Exploration of the concern for dieting factor of the Revised Restraint Scale with an overweight sample

Merna Heinrich Terry

The University of Montana

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Exploration of the Concern for Dieting Factor

of the Revised Restraint Scale

with an Overweight Sample

By

Merna Heinrich Terry

B.A., University of Montana, 1988

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for the degree of

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Approved by

Chair, Board of Examiners

Dean, Graduate School

Feb. 27, 1992

Date
The Revised Restraint Scale (RRS) is a scale used to measure cognitive restraint on eating. This scale is composed of two factors, Concern for Dieting (CD) and Weight Fluctuation (WF). The RRS has been found to classify a large number of overweight persons as restrained. It has been found that overweight persons have significantly higher WF factor scores, but not significantly higher CD factor scores than a normal weight group. The correlation between obesity and restraint scores on the full RRS may account for the finding that restrained obese persons do not show the counter-regulatory eating pattern which is characteristic of restrained normal weight eaters. The current study was designed to test the hypothesis that the CD factor of the RRS can distinguish between restrained and unrestrained overweight subjects better than the full RRS. Overweight female subjects were recruited from the introductory psychology subject pool at the University of Montana and administered the RRS. Subjects were assigned to preload and no preload conditions. The preload condition consisted of drinking one chocolate milkshake and the no preload condition consisted of not drinking one chocolate milkshake. The subjects were asked to rate crackers as to taste in a subsequent situation. The actual dependent variable was not the taste ratings given to the crackers, but the actual number of crackers consumed. The restrained subjects with a milkshake preload ate more crackers than the restrained subjects without a milkshake preload, thus supporting the hypothesis. The unrestrained subjects ate a small number of crackers regardless of their preload condition.
I would like to thank my thesis chairperson, Janet P. Wollersheim, for her patience, time, thoughtful comments, and conscientious reading and re-reading of this project. In addition, I would like to thank the members of my committee, D. Balfour Jeffrey, Nabil Haddad, and Robert Lindsay for their help. The many undergraduate students who ran subjects and did a large majority of the work were also indispensable.

I would especially like to thank my parents, Mom and Dad, for their perpetual belief in my ability to reach any goal and their never-ending love and support. Finally, I would like to thank my husband, Ron, for his strength and love and his patience while the printer continued late into the night.
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Obesity and Restraint

Chapter One  Introduction

Obesity  A Pervasive Problem

It is likely that obesity is one of the most serious health disturbances in our society. Children today, on the average, are 50% heavier than they were a generation ago (Simopoulos, 1985). The 1976-1980 survey conducted by the National Center for Health Statistics found that 22.8% of American men (14.5 million) and 25.8% of American women (18.1 million) are overweight based on a criteria of having a body mass index (BMI) at or higher than that obtained at the 85th percentile for men and women ages 20-29 studied between the years 1976 and 1980 (McDowell, A., Engel, A., Messey, J.T. and Maurer, K., 1981).

Once overweight is established, hypertension, hyperlipidemia, impaired glucose tolerance and other concomitants of obesity develop and through these concomitants, obesity, over time, increases the risk for developing cardiovascular disease (Hubert, Feinleib, McNamara, and Castellik, 1983). Studies have also found a positive relationship between overweight and increased mortality ratio (Andres, 1980). Obesity is implicated as a significant factor in many other diseases including breast and colon cancer (Gori, 1977).

The pervasiveness of obesity and its implications for health have lead to its being identified as "one of the most prevalent health problems in the United States today" (United States Public Health Service, undated). Many illnesses are now recognized to be complex maladaptive states in which genetics, diet, social milieu, and health practices interact (Hirsch and Van Itallie, 1985). Digestive disorders, hypertension, arteriosclerosis and some aspects of aging are problems that occur under the influence of environmental factors acting on a susceptible biological substrate. These diseases will not occur in organisms
that are not already susceptible to them. Such diseases will be those which remain after vaccines, antibiotics and public health measures have vanquished the others. It is likely that obesity will be a contributing factor etiologically in many of these diseases. Studying obesity and finding ways to decrease its prevalence in our society may help to lower the incidence of many illnesses.

**Internal-External Hypothesis**

Schachter (1971) developed a theory that isolated the differences between the eating behavior of obese and normal-weight individuals. The theory contends that normal-weight individuals' eating behavior is controlled by "internal" physiological cues while "external" environmental cues, such as the sight and smell of food, trigger obese individuals' eating behavior. This theory has been extended to include externality as a general personality trait of obese people (Schachter & Rodin, 1974).

A series of studies by Schachter and Nisbett suggested that the eating behavior of obese individuals was greatly influenced by the apparent passage of time, the taste and sight of food, and the number of highly palatable food cues present (Nisbett, 1968a, 1968b; Schachter & Gross, 1968). Other studies have failed to demonstrate that obese individuals are more responsive to external food and nonfood cues than normal-weight individuals (Goldman, 1969; Nisbett & Temoshok, 1976; Shaw, 1973).

There are a number of problems in conducting research in this area which make it difficult to reconcile the differences in research findings. A major problem has been defining external responsiveness in the nonfood cue studies. Many times the appropriate measure of external responsiveness is not readily apparent.

For example, consider the measure of external responsiveness in a study by Pliner, Meyer, and Blankstein (1974). In this study, the measure of external responsiveness was how positively or negatively subjects rated slides. The more extreme ratings of obese persons were considered evidence of generalized externality in the obese. These findings,
though, seem more suggestive of greater emotionality in the obese rather than greater externality, as the obese gave more emotional ratings to slides than did the normal-weight subjects.

The measurement of externality in studies of time estimation is also not readily apparent. In these studies, obese and normal weight subjects estimated the time elapsed while listening to tapes of high and low saliency. Saliency was operationalized as volume or interest level of the tape with loud or interesting tapes being more salient (e.g., Pliner, 1974; Rodin, 1975). It is not clear whether longer, shorter, or more varied time estimates by obese people in the high-saliency condition would be supporting evidence for an externality theory of obesity. It seems that highly salient tapes would be more interesting for both externalizers and internalizers. If this supposition is true, there would be decreased estimates of elapsed time for both types of persons because they do not become bored listening to the highly salient tapes. It is not apparent why more salient tapes would affect the time estimates of externalizers differently than internalizers.

Another difficulty has been in establishing ways to vary the intensity of external cues (Rodin, 1981). In studies using sounds as external cues, the volume of the tape could be used as a measure of intensity. However, in some studies, the intensities of external cues have been inferred from the subjects' reactions to them rather than an independent criteria (Ruderman, 1986). This has been particularly true in palatability studies which treat subjects' pleasantness ratings of the food as measures of intensity.

Another difficulty in research concerning Schachter's hypothesis has been defining and distinguishing between external and internal cues. Internal cues presumably arise from within the body and are mediated by the hypothalamus while external cues are considered the noncaloric properties of food and situational variables, such as the time of day or salience of food. Palatability was first considered to be an external cue and the obese were found to be more responsive to taste than were normal-weight subjects (Hashim & Van
Italie, 1965; Nisbett, 1972). It is now recognized, however, that perceptions of palatability are influenced by the internal state of the organism as well as by properties of the food (Spitzer & Rodin, 1981).

The conclusions reached in this area of study are that there are no clear internal-external differences in the eating patterns of obese and normal-weight persons (Spitzer & Rodin, 1981; Thompson, Jarvie, Lahey, & Cureton, 1982) and that the internal-external dichotomy is too simplistic to account for the differences in the eating behavior between the obese and normal-weight individuals (Rodin, 1981).

**Nisbett's Set-Point Theory**

In the early 70's, a theory was proposed by Nisbett (1972) to explain why the external responsiveness of obese and normal-weight people might differ. Nisbett hypothesized that both normal-weight and obese individuals eat so as to bring their weight into line with their physiologically appropriate weight. His term for this weight is "set point".

This set-point, according to Nisbett, is a direct function of the number of fat cells in the body. The more fat cells there are, the higher the set-point for weight is. Dieters, then, deplete the size of the fat cells in their body, not the number. This depletion is conveyed to the hypothalamus which, in turn, governs the behaviors which bring the individuals' weight into line with the set-point regulated by the number of fat cells in the body. These behaviors governed by the hypothalamus include states, such as hunger and over-responsiveness to external environmental cues.

Nisbett hypothesizes that obese people have a higher set-point than normal weight people. The set-point for weight of obese people is well above the culturally defined ideals for weight. The difference between the set-point for weight and the culturally defined ideals for weight causes the obese person to diet in order to achieve society's standard for ideal weight. Because obese persons are continuously dieting, they are below their set-
point for weight and in a state of chronic deprivation. According to Nisbett, this chronic state of deprivation is what produces over-responsiveness to external food cues.

Nisbett pointed out other parallels between obese people and starving organisms including being more emotional, more taste responsive and less active than normal-weight and non-starving people.

Research on Nisbett's theory has not supported his predictions. Rodin et al. (1977) found that the degree of external responsiveness did not change with weight loss. In this study, adolescent girls were tested at a weight reduction summer camp. Their degree of external responsiveness to conditions of high versus low food cue salience did not change after losing weight. According to Nisbett's theory, they would be expected to be more externally responsive after losing weight because they would be in a state of deprivation. A study by Abramson and Catalano (1985) found that successful dieters reported more frequent sexual behavior than did unsuccessful dieters. This finding runs counter to Nisbett's hypothesis that deprived person's are less physically active since the successful dieters would be more deprived than the unsuccessful dieters and, therefore, according to Nisbett's theory, less physically active.

