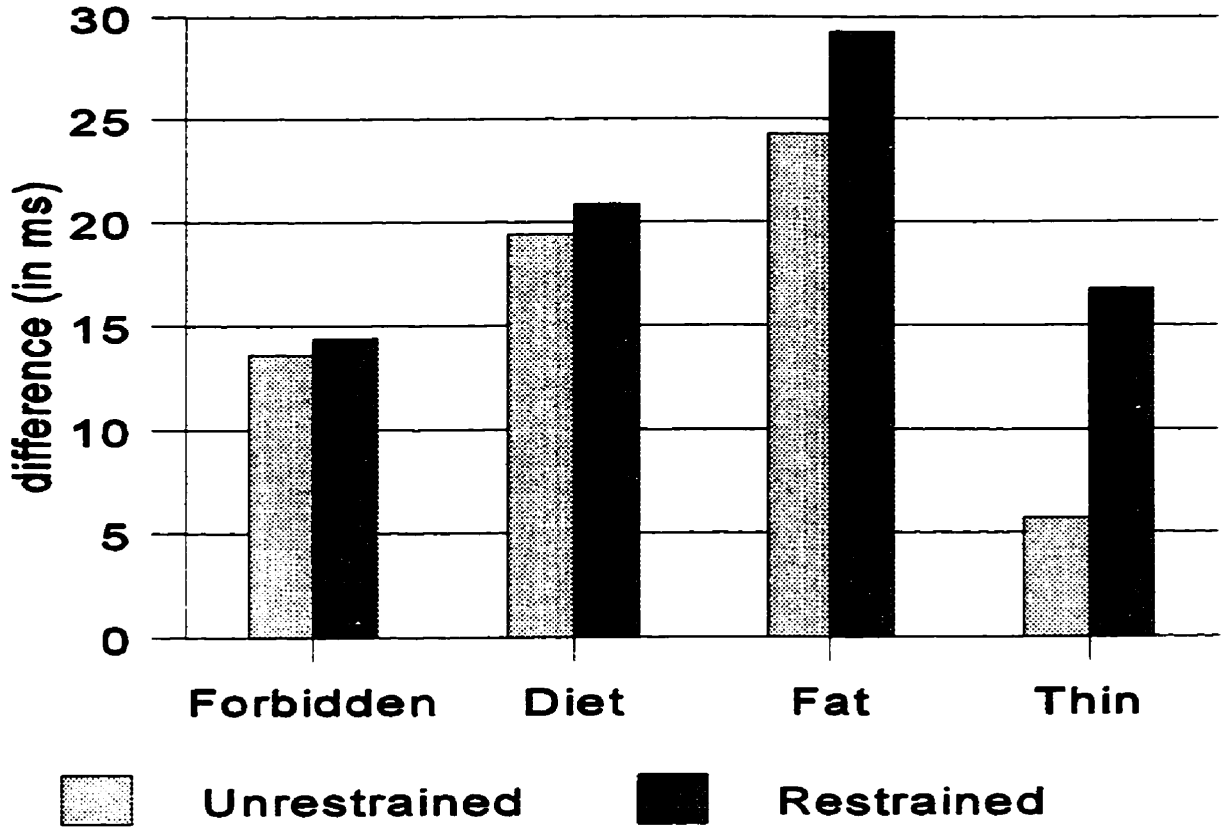
Study 4: Effects of word-type on food intake in restrained and unrestrained eaters who were weighed heavy (amount of cookies eaten in grams).

		NEUTRAL WORD READ	WEIGHT/SHAPE WORD READ	TOTAL
UNRESTRAINED EATERS	<u>M</u>	61.00	47.11	54.75
	<u>SD</u>	30.83	19.4	26.63
	<u>n</u>	11	9	20
RESTRAINED EATERS	<u>M</u>	51.00	91.13	71.06
	<u>SD</u>	33.98	33.99	38.83
	<u>n</u>	8	8	16
TOTAL	<u>M</u>	56.79	67.82	62.00
	<u>SD</u>	31.67	34.74	33.15
	<u>n</u>	19	17	36

FIGURE

Figure 1

Study 2b: Effects of word-type on colour-naming speed in restrained and unrestrained



eaters (difference between target word category and neutral word category).

APPENDICES

Appendix 1

Study 1: Word stem completion task.

Word Stem Completion Task

Please complete the word stems with whatever word come to your mind first...

