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Effects of standard setting on the eating behavior of restrained and unrestrained eaters

Marilyn R. Preston

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The present studies attempted to assess the effects of standard setting on the eating behavior of restrained and unrestrained eaters. Having consumed a liquid preload which they perceived to be highly caloric, restrained and unrestrained eaters were asked to participate in a taste perception task. Half the subjects were given information as to how many crackers were eaten by most people to make their judgments. Control subjects received no information about the number of crackers eaten by most people in similar situations. Results revealed that, as predicted, standard setting suppressed eating behavior of both restrained and unrestrained eaters. A number of interesting interactions also emerged. A second study investigated the effects of conflicting standards on the eating behavior of restrained and unrestrained eaters. The procedure used was similar to the procedure used in Experiment 1 with the addition of a confederate who consumed a large quantity of food. Again standard setting served to suppress eating. Implications of standard setting for past and future research are discussed.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Definitions, Problems, and Statistics</td>
<td>1</td>
</tr>
<tr>
<td>Etiologies of Obesity</td>
<td>4</td>
</tr>
<tr>
<td>Externality Hypothesis</td>
<td>10</td>
</tr>
<tr>
<td>Restrained and Unrestrained Eating</td>
<td>21</td>
</tr>
<tr>
<td>2. EXPERIMENT 1</td>
<td>30</td>
</tr>
<tr>
<td>Method</td>
<td>30</td>
</tr>
<tr>
<td>Results</td>
<td>33</td>
</tr>
<tr>
<td>Discussion</td>
<td>37</td>
</tr>
<tr>
<td>3. EXPERIMENT 2</td>
<td>46</td>
</tr>
<tr>
<td>Method</td>
<td>47</td>
</tr>
<tr>
<td>Results</td>
<td>49</td>
</tr>
<tr>
<td>Discussion</td>
<td>52</td>
</tr>
<tr>
<td>Conclusions</td>
<td>56</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>61</td>
</tr>
<tr>
<td>FOOTNOTE</td>
<td>68</td>
</tr>
<tr>
<td>APPENDICES</td>
<td></td>
</tr>
<tr>
<td>A. EATING HISTORY QUESTIONNAIRE</td>
<td>69</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>B. INSTRUCTIONS: EXPERIMENT 1 AND EXPERIMENT 2</td>
<td>71</td>
</tr>
<tr>
<td>C. POST RATING QUESTIONNAIRE PACKAGE</td>
<td>77</td>
</tr>
<tr>
<td>D. DIAGRAM</td>
<td>85</td>
</tr>
<tr>
<td>E. TABLES</td>
<td>87</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table | Page
--- | ---
1. Number of crackers eaten by sex of experimenter by restraint level by absence/presence of standard for Experiment 1 | 88
2. Mean number of crackers eaten by absence/presence of standard by sex of experimenter for Experiment 1 | 89
3. Mean number of crackers eaten by restraint level by sex of experimenter for Experiment 1 | 90
4. Initial hunger score by sex of experimenter by restraint level by presence/absence of standard for Experiment 1 | 91
5. Post experimental hunger score by sex of experimenter by restraint level by absence/presence of standard for Experiment 1 | 92
6. Mean post experimental hunger score by level of restraint by sex of experimenter for Experiment 1 | 93
7. Number of crackers eaten by level of restraint by level of private self-consciousness by sex of experimenter by presence/absence of standards for Experiment 1 | 94
8. Mean number of crackers eaten by sex of experimenter by level of self-consciousness for Experiment 1 | 95
9. Mean number of crackers eaten and mean hunger scores by sex of experimenter by presence/absence of standard for Experiment 1 | 96
10. Number of crackers eaten by restraint level by sex of experimenter by absence/presence of standard for Experiment 2 | 97
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Initial hunger score by sex of experimenter by level of restraint by presence/absence of standard for Experiment 2</td>
<td>98</td>
</tr>
<tr>
<td>12.</td>
<td>Post experimental hunger scores by sex of experimenter by level of restraint by presence/absence of standard for Experiment 2</td>
<td>99</td>
</tr>
<tr>
<td>13.</td>
<td>Number of crackers eaten by level of restraint by level of private self-consciousness by sex of experimenter by presence/absence of standard for Experiment 2</td>
<td>100</td>
</tr>
<tr>
<td>14.</td>
<td>Mean number of crackers eaten by level of restraint by presence/absence of standard for Experiment 1 and Experiment 2</td>
<td>101</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