Nisbett's hypotheses about fat cells, set-point and body weight have also not been supported. Researchers now believe that the number of fat cells in the body can change in adulthood and overeating in any period of life may increase the number of fat cells in the body (Kirtland & Gurr, 1979). These recent findings are in direct contrast to Nisbett's theory which contends that persons have a set number of fat cells and that number does not change throughout life.

A clear definition of set-point and a way to measure it still remain to be developed if this theory is to be tested adequately. The assumption that overweight people are below their set-points while normal weight people are at their set-points does not seem logical. Although Nisbett's (1972) theory is difficult to test and research based on it has declined, it
did provide the impetus for another theory on the differences between obese and normal-weight persons.

**Conscious Restraint of Eating**

Herman and Polivy and their co-workers attempted to explain the poor results of studies trying to find a relationship between obesity and externality with a theory based on conscious restraint of eating (Herman & Mack, 1975; Herman, Polivy & Silver, 1979; Hibscher & Herman, 1977). Herman and Polivy (1980) hypothesized that eating patterns are a function of physiological desires for food and the cognitively mediated effort to resist food. They termed this cognitively mediated effort to resist food, restraint. Both normal-weight and obese people can be restrained eaters. All people possess restraint to some degree in their eating patterns, although the levels of restraint practiced vary from individual to individual. For example, a person that does not begin eating her lunch while sitting in a class of 100 people even though she is hungry is practicing restraint and a person who does not eat for three days at a time is practicing restraint, but to a larger degree. According to restraint theory, both obese and normal weight people may be more externally responsive if they tend to eat in a restrained manner.

A 10-item scale (Herman, Polivy, Pliner, Threlkeld & Munic, 1978) was developed to assess the extent to which individuals exercise restraint. Restraint is defined as a cognitively mediated effort to combat the urge to eat. People who are constantly dieting and struggling to resist food are at one end of the continuum and labeled restrained eaters. Unrestrained eaters eat freely when the desire strikes them and are at the other end of the continuum.

Two basic hypotheses have developed from this notion of restraint. One hypothesis, called the disinhibition hypothesis, suggests that restrained eaters develop eating patterns characterized by cycles of dieting and overindulgence (Herman & Mack, 1975). The second hypothesis is that the differences in restraint level underlie obese-
normal differences in behavior (Herman & Polivy, 1980; Hibscher & Herman, 1977). In other words, this hypothesis states that overweight persons are generally more restrained than normal weight persons.

**Restraint and Disinhibition**

The disinhibition hypothesis suggests that restrained eaters exert self-control over their eating behavior to such an extent that once this self-control is disrupted, overeating ensues. These disrupting events, or disinhibitors, include cognitions, alcohol, and strong emotional states.

Researchers have hypothesized that the perception of overeating or breaking a diet will lead to disinhibition in restrained eaters (Herman & Mack, 1975). The assumption behind this hypothesis is that restrained eaters behave in an all-or-none fashion when it comes to eating. They feel that if they break their diet, they may as well keep eating. They respond to violating their diets with cognitions such as, "I've blown it! I might as well keep on eating until it's gone."

Experimenters have manipulated the perception of having overeaten by having subjects eat a preload such as a milkshake before participating in a taste test. In the most common experimental paradigm, subjects are divided into groups according to a median split of scores on the Restraint Scale with high scorers labeled restrained eaters and low scorers labeled unrestrained eaters. Half of the subjects in each group are given preloads of one or two milkshakes depending on the study and told that these flavors are needed to assess the influence of previous taste experiences on subsequent taste experiences. These preloads are meant to disinhibit restrained eaters as the restrained eaters will believe that eating the milkshakes has blown their diet and they may as well quit dieting for the rest of the day.

The subjects are told they are participating in a taste test and need to rate flavors of ice cream. The guise of the taste test is used to divert the subject's attention from the
amount of food eaten. The amount of ice cream eaten by subjects is what is measured by the experimenter. Studies using this paradigm have consistently found a preload x restraint interaction (Herman & Mack, 1975; Hibscher & Herman, 1977; Ruderman & Christenson, 1983). Restrained eaters ate more after a preload than without a preload. Unrestrained subjects ate less with a preload than without one. These results support the hypothesis that preloads have a disinhibiting effect on restrained eaters.

Herman and Polivy (1980) later described the restrained eating pattern seen in these studies as "counter-regulatory" because the restrained eaters make no attempt to regulate their food intake after eating a preload. They described the unrestrained eaters' eating pattern as "regulatory" because they regulated their food intake after eating a preload by eating less than if they had had no preload.

Other researchers (Spencer & Fremouw, 1979; Polivy, 1976; Woody, Costanzo, Jiefer & Conger, 1981) have studied beliefs about the caloric properties of preload milkshakes. They found that subjects' beliefs about the caloric content of preloads influences their subsequent consumption. If restrained eaters are told the milkshake is high in calories, they will subsequently eat more in the taste test than if told the milkshake is low in calories. Unrestrained eaters, however, eat somewhat, but not significantly, less when told milkshakes are high in calories as compared to when told milkshakes are low in calories.

Researchers have studied how other cognitions affect restrained and unrestrained eaters. A study by Ruderman, Belzer & Halperin (1985) suggested that anticipation of a dietary violation by restrained eaters may lead to counterregulation.

Emotional distress has also been found to trigger counterregulation in restrained eaters. Herman and Polivy (1975) found that anxiety reduced food intake of unrestrained eaters, but increased food intake of restrained eaters. Another study by Polivy and Herman (1976) found that in psychiatric patients, non-dieters lost weight when depressed, but
dieters gained weight. Other studies have used mood induction procedures and have found significant and marginally significant mood X restraint interactions with dysphoric moods (Baucom & Aiken, 1981; Ruderman, 1985a; Frost, Goolkasian, Ely & Blanchard, 1982). Overall, the results of the studies concerning emotional arousal and restrained eaters support the hypothesis that strong affect disinhibits restrained eaters.

Another factor which has been found to induce overeating in restrained eaters is the belief that alcohol has been consumed (Polivy & Herman, 1976c). A study using disguised alcohol consumption failed to find an effect (Herman & Polivy, 1976b). Restrained subjects counter-regulated whether they actually consumed alcohol or just believed that they had consumed alcohol. This finding suggests that it is the belief of having consumed alcohol rather than the actual consumption of alcohol that triggers counterregulation in restrained eaters.

Overall, the studies concerned with the disinhibition hypothesis suggest that cognitions have a disinhibiting impact on restrained eaters. Restrained eaters tend to think in a rigid, all-or-none fashion (Ruderman, 1985c) and to overeat under circumstances of preloads, anticipations of dietary violations, the belief of having consumed alcohol and increased emotional arousal. A major problem with the studies on restraint and disinhibition is that these studies employed mostly normal-weight subjects and did not look at the effects of restraint on obese subjects.

Restraint and Obesity

Since the restraint hypothesis was originally developed as an alternative to Schachter's (1971) theory stating that obese people eat in response to external food-related cues rather than internal cues, it would be expected, according to the hypothesis, that obese people would have a tendency towards dietary restraint. A study by Schachter et al. (1968) found that obese subjects ate somewhat, but not significantly more after eating
sandwiches and soft drinks than after eating nothing at all. Normal weight subjects significantly decreased their consumption after a snack.

Preload studies using both restraint and weight as factors have not found that obese subjects (even restrained obese subjects) counterregulate (S.C. Wooley, 1972; Hibscher & Herman, 1977; Ruderman & Christensen, 1983) although normal-weight subjects do counter-regulate as in the studies above. The study by Ruderman & Christensen (1983) found that obese people do not behave like restrained eaters at all. In fact, obese subjects ate significantly less after a preload than without it. Reanalysis of other studies (Hibscher & Herman, 1977; Spencer & Fremouw, 1979) by Ruderman and Wilson (1979) suggested that overweight people regulated their food intake better than normal-weight subjects.

Even though obese subjects do not behave like restrained eaters, they have, on the average, higher scores on the Restraint Scale than normal weight subjects (Ruderman & Wilson, 1979; Ruderman & Christensen, 1983). This paradox has yet to be explained although a couple of suggestions have been put forth. Ruderman (1983) has suggested that the problem lies in the Restraint Scale itself because the Restraint Scale tends to inflate obese subjects' scores. Herman, Polivy, King, & McGree (1988) have suggested that obese people need a different amount of food than normal weight people to make them believe they have blown their diets and consequently counterregulate. Their conjecture has been called the dietary boundary model.

**Dietary Boundary Model**

Herman and Polivy (1984) have attempted to construct a model for the situation in which obese restrained subjects do not counterregulate. They call this a dietary boundary model. According to this model, dieters construct a diet boundary which represents the upper limit of food intake prescribed by the diet. This boundary is usually somewhere between hunger and satiety for dieters. If the dieter exceeds the limit of his boundary,
disinhibition will occur. Whether disinhibition will occur or not depends on whether the dieter has eaten enough to break the dietary boundary.

It is possible that obese and normal-weight dieters may differ in how much food is allowed by their dietary boundaries. If obese people have stricter dietary boundaries, a small amount of food may lead them to disinhibit, but a larger amount may bring them to the point of satiety and, therefore, destroy any counter-regulation that may have occurred. If the dietary boundaries of obese people are less strict than the dietary boundaries of normal-weight dieters, then a larger amount of food would be required for them to counterregulate. This reasoning suggests that the same preloads that produce counterregulation in normal-weight eaters may not produce counterregulation in obese eaters. More research is needed in this area using preloads of different sizes to study the hypothesis that obese and normal-weight eaters may have different dietary boundaries.