WAI_____

THR_____

HUS_____

BLO_____

HEA_____

BLU_____

DET_____

LAR_____

STO_____

DIE_____

ROU_____

RAD_____

BUR_____

OBE_____

PHO_____

CHU_____

PLU_____

PRA_____

SWO_____

WHA_____

PUD_____

OVE_____

THI_____

GRO_____

CRA_____

MAS_____

BUT_____

POR_____

WEI_____

ROT_____

BUL_____

HUG_____

FLE_____

SOL_____

Appendix 2**Study 1: Importance of weight and shape questions.**

Please circle one answer for each question...

1. When evaluating yourself as a person how important is your WEIGHT to you?

- a) not at all important
- b) slightly important
- c) important
- d) very important
- e) one of the most important aspects
- f) the most important aspect of myself

2. When evaluating yourself as a person how important is your SHAPE to you?

- a) not at all important
- b) slightly important
- c) important
- d) very important
- e) one of the most important aspects
- f) the most important aspect of myself

Appendix 3

Study 2: Visual analogue mood scales.

Please rate the following according to how you are feeling right now. Please circle the appropriate number that corresponds to how you are feeling at this moment...

PLEASSED

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

DISTRESSED

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

CONFIDENT

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

BORED

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

GUILTY

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

ANXIOUS

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

UPSET

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

HAPPY

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

NERVOUS

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

SATISFIED

1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____
not at all _____ extremely

CALM
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

SAD
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

ELATED
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

ANGRY
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

DEPRESSED
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

CONCERNED
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

DISAPPOINTED
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

REGRETFUL
1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7
not at all **extremely**

HARDWORKING _____ LAZY

THIN _____ FAT

TALL _____ SHORT

Appendix 5
Studies 2, 3, and 4: Normative data questionnaire (manipulation booster).

Normative Data Questionnaire

1. Age: _____
2. Sex: _____
3. Height: _____
4. Weight: _____
5. When was the last time you weighed yourself?
Date: _____
Time: _____
6. How much did you weigh?

7. How much did you expect to weigh today?

8. Is there is a difference between what you weighed today and the last time you weighed yourself?

YES or NO (circle one)
9. If yes, how do you account for this?

10. What year of university are you in?

11. What area of study do you plan on majoring in?

Appendix 6**Study 3: Mental rotation task.**

Circle N's and D's as quickly as you can without making mistakes...

Please see next page...

lips.

And then to sleep with a prayer for the beloved in your heart and a song of praise upon your

To return home at eventide with gratitude;

To rest at the noon hour and meditate love's ecstasy;

To wake at dawn with a winged heart and give thanks for another day of loving;

And to bleed willingly and joyfully.

To be wounded by your own understanding of love;

To know the pain of too much tenderness.

To melt and be like a running brook that sings its melody to the night.

But if you love and must needs have desires, let these be your desires:

Love has no other desire but to fulfil itself.

course.

And think not you can direct the course of love, for love, if it finds you worthy, directs your

God."

When you love you should not say, "God is in my heart," but rather, "I am in the heart of

For love is sufficient unto love.

Love possesses not nor would it be possessed;

Love gives naught but itself and takes naught but from itself.

Appendix 7
Studies 3 and 4: The word generation task.

Word Generation Task

Below is a list of five words. Your task is to generate shorter words from the letter in each word. For example, the word poem can be generated from the word impropriety. Do not include words that are less than four letters long. This is a timed task so work as quickly as you can.

DEMONSTRATE

APPLICATION

MANIFESTATION

ACCENTUATING

CONSIDERATION

Appendix 8

Study 3: Social skills task (questions asked and participants rated by research assistant).

Questions to ask the participant.

1. Tell me about yourself?
2. What are your career goals?
3. What are your outside interests?
4. What are your weaknesses?
5. What are your strengths?

Ratings:

To what extent was this person successful at making a good impression?

1	2	3	4	5	6	7
not at all			moderately			totally

To what extent did you find this person to be interesting?

1	2	3	4	5	6	7
not at all			moderately			totally

To what extent did you find this person to be friendly?

1	2	3	4	5	6	7
not at all			moderately			totally

To what extent would you like this person as a friend?

1	2	3	4	5	6	7
not at all			moderately			totally

To what extent would you like this person as a co-worker?

1	2	3	4	5	6	7
not at all			moderately			totally

To what extent did this person engage in eye contact when answering the questions?

1	2	3	4	5	6	7
not at all			moderately			totally

To what extent did this person appear to be nervous?