Definitions, Problems, and Statistics

Obesity, one of the easiest pathologies to describe and recognize, can be defined as an excessive quantity of stored body fat. It is the visible result of ingesting more calories than is required for physical activity and somatic maintenance. Most psychological research defines obesity as 15% overweight (Leon & Roth, 1977). Twenty-five to 45% of the American population over 30 years old are over 20% overweight (Jeffrey & Knauss, 1981). Based on these figures obesity should be considered a widespread phenomenon with approximately 70 million Americans classifiable as obese. Obesity has been described as perhaps the most pervasive of all human infirmities (Rodin, 1977a). The high cost, small payoff, and relatively simple remedy for obesity should make it the most trivial of abnormalities. Unfortunately it has become one of the most formidable.

It is important to make a distinction between overweight and obesity. An obese individual has a high proportion of adipose tissue relative to body mass. Overweight individuals are described as such because their weight surpasses the optimal weight on a statistical height-weight table (which has been developed by insurance companies for the purpose of determining insurance policies). An example of an overweight individual might be an athlete who has surpassed the
optimal weight range according to insurance charts due to the development of a large portion of heavy muscle tissue. Though the athlete may be heavier than the average person his/her height, the athlete would not be considered obese because the excess weight could be attributed to muscle tissue not to the presence of excess adipose tissue.

A certain amount of body fat is necessary for normal bodily functions. Optimal body fat levels depend upon environmental conditions. In a society where food is normally scarce it behooves one to accumulate an excess amount of body fat during times when food is available. The excess food acquired during plentiful times can then be stored as body fat and metabolized during periods of food scarcity. However, in a food abundant society such as ours, excess body fat is nonadaptive and pathological. Since food is always plentiful there is no need to build up reserves of body fat.

Obesity has been considered a health problem because it is often associated with a number of chronic physical diseases and several psychopathological symptoms. Four different types of hazards to health have been associated with obesity - obesity leads to changes in various normal body functions, increases in the risk of developing certain diseases, detrimental effects on previously established disease and adverse psychological reactions (Mayer, 1969). Not only has obesity been detrimental to the mental and
physical well-being of the overweight individual it has also caused economic difficulties in the form of monies spent for weight loss programs, special clubs and foods (see Jeffrey & Knauss 1981 for details on the economic, physical and psychopathological problems).

Before considering etiologies of obesity it is important to note the problems that have surrounded obesity research. First, researchers are not in agreement on the cause of obesity. Since researchers differ in their ideas about what causes obesity, various researchers focus on different etiologies when investigating the problem. Information obtained from these diverse investigations is specific to the etiology researched and therefore limited in generalizability. Defining obesity has also caused complications in comparing obesity research findings. Some researchers rely on insurance tables while others use a measurement of skin fold thickness to determine degree of obesity. Another variable which is often overlooked and may limit direct comparisons of obesity research is the onset of obesity. According to Milich and Fisher (1979) onset of obesity has a dramatic effect on successfulness of weight loss and differences between overweight individuals. Individuals who have become obese during childhood experience more drastic responses to weight reduction than do victims of adult obesity onset. The responses include anxiety and depression, faulty time perception and distortion of body image. Finally, the population sampled in obesity research should always be considered.
Although it has been reported (Stunkard, 1975) that lower socio-economic standard individuals comprise the majority of obese, most laboratory studies use college students or upper to middle class women as subjects and attempt to generalize to the total obese population (Milich, 1975). It is important to be aware of these problems when comparing various studies in the literature.

**Etiologies of Obesity**

**Physiological etiologies.** Researchers have investigated the physiological etiologies of obesity by examining the effects of cellular and metabolic determinants, neurology, heredity and nutrition. It should be noted that these categories are not mutually exclusive. For example, heredity can contribute to adipose cellularity which can in turn influence metabolic rates. Though these effects may not be independent, for clarity they will be discussed individually.