Problems with the Restraint Scale

Although overweight subjects tend to score higher on the Restraint Scale, they have not been found to behave like restrained eaters. This contradictory finding suggests that there is either something wrong with Restraint theory itself or the Restraint Scale incorrectly measures restraint in obese samples. Although the dietary boundary model discussed above may be an explanation for this unexpected finding, there has been much research on the Restraint Scale and it does not appear to be a useful measure of restraint for overweight individuals.

Two separate factors have been found to be tapped in the Restraint Scale; a weight fluctuation factor (WF) and a concern for dieting factor (CD) (Drewnowski, Riskey, & Deser, 1982; Ruderman, 1983). The weight fluctuation factor consists of four items which assess maximum amount of weight lost in one month, maximum weight gain in one week, weekly weight fluctuation, and number of pounds over desired weight at maximum weight. The concern for dieting items assess the frequency of dieting, the effect of a five
pound weight fluctuation on one's life, tendencies to splurge alone, amount of time and thought spent on food, feelings of guilt after overeating, and consciousness of what is being eaten.

There is evidence that overweight people tend to have higher restraint scores than normal-weight people because of the WF factor of the Restraint Scale (Ruderman, 1983, 1985b, 1986). For example, if everyone fluctuates 5%, the heavier the individual, the greater the weight fluctuation in pounds. In fact, the WF items are scored so that the larger the weight fluctuation measured in pounds, the higher the score. It may be that because their restraint scores are inflated due to the WF factor, overweight individuals are not behaving the way restrained normal-weight people do because they are not necessarily restrained.

Researchers, indeed, have found that the relationship between obesity and restraint is due to the WF factor of the Restraint Scale (Blanchard & Frost, 1983; Ruderman, 1985b). Drewnowski et al. (1982) found that their overweight group had significantly higher WF scores, but not significantly higher CD scores than did their normal weight group. These findings suggest that higher restraint scores among obese subjects do not necessarily represent high levels of the CD factor and may account for the finding that obese people, even restrained obese eaters, do not show the counter-regulatory eating pattern that is characteristic of restrained normal-weight eaters.

The CD factor of the Revised Restraint Scale with the WF factor partialled out has been found to have virtually no relation to degree of overweight (Ruderman, 1985). Public Self-consciousness (a measure of concern about the reactions of others to oneself) and Social Anxiety (a measure of anxiety in interpersonal situations) have both been significantly correlated with the CD factor, but not the WF factor (Frost et al., 1983). The CD factor has also been found to be significantly correlated with bulimia (Ruderman, 1985). The major symptom of bulimia is binge eating. Counter-regulation has been
likened to a naturally occurring eating binge by Polivy (1976) and Spencer and Fremouw (1979).

The correlation of the CD factor with bulimia, suggests that the CD factor of the Restraint Scale with the WF factor partialled out would be correlated with counter-regulatory eating. No studies have been done using a preload paradigm to see if there is a correlation between the CD factor of the Restraint Scale with the WF factor partialled out and counter-regulatory eating in an overweight restrained population.

**Purpose**

As current research on the Restraint theory and obesity suggests, either the Restraint Scale does not adequately measure restraint in obese subjects or obese subjects need different size preloads than normal weight subjects to counter-regulate. The WF factor of the Restraint Scale has been correlated with degree of overweight and the CD factor has been correlated with bulimia. Since binge-eating is a major symptom of bulimia and has been equated with counter-regulation, it seems reasonable to expect that counter-regulation and the CD factor of the Restraint Scale are correlated. Thus, the purpose of this study is to test whether the CD factor of the Restraint Scale can predict counter-regulation better than the complete Restraint Scale for obese subjects, thus, better predicting restraint in overweight subjects.

Overweight subjects were divided into groups of restrained and unrestrained eaters according to scores on the CD factor of the Revised Restraint Scale. They were matched for weight and put into either the preload or no preload conditions. The number of crackers eaten after consuming a milkshake was the dependent variable. A post-hoc analysis, using the complete Revised Restraint Scale to divide subjects into restrained and unrestrained eating groups was also done to see if the complete Revised Restraint Scale predicted counter-regulation as well as only the CD factor of the scale.
An interaction between the effects of preload and restraint status was predicted. It was expected that the obese restrained eaters in the preload condition would eat a larger number of crackers than the obese restrained eaters in the no preload condition (see Figure 1). This result was expected because the milkshake preload should disinhibit the restrained eaters and make them eat more crackers than they would normally eat without a disinhibitor.

It was further predicted that the overweight unrestrained eaters in the preload condition would eat less than the obese unrestrained eaters in the no preload condition (see Figure 1). This prediction was made because the overweight unrestrained eaters with a preload were expected to regulate their eating after having consumed a milkshake by decreasing the amount of food eaten afterwards. The obese unrestrained eaters without a preload were not expected to need to decrease their food intake because they did not consume anything to warrant that they limit their food intake.
Predicted Amount of Crackers Eaten as a Function of Restraint Status and Preload Condition

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<tr>
<th>Preload Condition</th>
<th>Preload</th>
<th>No Preload</th>
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<tr>
<td>Restrained</td>
<td>Group 1</td>
<td>Group 2</td>
</tr>
<tr>
<td>Unrestrained</td>
<td>Group 3</td>
<td>Group 4</td>
</tr>
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</table>

The number of crackers predicted to be eaten by Group 1 is greater than the number predicted to be eaten by Groups 2 and 3.

The number of crackers predicted to be eaten by Group 4 is greater than the number predicted to be eaten by Groups 2 and 3.
Overview

Prior to participation in the study, a large number of students in an introductory Psychology class and other classes on campus, including all of those who eventually became subjects, participated in a screening session. Screening sessions involved asking students in each class to complete a Revised Restraint Scale (RRS) (Appendix A), an information sheet including self-reported height and weight (Appendix B), and a separate sheet, requesting their name and phone number (Appendix C). The separate sheet including their name and phone number was kept separate from all of the other data.

Overweight female subjects were recruited from this pool of students. Students in the introductory Psychology class received experimental credits in their Psychology class for participating in this experiment. Other subjects were volunteers recruited from other classes on campus.

Subjects were selected for the study on the basis of being 10% or more above the ideal weight for their height and age as specified by the Metropolitan Life Insurance Norms (1983) (Appendix D) of average weights for women. The subjects were first classified by their self-reported weights, but were measured after completing the study to ensure that they were indeed the height and weight they reported. The subsequent measurement ensured accurate percentage overweight measures for the subjects. There is evidence that self-reported weights are quite accurate for both normal and overweight populations (Stunkard & Albaum, 1981).

Subjects were divided into groups of restrained and unrestrained eaters according to their scores on the Concern for Dieting factor of the Revised Restraint Scale. Subjects were assigned to preload or no preload conditions at the time of their participation according to their reported percent overweight. An attempt was made to match subjects in
each of the four groups by their actual percents overweight. One half of the subjects were given a chocolate milkshake preload and the other half was given no preload. The number of subjects given preloads were divided equally among the restrained and unrestrained subjects. Two bowls of crackers with 100 crackers in each bowl and one bowl of 75 crackers were then presented to all subjects. Subjects were told they were taking part in a taste test and asked to rate the three different types of crackers according to five separate criteria (Appendix E). The total number of the three different varieties of crackers consumed ad lib served as the dependent measure.

Subjects

Subjects were 64 (16 in each of the four conditions) overweight female subjects enrolled in an introductory Psychology class and upper level Psychology classes at the University of Montana. Subjects in the introductory Psychology class received experimental credits for participating in this experiment. The other subjects volunteered or were paid a fee of three dollars to participate in the experiment.

Subjects were tested individually by female experimenters blind to the subjects’ restraint status, but not blind to the hypothesis of the study. All subjects were instructed not to eat for two hours prior to participating in the experiment because the study involved the sense of taste. They were given this instruction so they would not be full when participating in the experiment.

Measures

Revised Restraint Scale (Appendix A). In normal weight samples, this measure has been found to be both reliable and valid (Herman et al., 1978). Ruderman (1983) reported an alpha coefficient of .86 in a normal weight sample. Previous research has indicated that the use of the complete Revised Restraint Scale is questionable in an overweight population (Ruderman & Christensen, 1983; Wooley, 1972; Hibsch & Herman, 1977). The Concern for Dieting factor has been found to have satisfactory inter-
item reliability by Blanchard and Frost (1982). They reported an alpha coefficient of .78 for a group composed of both normal and overweight individuals.

A frequency distribution of the Concern for Dieting factor scores of the first 305 female subjects who participated in the screening was used to determine how to classify subjects as restrained or unrestrained. The criteria used for scoring the Concern for Dieting factor and the Weight Fluctuation factor of the Revised Restraint Scale is shown in Table 1. The mean of the Concern for Dieting factor scores of the first 305 female subjects was 8.94 and the standard deviation was 3.64. Subjects scoring higher than one half of a standard deviation above the mean for the first 305 subjects (10.86) were classified as restrained eaters and subjects scoring lower than one half of a standard deviation below the mean for the first 305 subjects (7.12) were classified as unrestrained eaters. Therefore, those subjects scoring 11 or higher on the CD factor were classified as restrained and those subjects scoring seven or lower on the CD factor were classified as unrestrained.