1	2	3	4	5	6	7
not at all			moderately			totally

To what extent did this person seem enthusiastic when answering the questions?

1	2	3	4	5	6	7
not at all			moderately			totally

Appendix 9
Study 4: Experimental word reading.

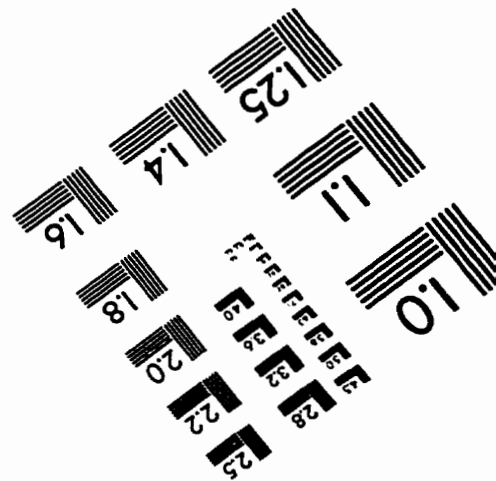
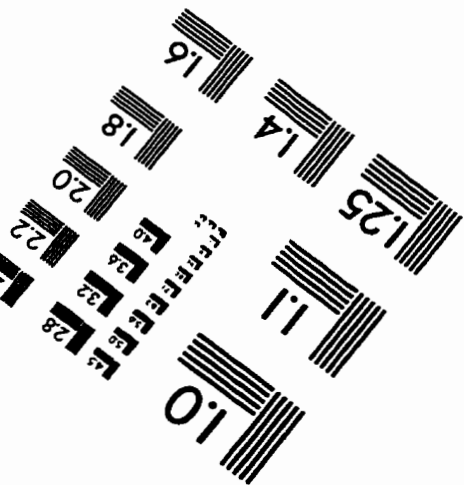
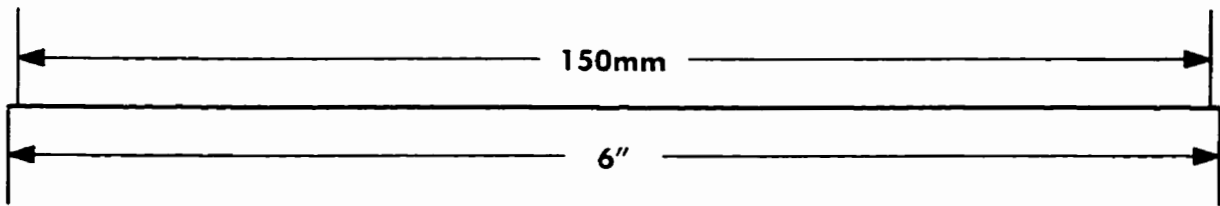
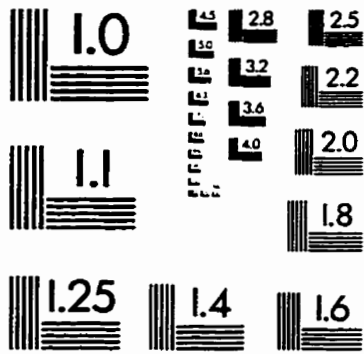
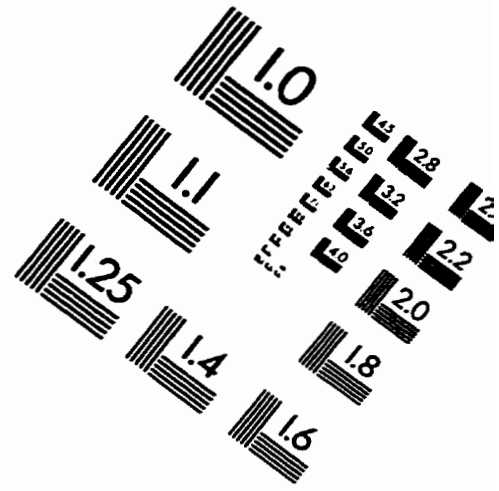
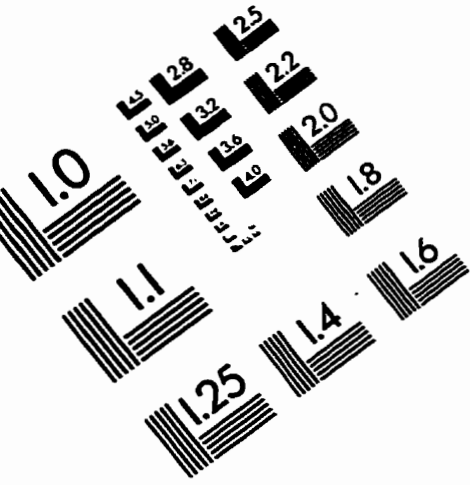
COUCH	OBESE	NARROW	CELLULITE	SLIM
FAT	NARROW	CURTAIN	CARPET	CABINET
SLENDER	CARPET	LAMP	STOUT	OBESE
OBESE	SKINNY	FLABBY	HUGE	DESK
THIN	HUGE	PUDGY	STOOL	SKINNY
CHAIR	SHELF	SLIM	SKINNY	HEFTY
CHUBBY	CELLULITE	SLIGHT	HEFTY	CARPET
CABINET	COUCH	DESK	SHELF	LEAN
SHELF	SLENDER	LITHE	LEAN	FAT
HEFTY	TONED	BENCH	CHUBBY	BENCH
HUGE	PUDGY	TONED	CHAIR	LITHE
STOOL	SLIM	PLUMP	OBESE	SHELF
SKINNY	BENCH	SLENDER	THIN	HUGE
STOUT	FLABBY	CABINET	COUCH	TONED
CARPET	CURTAIN	PETITE	FAT	LAMP
CELLULITE	FAT	CARPET	SLENDER	NARROW
PETITE	CABINET	CELLULITE	LITHE	COUCH
LEAN	STOOL	SKINNY	CURTAIN	SLENDER
TONED	CHAIR	STOUT	SLIM	CHUBBY
PLUMP	SLIGHT	HUGE	PUDGY	STOOL
LITHE	PETITE	STOOL	LAMP	CELLULITE
BENCH	THIN	HEFTY	FLABBY	SLIGHT
SLIGHT	HEFTY	SHELF	DESK	PUDGY
DESK	LAMP	LEAN	SLIGHT	CURTAIN
FLABBY	LEAN	CHUBBY	BENCH	FLABBY
LAMP	STOUT	THIN	PLUMP	THIN
PUDGY	LITHE	CHAIR	NARROW	CHAIR
SLIM	PLUMP	COUCH	TONED	STOUT
CURTAIN	DESK	OBESE	CABINET	PETITE
NARROW	CHUBBY	FAT	PETITE	PLUMP