The common problem in hereditability studies is the confounding of environment and inheritance. A child from obese parents may become obese as a result of genetic inheritance, learned eating and exercise habits, or both. A number of studies reported in Jeffrey and Knauss (1981) attempt to investigate these apparent confounding variables. The correlations of percent overweight for children and their natural parents were compared to the correlations of percent overweight for foster children and their foster parents. Correlations of percent overweight for parents and biological children were positive
and statistically significant while the correlation for parents and foster children were much lower and nonsignificant. Another study compared monozygotic twins separated at birth and reared in different family environments. Percent of variance of overweight attributable to hereditability varied from 27 to 78. A third study collected data from female diet group members and their family members and found family environment accounted for 31% of the variance while hereditability accounted for 11%. Though hereditability studies contain many problems and limitations, the conclusions drawn from all of these studies have been consistent in reporting both heredity and environment as important determinants of obesity.

Neurologic and metabolic determinants of obesity have also been investigated. The fact that normal weight individuals can regulate their body weight with extraordinary accuracy has been puzzling and is not completely understood. The hypothalamus has been investigated as a possible food regulating mechanism. Studies have demonstrated that immediately following a lesion of the ventral medial hypothalamus (VMH) laboratory animals increase their eating and begin gaining weight. This period of rapid weight gain is called the dynamic phase and usually lasts three weeks. Following the dynamic stage the animals' weight stabilizes at a new higher level. Based on this research it has been suggested that lesions in the VMH may greatly alter the set point around which the weight of an animal is regulated.
Set point has been defined as the optimal level around which an animal stabilizes its weight in order to maintain normal and efficient bodily functioning. In contrast to VMH lesioned animals, animals with lesions in the lateral hypothalamus (LHT) eat less and consequently lose weight rapidly. This finding suggests that the LHT may also serve to partially regulate food intake. It has been hypothesized that the VMT and LHT may interact via monoamine pathways (neural transmitters) traveling through the hypothalamus and extrahypothalamus sites. This interaction may be an important factor in controlling the eating behavior of animals (Rodin, 1977a).

Although this information is very interesting the incidence of a lesion in the VMH of humans is quite rare and cannot possibly be accounting for the widespread obesity problem among humans. Thus, other possible explanations of obesity should be considered. Differences in metabolic rate have been considered to be a possible explanation for why some people are obese while others are not. It has been suggested that obese individuals are more efficient in the digestion of food and in the formation of adipose tissue. If obese are more efficient in this function they might gain weight with lower caloric intake than normal people. Although one study (Passmore, Strong, Swindells & El Din, 1963, cited in Jeffrey & Knauss, 1981) does provide support for this hypothesis there has been little evidence to support a causal relationship. In contrast, it is believed that in most cases
metabolic and endocrinological anomalies result from an increase in adipose tissue and not vice versa (Rodin, 1977a).

Since obesity has been defined as an excess amount of body fat it has been considered important to investigate the development, maintenance and stability of adipose tissue. Two types of body fat have been distinguished; essential and non essential. Essential body fat is required for body maintenance. It is necessary for storing energy and protective functions and is an integral part of many vital organs. Nonessential body fat is not necessary for bodily functions and in extreme cases may be detrimental to the processes. Amount of body fat can be increased by enlarging the size of existing adipose tissue cells, adipocytes, (hypertrophy) increasing the number of adipocytes (hyperplasic) or a combination of the two processes. Obesity according to this definition is therefore determined by the size and the amount of adipocytes.

Research in cellular determinants has been fruitful in increasing the knowledge of obesity through investigation of adipose tissue cellularity. Unfortunately the mechanism of normal adipose tissue development and anomalies producing hyperplasic/hypertropic obesity are presently poorly understood.

The nutritional component of obesity revolves around the discrepancy that has arisen between what people should eat and what people actually do eat. Because of ignorance, carelessness or
convenience Americans have been consuming diets high in fats and refined sugars. Misconceptions and concerns about so called "starchy" foods have led people to voluntarily place themselves on nutritionally unbalanced and more caloric diets. Convenience foods, which now account for 60% of the American's typical diet, provide consumers with large numbers of low density calories. According to nutritionists a balanced diet can control weight by suppressing hunger and at the same time decreasing caloric intake (Bayrd, 1978).