In the post hoc analyses, which used the full Revised Restraint Scale scores for classification, the subjects who scored fifteen or higher on the complete Revised Restraint Scale were considered restrained and those scoring fourteen or lower were considered unrestrained. These numbers were selected because they coincide with previous research in the area.

**Metropolitan Life Insurance Norms (1983) (Appendix D).** Subjects were classified as overweight according to their height and weight compared to the desirable weight of a person of their same height and weight with a medium frame. Those subjects
Table 1
Revised Restraint Scale

1. How often are you dieting?
   Never (0)  rarely (1)  sometimes (2)  often (3)  always (4)

2. What is the maximum amount of weight (in pounds) that you have ever lost within one month?
   0-4 (0)  5-9 (1)  10-14 (2)  15-19 (3)  20+ (4)

3. What is your maximum weight gain within a week?
   0-1 (0)  1.1-2 (1)  2.1-3 (2)  3.1-5 (3)  5.1+ (4)

4. In a typical week, how much does your weight fluctuate?
   0-1 (0)  1.1-2 (1)  2.1-3 (2)  3.1-5 (3)  5.1+ (4)

5. Would a weight fluctuation of 5 lb. affect the way you live your life?
   Not at all (0)  slightly (1)  moderately (2)  very much (3)

6. Do you eat sensibly in front of others and splurge alone?
   Never (0)  rarely (1)  often (2)  always (3)

7. Do you give too much time and thought to food?
   Never (0)  rarely (1)  often (2)  always (3)

8. Do you have feelings of guilt after overeating?
   Never (0)  rarely (1)  often (2)  always (3)

9. How conscious are you of what you are eating?
   Not at all (0)  slightly (1)  moderately (2)  extremely (3)

10. How many pounds over your desired weight were you at your maximum weight?
    0-1 (0)  1-5 (1)  6-10 (2)  11-20 (3)  21+ (4)
The score for each item is the number in parentheses next to the item circled by the subject.

* denotes items for which scores are added to obtain the Concern for Dieting factor score.

# denotes items for which scores are added to obtain the Weight Fluctuation factor score.
10% or more above their desirable weights were considered overweight and included in this study. Desirable weights were calculated as the mid-point in the table range (e.g., percent overweight for a woman five feet four inches tall weighing 138 pounds would be calculated as follows: Metropolitan range is 124-138 pounds. Thus, 138 pounds would be compared to 131 (midpoint in the range) for a difference of seven pounds. This individual would be 7/131 or 5% over the ideal weight, but would not be considered overweight according to the criteria for this study.). The norms for weight include an added three pounds to adjust for indoor clothing, so subjects were weighed in just indoor clothing. One inch heels were figured into the norms for height, so one inch was added to each subject's height and they were measured without shoes, to correspond with norms.

Procedure

Subjects who reported that they were at least 10% above their ideal body weight according to the Metropolitan Life Insurance norms (1983) and who either scored eleven or higher on the CD factor of the RRS or seven or lower on the CD factor of the RRS were selected. These individuals were called on the telephone and asked to participate in the study.

Reported weights were expected to correlate highly with actual percent overweight (Stunkard & Albaum, 1981). A high correlation between actual and reported percents overweight was not found. Subjects tended to minimize their actual amount overweight by reporting that they weighed less than they actually did. Because of the low correlation between reported and actual percents overweight, it was difficult to obtain subjects to participate in the study. Because of the difficulty obtaining subjects for the study who reported they were at least 10% overweight and the trend for subjects to under-report their weight in this sample, subjects who reported they were at least 5% overweight were called to participate in the study. The criterion of 10% overweight in actuality was still maintained for subjects' data to be included in the analysis. Therefore, a number of subjects were
called to participate in the study who reported being 5-9% overweight. Their data was only included in the study if they were at least 10% overweight in actuality.

An attempt was made to match subjects in the preload and no preload groups according to three weight categories; mildly overweight (10-24.9%), moderately overweight (25-49.9%) and extremely overweight (50% and up). These weight categories were selected on the basis of a survey of the weight categories previously used in a review of the literature (Leon & Roth, 1977). The number of subjects in each category are summarized in Table 2. New subjects were placed into preload or no preload conditions according to their reported weights so as to keep an equal number of subjects of each weight category in the preload and no preload conditions for each restraint classification.

The major experimenter called subjects who met the criteria for the study on the phone and asked them to participate in a study on the effects of prior taste experiences on the rating of new taste experiences. All subjects participated in the experiment between 7:00 P.M. and 10:00 P.M on weekday evenings. They were asked not to eat for two hours before the study so they would not be full during the taste test.

All experimenters were female. The subjects participated in the experiment individually. Upon arrival, in accordance with the standards for research with human subjects (Appendix F), subjects were given a consent form to read and sign.

Subjects were then informed that the experiment was concerned with the influence of one "sensory experience" upon another subsequent experience in the same sensory modality (See Appendix G for specific instructions). Specifically, the experiment was
Table 2
Numbers of Subjects
According to Weight Classifications
in Each Condition

<table>
<thead>
<tr>
<th>Weight Classification</th>
<th>Restrained Preload</th>
<th>Restrained No preload</th>
<th>Unrestrained Preload</th>
<th>Unrestrained No Preload</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-24.9%</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>25-49.9%</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>50% &amp; up</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>
presented to the subjects as a study of the effect of one taste experience on subsequent taste experiences. The subjects were told that the study was measuring the effect of tasting one prior flavor versus tasting no prior flavor on the subsequent taste ratings of crackers. Subjects were then told that they were assigned to either the group that would taste one flavor or the group that would taste no flavor first. Further, they were all told that later they would taste three types of crackers to assess the influence of their previous taste experiences.

The only variable to be manipulated experimentally was the initial taste experience, which in reality was a preload condition rather than a taste experience. Subjects received either no chocolate milkshake or one chocolate milkshake prior to tasting crackers. The chocolate milkshakes were made immediately prior to the testing situation by the experimenters in a uniform manner and were found in informal pilot tests to be large enough to make a person feel "slightly full". Informal pilot tests involved giving milkshakes of different sizes and consistencies to persons and asking them to rate how full they were after consuming the milkshake. The possible rating they were asked to choose from were: very hungry, slightly hungry, slightly full, full, and very full.

No-milkshake Condition (No Preload)

Following the general instructions, the experimenters informed the subjects assigned to the no preload condition that they were assigned to the "no taste" condition and that they would provide information on the way the final food tastes if it is has not been immediately preceded by another taste. This group then proceeded directly to the final taste test.

Milkshake Condition (Preload)

Following the general instructions, the subjects assigned to the preload condition were told that they were to provide information regarding the effect of one particular taste on subsequent tastes. They were presented with a chocolate milkshake and a questionnaire
consisting of five scales concerned with various dimensions on which to rate the milkshake (Appendix E). The scale was used to further suggest to the subjects that they were indeed taking part in a taste test. The information from the scales was not kept for further analysis.

The subjects were required to rate the milkshake as they consumed it and "for purposes of control" asked to consume the entire milkshake. The experimenters left the room for ten minutes while the subjects drank and rated their milkshakes. After the milkshakes were consumed and rated, the subjects proceeded to the final taste test.

Final Taste Test

From this point on, all subjects were treated identically. The experimenters provided the subjects with three bowls of three different types of crackers with seventy-five crackers in one bowl and one hundred crackers in the other two. The crackers consisted of Wheat Thins®, Better Cheddars®, and Chicken in a Biscuits® made by Nabisco. Seventy-five Chicken in a Biscuits® were used in one bowl because the Chicken in a Biscuits® were slightly larger than the other two types of crackers. Putting 75 crackers in the bowl of larger crackers made it look like there was an even amount of crackers in each bowl. Three different kinds of crackers were provided to maximize the likelihood that there was at least one desirable taste.

All three types of crackers were of approximately the same fat and caloric content. The Wheat Thins® contained three grams of fat and 70 calories per half ounce serving (approximately eight crackers); the Better Cheddars® contained four grams of fat and 70 calories per half ounce serving (approximately ten crackers); and the Chicken in a Biscuits® contained five grams of fat and 80 calories per half ounce serving (approximately seven crackers).

The subjects were also provided with three five-item questionnaires (Appendix E), which they were to use to rate the taste of each kind of cracker on various dimensions. The
rating scales were the same as the rating scale used to rate the milkshakes in the preload condition. The information on these rating scales was also not kept for further analysis because subjects rated the crackers in order to lend face validity to the experiment being described as a taste study.

The subject was instructed that it was important that she taste the three crackers in a specific order to "control" for the effect of one taste upon another. She was told she could taste as many of each cracker as she wanted, but the necessity for accurate ratings was emphasized. She was also told that after all of the crackers had been tasted and rated, she could help herself to any of the remaining crackers as she wished, but that she must not change her initial ratings.

Once it was established that the subject understood the instructions, the experimenter left the room, telling the subject that she had ten minutes to complete the task. The subject, then, consumed and rated the crackers in isolation in order to minimize whatever inhibitions on eating the presence of the experimenter might have had. Furthermore, the containers held a fairly large amount of crackers, so that the subjects were less likely to worry that consuming a larger amount of crackers than would be necessary for purposes of taste rating would be apparent to the experimenter afterwards. The questionnaires were short enough to be completed well within ten minutes, leaving the subject ample time to eat additional crackers before the experimenter returned.