Appendix 10

Study 4: Control word reading.

COUCH	DESK	STOOL	HAMSTER	CABINET
WOOD	CEMENT	TURTLE	METAL	BENCH
DOG	STEEL	DESK	CONCRETE	RABBIT
CHAIR	RABBIT	CEMENT	RABBIT	STOOL
BRICK	DOG	CONCRETE	ALUMINUM	FISH
CAT	STOOL	STEEL	HORSE	PLASTER
SHELF	CANARY	LAMP	CABINET	MOUSE
STONE	BENCH	HAMSTER	MOUSE	TURTLE
HAMSTER	CURTAIN	STONE	CEMENT	DOG
LAMP	HORSE	SHELF	CURTAIN	WOOD
STEEL	STONE	CAT	GLASS	LAMP
RABBIT	METAL	BRICK	DOG	HORSE
CEMENT	CABINET	CHAIR	WOOD	SHELF
DESK	COUCH	DOG	BRICK	CHAIR
TURTLE	SHELF	WOOD	CHAIR	METAL
STOOL	WOOD	COUCH	DESK	MONKEY
CONCRETE	CAT	MONKEY	PLASTER	CANARY
BENCH	MONKEY	CARPET	TURTLE	BRICK
CANARY	GLASS	PLASTER	CARPET	ALUMINUM
ALUMINUM	LAMP	MOUSE	FISH	COUCH
CABINET	PLASTER	METAL	COUCH	GLASS
HORSE	ALUMINUM	FISH	CANARY	HAMSTER
GLASS	FISH	CURTAIN	BENCH	CEMENT
CURTAIN	BRICK	GLASS	CAT	CURTAIN
FISH	CHAIR	HORSE	STONE	CAT
METAL	TURTLE	CABINET	STEEL	CARPET
MOUSE	CONCRETE	ALUMINUM	SHELF	STONE
PLASTER	HAMSTER	CANARY	MONKEY	STEEL
CARPET	MOUSE	BENCH	STOOL	CONCRETE
MONKEY	CARPET	RABBIT	LAMP	DESK

IMAGE EVALUATION TEST TARGET (QA-3)



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