**Psychosocial etiologies.** A second major area of obesity research revolves around psychosocial factors. Psychosocial theories differ from physiological theories in that the former distinguish between hunger and appetite. Hunger refers to a biological urge which signals depletion of nutrient reserves. Appetite refers to an urge to eat based on social and psychological factors. Both hunger and appetite stimulate eating behavior in humans. Appetite may control eating even when the hunger drive has been satisfied. According to psychosocial theories obesity is due to a malfunction of the appetite process. The psychosocial theories which deal with this malfunction are psychodynamic, social learning, and the externality hypothesis.

According to the psychodynamic theory nonnutritive eating is an acquired coping response usually established in childhood which is associated with anxiety reduction. In later life, when personal and social difficulties arise, anxiety increases motivating the individual to
resort to the behavioral response of eating. This cyclical pattern produces and sustains a potential weight problem (McKenna, 1972). Presently, there is little supportive evidence for this approach. In fact, most of the evidence supports the contention that obesity is a cause of the anxiety and other emotional problems rather than the result of these factors. Obesity leads to emotional stress, which in turn increases eating behavior thereby magnifying the problem.

Social learning theorists view obesity as a function of behaviors which develop and maintain obesity (Jeffrey & Knauss, 1981). Although physiological influences are not ruled out, social learning theorists hypothesize obesity to be due to a positive energy balance resulting from various learned eating and exercising behaviors. According to social learning theory the factors that affect the learning of any behavior can also affect eating behavior. This theory is perhaps the most optimistic for obesity control because it suggests that improper eating habits can be altered and replaced by proper eating behaviors (Coates, 1977).

Social learning analysis of obesity can be broken into two components - micro and macro (Jeffrey & Knauss, 1981). Micro social learning analysis focuses on the eating, exercise and psychological patterns of the individual while the macro analysis focuses on the total society and how it affects eating habits, physical habits and weight management.
The final psychosocial etiology to be discussed is the externality hypothesis. This theory and its derivatives will be the focus of the remainder of this manuscript.

**Externality Hypothesis**

Schachter's theory of emotions. The externality hypothesis is based on Schachter's theory of emotions. Schachter's theory was an attempt to develop an explanation for human emotions that could satisfy the criticisms of the James-Lange theory posed by Cannon (Schachter, 1971a). The critique was based on the following points:

1. Total separation of the viscera from the central nervous system does not alter emotional behavior,

2. The same visceral change occurs in very different emotional states and in nonemotional states,

3. Viscera are relatively insensitive structures,

4. Visceral changes are too slow to be a source of emotional feeling, and

5. Artificial induction of visceral changes that are typical of strong emotions do not cause those emotions.

Although Cannon's criticisms have not gone uncontested, his contribution to the area has been important in demonstrating a strict visceral interpretation of emotions to be inadequate. Likewise, data collected showing the limitations of Cannon's criticisms revealed the flaws in a totally peripheral interpretation.
Schachter's two factor theory combined the visceral and the peripheral theories of emotion. According to Schachter's theory, emotions consist of a physiological and a cognitive component. Schachter's theory states that a general pattern of sympathetic discharge accompanies any emotional state. Schachter also hypothesized that given this general state of arousal an individual labels, interprets and identifies the state in terms of the situation. Cognitive factors therefore are important determinants of emotional states (Schachter, 1971a). Cognitions from the immediate situation are interpreted using past experience which provides a framework within which one understands and labels one's feelings.

If these hypotheses are indeed accurate, the following propositions should logically follow.

1. Arousal with no immediate explanation should lead one to label and describe his/her feelings in terms of the cognitions available.

2. If an immediate explanation for the arousal is available no alternative cognitive labeling is necessary.

3. Given the same cognitive circumstances an individual will react emotionally or describe emotions only to the extent that he/she experiences a state of physiological arousal.