After the ten minute "tasting" period, the experimenter returned and took the subject to another room where she measured the subject's height and weight to be sure that the reported height and weight corresponded to the actual height and weight. The weight and height were recorded without outdoor clothing and with no shoes on. To correspond with the height on the Metropolitan Life Insurance norms (1983), one inch was added to each subject's height. If a subject's height and weight was not accurate, such that she did not meet the criteria of being 10% overweight for being in the study, her data was not used in
the study. The experimenter also asked the subject how many hours it had been since the subject had eaten and her present age.

Subjects were then told that the experiment was complete and asked if they had any questions about what was happening as they participated in the experiment. If any subject reported that she had an awareness that the extent of her eating behavior during the "final taste" phase had been of concern to the experimenter, her data was not used in the analysis of the study. Subjects were then fully debriefed as to the true nature of the study and asked not to discuss the nature of the study (Appendix H).

After the subjects left, the experimenter counted the crackers which remained to calculate the total number of crackers eaten in the ten minute period. The number of crackers eaten was the dependent variable in the experiment.
Chapter Three  Results

Over 1,000 subjects from the introductory psychology subject pool and four upper division psychology classes at the University of Montana were screened. After screening out males, persons who did not make the reported weight criteria, and those who did not score above ten or below eight on the Concern for Dieting factor of the Revised Restraint Scale, this pool was greatly reduced.

Seventy-seven subjects actually participated in the study, but data from thirteen of these subjects were excluded from the analysis. One of the thirteen was excluded for not following directions; six were excluded because they were suspicious about what the study was looking for; and another six were excluded because they did not meet the actual percent overweight requirement for the study when they were weighed and measured after participating. After these exclusions, sixty-four subjects remained and were used in the actual analysis with sixteen subjects in each of the four conditions.

Subject Characteristics

Subjects ranged in age from 17 to 42 years old, with a mean of 22.188 years and a standard deviation of 6.352 years. The actual percent overweight of the subjects ranged from 10% to 94% overweight, with a mean of 30.03% overweight and standard deviation of 20.78%. The average reported percent overweight of subjects was 19.3% overweight with a standard deviation of 16.2% and a range of 5% to 69% with three subjects not reporting their weight. There was a significant difference between the reported and actual percents overweight for all subjects ($t (118)= 3.23, p < .05$).

Subjects ate an average of 13.42 crackers with a standard deviation of 9.00. The number of crackers eaten ranged from three to 40. Actual percent overweight did not
correlate with the number of crackers eaten \((r = -0.03)\). The number of crackers eaten and the number of reported hours of food deprivation did correlate moderately \((r = 0.314)\). Hours of reported food deprivation ranged from two to 13 with a mean of 4.141 hours and a standard deviation of 2.536 hours.

Scores for all 64 subjects on the full Revised Restraint Scale ranged from a minimum of six to a maximum of 28. The maximum score possible on this measure is 35. The mean of the subjects' scores was 17.016 and the standard deviation was 5.988. The correlation between the number of crackers eaten and scores on the full Revised Restraint Scale was low \((r = 0.154)\). There was a moderate correlation between scores on the RRS and actual percentage overweight \((r = 0.27)\). Subjects had an average score of 8.937 on the Concern for Dieting factor of the Revised Restraint Scale, with a standard deviation of 4.393. The maximum score possible on the Concern for Dieting factor of the RRS is 19 and subjects' scores ranged from one to 16.

The average score for the Weight Fluctuation factor of the scale was 8.078 with a standard deviation of 3.108. The maximum score possible on this factor is 16. Subjects' scores ranged from one to 13. Subjects' overall characteristics are summarized in Table 3.

---

Subject Characteristics as Classified by the Concern for Dieting Factor of the Revised Restraint Scale

Since the subjects were classified as restrained or unrestrained on the basis of their Concern for Dieting factor scores, there was a significant difference between the Concern for Dieting scores of the restrained \((M = 13)\) and unrestrained groups \((M = 4.875, \text{ } \text{ } \text{ } \text{ } t (61) = -20.26; p < .05)\). The range for the restrained subjects on the Concern for Dieting factor was 11 to 16 and the range of scores for the unrestrained subjects was one to seven.
### Table 3

Subject Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>22.188</td>
<td>6.352</td>
<td>17-42</td>
</tr>
<tr>
<td>Actual percent overweight</td>
<td>30.03</td>
<td>20.78</td>
<td>10-94*</td>
</tr>
<tr>
<td>Reported percent overweight</td>
<td>19.3</td>
<td>16.2</td>
<td>5-69*</td>
</tr>
<tr>
<td>Hours deprivation</td>
<td>4.141</td>
<td>2.536</td>
<td>2-13</td>
</tr>
<tr>
<td>Number of crackers eaten</td>
<td>13.42</td>
<td>9.00</td>
<td>3-40</td>
</tr>
<tr>
<td>RRS total score</td>
<td>17.016</td>
<td>5.988</td>
<td>6-28</td>
</tr>
<tr>
<td>CD factor</td>
<td>8.937</td>
<td>4.393</td>
<td>1-16</td>
</tr>
<tr>
<td>WF factor</td>
<td>8.078</td>
<td>3.108</td>
<td>1-13</td>
</tr>
</tbody>
</table>

*These two means differ from each other significantly.
Although, as stated above, there was a moderate correlation between the number of hours of food deprivation and number of crackers eaten, there was no significant difference regarding the number of hours of food deprivation between the subjects classified as restrained by the Concern for Dieting factor (M = 4.63) and those classified as unrestrained by this factor (M = 3.66; t (62) = -1.54, p > .05). Further, there were no significant differences in age between restrained (M = 21.94) and unrestrained subjects (M = 22.44; t (62) = .31, p > .05) as classified by the Concern for Dieting factor, nor in the actual percent overweight of the restrained (M = 32.5) and unrestrained subjects (M = 27.6; t (62) = -0.95, p > .05) as classified by the Concern for Dieting factor of the Revised Restraint Scale. Both restrained (M = 13.2) and unrestrained subjects as classified by the Concern for Dieting factor had an equivalent tendency to underreport their percentage overweight (M = 8.3; t = -1.48, p > .05).

Subjects classified as restrained by the Concern for Dieting factor scored significantly higher on the Weight Fluctuation factor (M = 9.06) than those that were classified as unrestrained (M = 7.09; t (58)= -2.65, p < .05). The restrained subjects also scored significantly higher on the full Revised Restraint Scale (M = 22.06) than the unrestrained subjects (M = 11.97; t (60) = -12.68, p < .05). Subjects' characteristics as classified by the Concern for Dieting factor of the Revised Restraint Scale are summarized in Table 4.

| Insert Table 4 about here |

**Subject characteristics as classified by the full Revised Restraint Scale**

When the subjects were later classified as restrained or unrestrained by their scores on the total Revised Restraint Scale, there were forty classified as restrained and twenty-
Table 4

Subject characteristics by level of restraint as defined by the Concern for Dieting Factor

<table>
<thead>
<tr>
<th></th>
<th>Restrained</th>
<th>Unrestrained</th>
<th>Student's t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours deprivation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>4.63</td>
<td>3.66</td>
<td>-1.54</td>
</tr>
<tr>
<td>SD</td>
<td>2.99</td>
<td>1.91</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>21.94</td>
<td>22.44</td>
<td>0.31</td>
</tr>
<tr>
<td>SD</td>
<td>5.49</td>
<td>7.19</td>
<td></td>
</tr>
<tr>
<td>Actual percent overweight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>32.5</td>
<td>27.6</td>
<td>-0.95</td>
</tr>
<tr>
<td>SD</td>
<td>20.4</td>
<td>21.2</td>
<td></td>
</tr>
<tr>
<td>Self-report-actual weight discrepancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>13.2</td>
<td>8.3</td>
<td>-1.48</td>
</tr>
<tr>
<td>SD</td>
<td>14.0</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>CD factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>13.0</td>
<td>4.8</td>
<td>-20.26***</td>
</tr>
<tr>
<td>SD</td>
<td>1.57</td>
<td>1.64</td>
<td></td>
</tr>
<tr>
<td>WF factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>9.06</td>
<td>7.09</td>
<td>-2.65*</td>
</tr>
<tr>
<td>SD</td>
<td>2.59</td>
<td>3.31</td>
<td></td>
</tr>
<tr>
<td>Total RRS score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>22.06</td>
<td>11.97</td>
<td>-12.68***</td>
</tr>
<tr>
<td>SD</td>
<td>2.91</td>
<td>3.44</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05

* p < .0001
Restraint and Obesity

four as unrestrained. There was a significant difference between the total Revised Restraint Scale scores of subjects that were classified as restrained (M = 20.975) by the total Revised Restraint Scale and those that were classified as unrestrained (M = 10.417, t(61)= 14.66, p< .05). A difference between the full scale scores of restrained and unrestrained subjects was expected because the scale formed the basis for the classification. There was not a statistically significant difference between restrained (M = 4.46) and unrestrained (M = 3.60; t(62) = 1.52, p > .05) subjects, when they were classified according to the full Revised Restraint Scale, with regard to the number of hours of food deprivation. Nor was there an age difference between the restrained (M = 22.33) and unrestrained subjects (M = 21.96; t(62) = 0.21, p >.05) classified the same way. There was, however a difference very close to significance between the restrained (M = 33.8) and unrestrained subjects as classified by the full scale (M = 23.7; t (62) = 1.96, p = .056) with regard to the actual percent overweight. The restrained eaters tended to be more overweight than the unrestrained eaters when classified by the full Revised Restraint Scale. This difference in actual percent overweight between restrained and unrestrained subjects is different than what was found when the subjects were classified using the Concern for Dieting factor only. There was a trend towards a significant difference between the restrained (M = 13.1) and unrestrained (M = 6.9; t (52) = 1.87, p = .067) subjects according to the difference between their reported and actual percents overweight when they were classified by the full RRS also.

The Concern for Dieting factor scores of the restrained subjects as classified by the full Restraint Scale score were significantly higher (M = 11.52) than those of the unrestrained subjects classified the same way (M = 4.63; t(60) = 10.93, p < .05). The scores on the Weight Fluctuation factor were also significantly higher for the restrained subjects classified by the full RRS (M = 9.45) than for the unrestrained subjects (M = 5.79;
Restraint and Obesity

\( t(45) = 5.41, p < .05 \) classified the same way. The subject characteristics for classification by the full Revised Restraint Scale are summarized in Table 5.

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Insert Table 5 about here

---

**Food Consumption and the Concern for Dieting Factor**

The mean number of crackers consumed by each group as classified by the Concern for Dieting factor is shown in Table 6. The restrained group with a preload ate an average of 19.625 crackers and the restrained with no preload ate 11.188 crackers on the average. The unrestrained subjects with a preload ate 12.688 crackers on the average and the unrestrained subjects with no preload ate an average of 10.188 crackers.

---

Insert Table 6 about here

---

An initial two-way analysis of variance (ANOVA) was performed on the mean number of crackers eaten by subjects using restraint classification by the Concern for Dieting factor of the RRS and preload condition as factors (restraint X preload). The analysis of variance summary is shown in Table 7.

---

Insert Table 7 about here

---

An interaction between the two factors was expected. The restrained subjects with a preload were expected to eat more crackers than the restrained subjects without a preload.
### Table 5
Subject Characteristics by Level of Restraint as Measured by the Total Revised Restraint Scale Score

<table>
<thead>
<tr>
<th></th>
<th>Restrainted</th>
<th>Unrestrained</th>
<th>Student's t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours Deprivation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>4.46</td>
<td>3.60</td>
<td>1.52</td>
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<tr>
<td>SD</td>
<td>2.94</td>
<td>1.59</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
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</tr>
<tr>
<td>Mean</td>
<td>22.33</td>
<td>21.96</td>
<td>0.21</td>
</tr>
<tr>
<td>SD</td>
<td>5.65</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Actual Percent Overweight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>33.8</td>
<td>23.7</td>
<td>1.96#</td>
</tr>
<tr>
<td>SD</td>
<td>20.8</td>
<td>19.5</td>
<td></td>
</tr>
<tr>
<td>Self-report-actual weight discrepancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>13.1</td>
<td>6.9</td>
<td>1.87#</td>
</tr>
<tr>
<td>SD</td>
<td>13.2</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>CD factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>11.52</td>
<td>4.63</td>
<td>10.93***</td>
</tr>
<tr>
<td>SD</td>
<td>3.34</td>
<td>1.69</td>
<td></td>
</tr>
<tr>
<td>WF factor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>9.45</td>
<td>5.79</td>
<td>5.41***</td>
</tr>
<tr>
<td>SD</td>
<td>2.48</td>
<td>1.70</td>
<td></td>
</tr>
<tr>
<td>Total RRS score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>20.98</td>
<td>10.42</td>
<td>14.66***</td>
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<tr>
<td>SD</td>
<td>3.45</td>
<td>2.30</td>
<td></td>
</tr>
</tbody>
</table>

# p< .07
*** p<.0001
Table 6
Mean Number of Crackers Eaten
as a Function of Preload Condition and Restraint Status
as Measured by the Concern for Dieting Factor
of the Revised Restraint Scale

<table>
<thead>
<tr>
<th>Preload Condition</th>
<th>Preload</th>
<th>No Preload</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrainted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>19.625*</td>
<td>11.188</td>
</tr>
<tr>
<td>SD</td>
<td>11.225</td>
<td>8.01</td>
</tr>
<tr>
<td>Unrestrained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>12.688</td>
<td>10.188</td>
</tr>
<tr>
<td>SD</td>
<td>5.029</td>
<td>5.868</td>
</tr>
</tbody>
</table>

Note: n = 16 per cell.

* Denotes cell with a mean that is significantly different from all other cells (p < .05).
Table 7

Analysis of variance summary table for 2 x 2
(Restraint status as measured by the Concern
for Dieting Factor X Preload condition) ANOVA

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>MS</th>
<th>df</th>
<th>F ratio</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restraint Status</td>
<td>252.02</td>
<td>252.02</td>
<td>1</td>
<td>3.57</td>
<td>.064</td>
</tr>
<tr>
<td>Preload Condition</td>
<td>478.52</td>
<td>478.52</td>
<td>1</td>
<td>6.78</td>
<td>.012*</td>
</tr>
<tr>
<td>CD x preload</td>
<td>141.02</td>
<td>141.02</td>
<td>1</td>
<td>2.00</td>
<td>.163</td>
</tr>
<tr>
<td>Error</td>
<td>4232.06</td>
<td>70.53</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5103.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05
The unrestrained subjects without a preload were expected to eat more crackers than the unrestrained subjects with a preload. This hypothesis is illustrated in Figure 1. The predicted interaction between preload and restraint was not found \( \beta(1, 60) = 2.00, p > .05 \), therefore, the hypothesis that the restrained-preload and unrestrained-no preload groups would eat significantly more crackers than the restrained-no preload and unrestrained-preload groups was not supported.

There was, however, a significant main effect for the preload condition \( \beta(1, 60) = 6.78, p < .05 \) and a trend toward significance for the restraint classification \( \beta(1, 60) = 3.57, p = .064 \). The interaction between preload condition and restraint classification is depicted in figure 2.

Subsequent multiple comparisons, using Bonferroni’s multiple comparison procedure, indicated that the restrained - preload group ate more crackers, on the average, than any of the three other groups. None of the three remaining means differed significantly from each other.

An analysis of variance using the full Revised Restraint Scale as the classification system for the restraint factor was not possible because of unequal cell sizes and heterogeneous variance across groups.
Figure 2
Interaction Between Preload Condition and Restraint Status as Classified by the Concern for Dieting Factor

Data from "Mean # of crackers eaten"

Crackers consumed

Preload Status

Preload No preload

Restrained
Unrestrained
Counter-regulation and Restraint

The hypothesis that the Concern for Dieting factor of the RRS may be a better indicator of restraint and counter-regulation in the overweight population than the full RRS has received some support in the present study. In this study, overweight restrained eaters, as classified by just the Concern for Dieting factor of the RRS, counter-regulated when given a milkshake preload. This result is depicted in Figure 2, which shows that the restrained subjects, as classified by the CD factor, ate more crackers after a preload of a milkshake than the restrained subjects who did not receive a milkshake preload. The number of crackers eaten by the restrained subjects in the preload condition was significantly higher than the number of crackers eaten by subjects in the other three conditions. This study is the first study in which restrained obese subjects counter-regulated with a preload. The fact that the subjects were classified by the CD factor of the RRS indicates that the CD factor adequately measured restraint in the restrained overweight subjects.

Although the hypothesis that restrained overweight persons as classified by the Concern for Dieting factor of the RRS would counter-regulate when given a preload was supported, the unrestrained eaters did not behave as predicted. It was predicted that the unrestrained eaters as classified by the CD factor, would regulate their food intake with regard to previous consumption; those that received a preload would eat a smaller amount of crackers than those who did not receive a preload. This did not happen. The unrestrained overweight eaters as classified by the CD factor, ate the same amount of crackers whether they were given a preload or not.

A possible explanation for these results may be that the crackers used as a dependent measure were not sufficiently palatable to induce unrestrained eaters to eat many
of them, whether they had a preload or not. For the restrained eaters, on the other hand, the preload may have overridden the low palatability of the crackers. Once they broke their diet with a milkshake, they ate any of the food that was placed before them because of the emotional impact of having broken their diet.

This possible explanation does not concur with past work in this area, though. Woody et al. (Woody, Constanzo, Leifer and Conger, 1981), using a preload design, found that two conditions must be met for counter-regulation to occur in normal weight restrained eaters: 1) the preload must be believed to be high in calories, and 2) the ad lib food must be good-tasting. Schachter's work with the obese population supports the conclusion that the ad lib food must be good-tasting (see Schachter, 1971 for a review of this literature).

Although the literature that says the ad lib food must be good-tasting, it does not altogether discount the hypothesis that the crackers may not have been sufficiently palatable for the unrestrained eaters in a no preload condition. It may be that there is a differential level of response to palatability between restrained and unrestrained persons. Restrained subjects may find food generally more palatable than unrestrained subjects. This hypothesis is similar to the internal-external hypothesis of Schachter, but includes the idea of restraint as a factor. Further research into the taste perception differences between restrained and unrestrained subjects may give more information regarding the present study’s findings.

The hypothesis that the crackers used in this study may not have been palatable enough for the unrestrained eaters to eat a large amount of them seems to be the best explanation to explain the small number of crackers eaten by unrestrained eaters. The scales used to rate the crackers during the taste test portion of the experiment may have been helpful to determine the palatability of the crackers. These data were not retained, however, as the researcher used them to enhance the deception of a taste test in the study.
and did not foresee that the information might have been useful in the analysis. Other explanations for the results obtained by the unrestrained subjects are difficult to formulate.