The next logical step following any theory construction is to test the propositions. If Schachter's theory is correct, different
levels of physiological arousal, varying explanations of body states, and situations from which different cognitive explanations could be made should affect emotions.

Schachter and Singer (1962) manipulated emotional states using social determinants. Subjects were given an injection of epinephrine and provided with different expectations as to what their physiological reactions would be. The epinephrine informed group was given the correct explanation for the effects of epinephrine. The epinephrine misinformed group was provided with information completely unrelated to the actual reaction to epinephrine. An epinephrine ignorant group was given no indication as to what to expect from the injection. A placebo group was identical to epinephrine ignorant except that they received an injection of an inert substance. The cues available for aiding in the interpretation of the subjects' feelings were manipulated by the actions of a confederate. The confederate was a trained actor instructed to behave in either an angry or euphoric manner. Subjects' level of anger or euphoria was then measured using self report and behavioral measures. In the conditions where subjects were not furnished an explanation for their bodily state (misinformed and ignorant groups) they gave behavioral and self report indications that they had been influenced by the confederates. In conditions in which subjects were injected with epinephrine and told precisely what they would feel and why, they were less influenced by the confederates.
One result of the experiment was somewhat problematic. The epinephrine ignorant and the placebo group did not significantly differ from each other in measures of euphoria and anger. This was a problem because the epinephrine ignorant subjects having been physically aroused from the epinephrine should have reported experiencing more emotion than the group that was injected with mere salt water. Schachter and Singer suggest that subjects in the placebo group may have become self-informed. All subjects knew they had been given an injection. Having received the injection subjects may have induced self-arousal of the sympathetic system.

In order to control for self-informing, Schachter and Wheeler (1962) designed a study which employed the drug chlorpromazine. Chlorpromazine acts as a blocking agent inhibiting activation of the sympathetic nervous system. Because of its blocking characteristic, injection of chlorpromazine would inhibit subjects from self-inducing autonomic arousal. Subjects were injected with epinephrine, chlorpromazine, or saline solution then shown a comedy film. A behavioral measure and self report revealed that epinephrine subjects found the film to be most humorous. The least humorous rating was given by the chlorpromazine group while the humorous rating of the placebo group fell between the other two.

Obesity studies. Based on Schachter's theory it would appear that learning may play an important role in the experiencing of
emotions. It is possible that the theory has implications for other feeling states besides emotions. Schachter developed an interest in how people experience hunger. Extrapolating his theorizing to the area of obesity, Schachter was influenced by a theory developed by Bruch (1961). Bruch hypothesized that the obese could not discriminate between physiological symptoms of food deprivation (hunger) and other conditions of arousal. Support for this hypothesis came from a study by Stunkard and Koch (1964). Stunkard and Koch demonstrated that for obese subjects there is little correspondence between gastric mobility and hunger. Obese are just as likely to report hunger when their stomach is contracting as when it is not contracting. Normal weight people are more likely to report hunger when their stomach is contracting than when it is not contracting.

Based on these findings, Schachter, Gordon, and Goldman (1968) designed a study which varied the stomach condition (empty or full) and fear level (high or low) of obese and normal weight college students. Subjects ate and rated crackers believing the experiment was constructed to test the effect of tactile stimulation on taste. Results of the experiment demonstrated that normal weight subjects with a full stomach ate less than overweight subjects with a full stomach, especially in the high fear condition. Normal subjects ate more crackers in the empty stomach low fear condition than the obese in this condition. Normal weights in the high fear condition ate
significantly less than normal weights in the low fear condition. However, there was no significant difference between the amount the obese subjects ate in the high as compared to the low fear condition. The authors speculate that since the obese did not decrease their eating when they had a full stomach or when highly fearful the internal state did not appear to influence their eating behavior. Since internal cues did not appear to influence eating behavior of obese individuals it was suggested that perhaps external food related cues were the stimuli that triggered their eating behavior.