The analysis of variance in this study yielded a significant main effect for presence or absence of a preload. Overall, subjects who received a milkshake preload, subsequently ate more crackers than those who did not receive a milkshake preload. There was also a trend towards a significant main effect for restraint status ($p = .064$). Restrained subjects tended to eat more crackers, on the average, than unrestrained subjects. It is important to note that there was no significant main effect for restraint status, just a trend towards it. The fact that there was a trend towards a main effect and not a significant main effect for restraint status suggests that further research and/or replication is needed to determine the actual status of the main effect for restraint status in an overweight sample.

The preload-restrained group ate significantly more crackers than any of the three other groups. Also there was no significant difference between the mean number of crackers eaten in any of these three other groups. The larger amount of crackers eaten by the restrained-preload groups suggests that the significant main effect for preloads and the trend towards a significant main effect for restraint status are probably artifacts of the fact that the restrained-preload group ate significantly more crackers than any of the other groups. See Table 6 for the mean number of crackers eaten by each group.

A difficulty in this study was the fact that there were an unequal number of subjects in each cell and heterogeneity of variance between the variances of each cell when the subjects were classified as restrained and unrestrained by the full RRS. This inequality precluded performing an analysis of variance based upon classifying subjects as restrained or unrestrained using the full RRS. The inequality between cells and inability to perform an analysis of variance using the full scale, makes comparisons between the two types of classifications difficult in the present study. Past studies, though, have used the full RRS for classifying overweight subjects on restraint status. The results of these studies can be
used to compare classification with the full RRS to classification with the CD factor of the full RRS.

**Subject Characteristics**

No differences between the restrained and unrestrained subjects were found on the variables of reported hours of food deprivation or age. This finding held true regardless of which classification system was used. Such a finding suggests that age and reported hours of food deprivation were not confounding variables in the present analyses.

When subjects were classified by the CD factor of the RRS, there was no difference between the restrained and unrestrained subjects' actual percents overweight. When subjects were classified by the full RRS, on the other hand, there was a trend ($p=.056$) for the restrained subjects to have a higher actual percent overweight than the unrestrained subjects. Past studies, using the full scale for classification, have found a significant correlation between obesity and high scores on the RRS (Lowe, 1984; Ruderman, 1983, 1985b; Wardle, 1980).

The fact that subjects were selected differently in this study than in past studies using the full RRS may account for the lack of a significant difference between restrained and unrestrained subjects' actual percents overweight. In this study, subjects were first classified by the CD factor of the scale. Subjects who scored between seven and eleven on that factor of the scale were not used in the analyses. In past research, when the full RRS was used for classification, subjects were not eliminated on the basis of their scores on the scale. Usually, persons with scores 15 or higher were classified as restrained and subjects with scores 14 or lower were classified as unrestrained. The elimination of subjects who scored between seven and eleven on the CD factor of the scale may have affected the percent overweight of the subjects when they were later classified by the full scale.
As mentioned above, a difference was found between the restrained and unrestrained subjects' actual percents overweight when they were classified by the full RRS, but not found when they were classified by the CD factor alone. This difference in classification between the full scale and the CD factor suggests that actual percent overweight may be a confounding variable when the full RRS is used to classify overweight persons as restrained or unrestrained and not a confounding variable when the CD factor is used to classify subjects. Therefore, the CD factor of the RRS may be a purer measure of restraint with overweight subjects than the full RRS.

The subjects in this study when considered as a group, regardless of their restraint classification, significantly under-reported their percent overweight. Subjects, on the average, reported that they were significantly less overweight than they actually were. See Table 3 for actual differences. The under-reporting of weight found in this study was not expected and contrasts with the results of past research (Stunkard & Albaum, 1981). Stunkard and Albaum (1981) found that self-reported weight was quite accurate.

Although all subjects significantly under-reported their percent overweight when considered as a group, there was a trend ($p = .067$) towards a difference in the amount of under-reporting between restrained and unrestrained subjects when they were classified by the full RRS. Hence, the restrained subjects as classified by the full RRS under-reported their percent overweight by an average of 13.1% while the unrestrained subjects as classified by the full RRS under-reported their percent overweight by an average of 6.9%. The restrained subjects tended to under-report their percent overweight more than the unrestrained subjects when subjects were classified by the full RRS. It is important to remember that the above difference between the restrained and unrestrained eaters is only a trend and did not reach statistical significance. Further research and/or replications need to be performed before conclusions can be reached.
When subjects were classified by the CD factor of the scale, there was no significant difference in the amount of under-reporting between the restrained and unrestrained eaters. The restrained and unrestrained eaters under-reported their percent overweight the same amount, on the average, when they were classified by the CD factor of the RRS.

The trend towards a difference found between the restrained and unrestrained subjects' under-reporting of percent overweight when classified by the full RRS suggests that the full RRS may differentiate between persons according to how much they under-report their weight. This differentiation between restrained and unrestrained eaters could be a result of the trend for restrained eaters to have higher actual percents overweight than unrestrained eaters when classified by the full RRS as discussed above. It may also be a result of the full RRS measuring a different construct than the CD factor of the scale measures for overweight subjects. Amount of under-reporting percent overweight may be a confounding variable when the full RRS is used to measure restraint in overweight subjects and not be a confounding variable when the CD factor of the scale is used to measure restraint in overweight subjects.

Clinical Implications

The present study suggests that the Concern for Dieting factor of the Revised Restraint Scale can effectively differentiate between subjects who will counter-regulate with a preload and those who will not counter-regulate with a milkshake preload in an overweight sample. Because counter-regulatory eating is seen as one aspect of restraint, it follows that the CD factor in this study was able to discriminate to some degree between restrained and unrestrained overweight subjects.

Restrained subjects may be prone to exhibit other behaviors and attitudes that differentiate them from unrestrained eaters. Ruderman (1985b) found that restrained eaters are prone to hold rigid, absolute beliefs, as measured by the Rational Beliefs Inventory
Ruderman's findings indicate that restrained eaters are more likely than unrestrained eaters to possess distorted cognitions of an unyielding and perfectionistic nature, suggesting that their behavior may differ from the behavior of unrestrained eaters. The fact that the CD factor of the RRS can discriminate to some degree between restrained and unrestrained overweight eaters, suggests that the overweight restrained eaters as classified by the CD factor of the RRS may also hold rigid, absolute beliefs and possess distorted cognitions.

If the CD factor of the RRS can accurately distinguish between restrained and unrestrained overweight persons and if restrained persons show a different set of behaviors and beliefs than unrestrained persons, the CD factor of the RRS may be a useful tool for determining overweight clients who hold a specific set of behaviors and beliefs.

Future research addressing the differential attitudes and beliefs presented by restrained or unrestrained overweight persons as classified by the CD factor of the RRS would be helpful to determine whether restrained overweight persons do hold different attitudes and beliefs than unrestrained overweight persons. Such findings may indicate the usefulness of the RRS for diagnostic assessment with overweight persons. The CD factor scores could help with the formulation of treatment plans and objectives with overweight clients if restrained overweight clients as classified by the CD factor do possess more rigid, absolute beliefs and distorted cognitions than unrestrained overweight eaters.

Overweight clients who score high on the CD factor of the RRS may tend to be more rigid and perfectionistic than overweight clients who do not. High scores on the CD factor have been found to be correlated with bulimia (Ruderman, 1985). Persons diagnosed with bulimia have been found to expect themselves to be perfect and to need a high amount of control over their lives (Boskind-Lodahl & Sirlin, 1977). Such data suggest that bulimia and restraint as measured by the CD factor of the RRS may be similar concepts.
Although high scores on the CD factor of the RRS have been correlated with bulimia, this correlation does not mean that all persons who score high on this factor are bulimics. Bulimia and restraint as measured by the CD factor of the RRS may have some common characteristics. Further research is needed to assess the similarity between bulimia and restraint, especially with overweight subjects. If research finds that restraint as measured by the CD factor of the RRS and bulimia are similar constructs in overweight persons, the CD factor of the RRS may be helpful in determining which overweight persons may be bulimics and which may not.

Research identifying attributes of overweight persons who are classified as unrestrained by the CD factor of the RRS may reveal a set of behavioral tendencies which do not include rigid, perfectionistic beliefs. It may be that these persons are less rigid and not as sensitive to external environmental cues as restrained overweight subjects. A set of attributes possessed by unrestrained overweight persons, if found, may indicate a second type of treatment plan for overweight unrestrained persons who present for therapy.
Summary

The present study supported the hypothesis that the Concern for Dieting factor of the RRS may be a better indicator of restraint in the overweight population than the full RRS. Overweight subjects classified as restrained by the CD factor counter-regulated after drinking a milkshake preload when those without a milkshake preload did not. Actual percent overweight and the amount of under-reporting of actual percent overweight may be confounding variables for use of the full RRS with overweight subjects.

The crackers used as a dependent measure may not have been palatable enough for the unrestrained eaters. There may be a differential level of responsiveness to palatability between restrained and unrestrained eaters. The possibility of the differential level of responsiveness warrants further research.

An analysis of variance using the CD factor of the scale for classification yielded a main effect for the presence of absence of a preload and a trend towards a main effect for restraint status. An analysis of variance using the full RRS for classification was not possible because of the unequal number of subjects in each cell and heterogeneity of variance across the cells.

Past research has found differences between restrained and unrestrained subjects with regard to their behaviors and beliefs. The finding that the CD factor of the RRS can discriminate between restrained and unrestrained overweight subjects suggests that the CD factor of the RRS may be a useful tool for determining restrained and unrestrained overweight subjects in a clinical setting. Further research regarding the differential behaviors and beliefs of overweight restrained and unrestrained eaters may suggest therapeutic directions. Further research is also needed to assess the similarity between bulimia and restraint for overweight subjects.
References


Restraint and Obesity


1. How often are you dieting?
   Never rarely sometimes often always

2. What is the maximum amount of weight (in pounds) that you have ever lost in one month?
   0-4  5-9  10-14  15-19  20+

3. What is your maximum weight gain within a week?
   0-1  1.1-2  2.1-3  3.1-5  5.1+

4. In a typical week, how much does your weight fluctuate?
   0-1  1.1-2  2.1-3  3.1-5  5.1+

5. Would a weight fluctuation of 5 lb. affect the way you live your life?
   Not at all slightly moderately very much

6. Do you eat sensibly in front of others and splurge alone?
   Never rarely often always

7. Do you give too much time and thought to food?
   Never rarely often always
8. Do you have feelings of guilt after overeating?
   Never  rarely  often  always

9. How conscious are you of what you are eating?
   Not at all  slightly  moderately  extremely

10. How many pounds over your desired weight were you at your maximum weight?
    0-1  1-5  6-10  11-20  21+
INFORMATION SHEET

Sex: Male Female

Age: ______

Height: ______ ______

feet inches

Weight (in pounds): ______

(in indoor clothing)

Marital Status:

_____ Single   _____ Remarried   _____ Widowed

_____ Engaged  _____ Separated

_____ Married  _____ Divorced

If Applicable: How long have you been married? ______

Husband/Wife's Age? ______

If you have children, please list their sex and ages:

Age: ______ ______ ______ ______ ______

Sex: ______ ______ ______ ______ ______
The information on this sheet is necessary so that we might contact you in the future regarding additional experimental credits. Please be aware that THE INFORMATION ON THIS SHEET WILL BE KEPT SEPARATE FROM ALL OTHER INFORMATION ON THE OTHER SHEETS. Thank you.

NAME: ______________________________

HOME PHONE#: ___________________________

WORKPHONE#: __________________________

PSYCH 110 INSTRUCTOR: ______________________

BEST TIME OF DAY TO CALL: _____________________
### 1983 Metropolitan Height & Weight Table for Women
Medium Frame, ages 25-59

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<thead>
<tr>
<th>Height (no shoes) + 1&quot;</th>
<th>Weight (in indoor clothing)</th>
</tr>
</thead>
<tbody>
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<td>108-122</td>
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<tr>
<td>4'11&quot;</td>
<td>111-125</td>
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<td>5'0&quot;</td>
<td>113-126</td>
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<tr>
<td>5'1&quot;</td>
<td>115-129</td>
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<tr>
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<td>145-159</td>
</tr>
<tr>
<td>6'0&quot;</td>
<td>148-162</td>
</tr>
</tbody>
</table>
Rating Sheet

Rating Scale

Rate the food on each scale by placing a check mark where you believe it belongs on the scale.

Saltiness

Not Salty 1 2 3 4 5 6 7 Extremely Salty

Sweetness

Not Sweet 1 2 3 4 5 6 7 Extremely Sweet

Bitterness

Not Bitter 1 2 3 4 5 6 7 Extremely Bitter

Consistency

Soggy 1 2 3 4 5 6 7 Crunchy

Overall Taste

Terrible 1 2 3 4 5 6 7 Excellent
Appendix F

Consent Form

I agree to participate in this study and understand that I am free to withdraw my consent and to discontinue participation in the project or activity at any time and still receive credits for my Introductory Psychology class.

Signature_________________________ Date ___________
Appendix G

Experimenter Instructions

Introduction

The study you are participating in today is concerned with the influence of one sensory experience upon another subsequent experience in the same sensory modality. We will be looking at the effects of one taste experience on subsequent taste experiences. There has been well-documented evidence that certain foods such as artichokes have an effect on how we perceive later taste experiences. You will receive either one or no flavor first and then taste three types of crackers. You will then rate the tastes of these crackers on a number of variables.

No Preload Condition

You have been assigned to the no-taste condition. You will be providing information about how the final food tastes if it has not been preceded by another taste. Let’s go directly to the final taste test.

Preload Condition

You have been assigned to the one taste condition. You will be providing information about the effect of one taste experience on later taste experiences. The food you will be tasting is this chocolate milkshake. I am going to leave the room while you drink the milkshake. For purposes of control, please consume the entire shake. I will return in a few minutes to continue. (The experimenter will leave the room and return in ten minutes. While the subjects is drinking the shake, the experimenter will be setting up the first room for the taste test. If the milkshake has not been consumed when the experimenter returns, she will stay and wait until it is finished.) We can now proceed to the final taste test.

Final Taste Test
There are three types of crackers in these bowls. You are to taste the crackers in bowl one first, rate them on this form and go on to bowl two. After you have rated the crackers in bowl two, go on to bowl three. It is important that you taste and rate the crackers in this order to control for the effects of one taste upon another. After you have rated the crackers, you must not change your ratings, but you may help yourself to whatever crackers remain. Do you understand the instructions? (The experimenter leaves the room for ten minutes and returns).
Appendix H

Debriefing

The experiment is now over, but I do have a few questions for you before we leave. While you were participating in the study, did you have any questions about what was happening?

This study was actually not about the taste of the crackers, but about what effect the food you eat has on the amount of food you eat afterwards. We have found that some people eat more after having eaten something filling and others eat less. You were picked for this study because of the answers you gave during the screening at the beginning of the quarter. The screening divided people into groups according to their eating patterns. We were measuring how much food you ate after (Without) drinking a milkshake beforehand. Do you have any questions about the study in general?

(If the subject asks what her type of eating pattern is, the experimenter will reply with) I don't have access to that information, but if it is something you would like to pursue, I can give you the name and number of a person you can contact. (The experimenter will then give the subject my name and number (Mema Terry, 251-3662)).

(After the experimenter has answered all of the subject's questions, she will say) It is important that you do not speak with other students or friends about this study because we will be performing this experiment through the end of the year and it will bias our results if people know what is being measured. We would appreciate it if you do not discuss this with anyone.

Again, I want to thank you for your help today.
Merna Heinrich Terry
December 4, 1989

1. Obesity is a serious health risk in our society which has been correlated with cardiovascular disease, breast and colon cancer, and an increased mortality rate. One theory of obesity suggests that obese people have different eating patterns than normal weight people. This theory, called Restraint theory, implies that obese people expend much effort in trying to resist food even when they are physiologically in need of food. If their efforts to resist food are disrupted, they will overeat because their diet has been broken.

A scale has been developed to measure restraint in both obese and normal-weight persons. This scale is made up of ten questions and is called the Revised Restraint Scale (RRS). There has been much controversy about whether this scale is a good indicator of restraint for obese people. This study will attempt to alter the Restraint Scale in such a way that it will adequately measure restraint in obese people.

Psychology 110 students will first be screened by being given the Revised restraint Scale and an information sheet on which they will be asked to give their weight and height. Subjects that are at least 10% above their ideal weight for their height will be selected for the study. They will be placed into groups according to how they scored on a shortened version of the RRS.

Subjects will be called and asked to participate in a study about the effects of prior taste experiences on subsequent taste experiences. They will be asked not to eat for two hours before participating in the experiment. Once they arrive, they will be asked to sign an informed consent form and either be given a chocolate milkshake to drink or no chocolate milkshake to drink, depending on which condition they were assigned to. All subjects will then be taken to a room where there are three types of crackers which they are told they are to rate according to taste on a short rating form. The data to be recorded will be the amount of crackers eaten by the subject, no the ratings of the crackers, but the subjects will not be told this. After the subjects have rated the crackers, they will be taken to another room where their weight and height will be measured on a balance scale by the experimenter. Their weight will not be stated out loud and they do not need to face the scale if they do not wish to do so.
The study will be run at the Clinical Psychology Center.

2. This research will help to develop a device which may more adequately measure restraint in obese populations. This may assist in determining the cause of obesity for particular clients and help in determining the most helpful type of treatment.

3. The subjects will believe that they are participating in a taste-testing experiment. They will either be given a milkshake to drink or no milkshake to drink, depending on the experimental condition they have been assigned to. They will then be shown to a room where there will be three types of crackers which they believe they are to rate on a small rating scale. After they have rated the crackers, their height and weight will be measured and they will be told that the amount of crackers they have eaten is actually what was being measured.

4. The subjects will be female Introductory Psychology students who are at least 10% above the ideal weight for their height according to the Metropolitan Life Insurance Norms for Women. Minors will not be used in this study.

5. There will be no risks to the subjects, although there may be some discomfort imposed on the subjects who will be required to consume a milkshake if they are not hungry. There will be a violation of normal expectations because the experiment is designed to measure something other than what they are told.

6. After the subjects have completed the study, they will be debriefed as to what the study was actually measuring. Here is a copy of what will be said to the subjects:

This study was actually not about the taste of crackers, but about what effect the food you eat has on the amount of food you eat afterwards. We have found that some people eat more after having eaten something filling and others eat less. You were picked for this study because of the answers you gave during the screening at the beginning of the quarter. The screening divided people into groups according to their eating patterns. We were measuring how much food you ate after (without) drinking a milkshake beforehand. Do you have any questions about the study in general? (If the subjects asks what type of eating pattern she has, the experimenter will reply with) I don't have access to that information, but if it is something you would like to pursue or if you have any