This speculation prompted a study manipulating the perceived passage of time. Schachter and Gross (1968) used time perception as the external cue to be manipulated. Obese and normal subjects were asked to participate in a physiological experiment which was scheduled to begin at 5:00 p.m. Subjects were given the opportunity to eat crackers while the experimenter was out of the room. For half of the subjects the clock on the wall of the experimental room was doctored so that the time read 5:25 when the crackers were available. For the other half of the subjects the clock read 6:10 when the crackers were available. The actual time for both groups was 5:40. In other words all subjects spent an equal amount of time in the experimental setting. It was hypothesized that obese subjects who believed the time to be 6:10 would eat more than obese subjects who believed the time to be 5:25. The external cue of time (6:10) would indicate to them that it was
their regular eating time and they should therefore be hungry. Normals
were also expected to be influenced by the clock but not to the same
extent as the obese. The results supported the first hypothesis with
obese in the fast time condition eating more than the obese in the
slow time condition but the opposite was true for normal weights.
Normal weights ate less in the fast time condition than in the slow
time condition. This finding was explained by the possibility that
normal weights did not wish to spoil their dinner. Schachter and
Gross had collected data concerning what time each subject usually
ate dinner. Using this information the hypothesis that normal weights
did not wish to spoil their appetite for dinner could be investigated.
No support was provided for this explanation. The results of
Schachter and Gross' study provided no evidence to support the past
findings that normal weights were attuned to internal hunger cues
(Stunkard & Koch, 1964). Since there was no evidence to support the
effects of internal cues on eating behavior of normal weights,
Schachter and Gross' interpretation was limited to the effects of
external cues on obese.

Other studies have also investigated the effects of external cues
on eating behavior. Nisbett (1968b) found obese to be more influenced
by taste of food than normal weights, with obese eating more good
tasting ice cream than normal or underweights. Another study by
Nisbett (1968a, cited in Schachter, 1971a) manipulated food presence.
When presented with only one sandwich and told that other sandwiches were available in a refrigerator nearby, obese ate the same amount as normals and underweights. However, when three sandwiches were present, with others available nearby obese ate more than normals. Ross (1974, cited in Leon & Roth, 1977) demonstrated that salience of the external cues affected obese eating behavior. Obese ate more in a brightly lit room than in a dimly lit room. For normals illumination had no effect. Another example of food cue prominence has been provided in a study by Schachter and Friedman (cited in Schachter, 1971b). Obese and normals were presented with either shelled or unshelled cashews. Obese ate significantly more of the shelled than the unshelled nuts. Johnson (1971) found that overweight individuals worked harder on an instrumental task to obtain food that was visible than when food was not directly visible. Visibility of food had no effect on responding of normal weights. A number of field studies have also lent support to Schachter's externality hypotheses (Goldman, Jaffa, & Schachter, 1968; Nisbett & Kanous, 1969).

Not all researchers, however, have found evidence to support the externality hypothesis (Milich, 1975; Nisbett & Storms, 1974; Palmer, 1973, cited in Leon & Roth, 1977; Reznick & Balch, 1977; Ross, 1974, cited in Leon & Roth, 1977; Rodin, 1981). Nor do all theorists agree with all aspects of the theory (Singh, 1973). For example, Singh (1973) thought that Schachter's theory was unable to
account for termination of eating behavior. Singh hypothesized that obesity could be attributed to the fact that some individuals have difficulty inhibiting responses once they have begun. Through a series of studies Singh demonstrated that obese were much more affected by existing response tendencies when compared to normal weights (Singh, 1973; Singh & Sikes, 1974). He concluded that the obese could be better understood as individuals with deficits in response tendencies than individuals under external control.

Further research with Singh's hypothesis has not been supportive (McArthur & Burstein, 1975; Reznick & Balch, 1977; Topping, Surratt & Barrios, 1977). A critical study which pitted Schachter's externality theory and Singh's response tendency theory against each other failed to confirm either theory (Milich & Fisher, 1979).

Other externality studies. The externality hypothesis has not been limited to eating behaviors. Studies have shown that obese are more sensitive to salience of cues (Pliner, 1973a) distraction, (Rodin, 1973) and persuasion (Glass, Lavin, Henchy, Gordon, Mayhew, & Donohoes, 1969). External cues seem to affect the thinking behavior, (Pliner, 1973b) emotionality, (Pliner, 1974; Rodin, Elman & Schachter, 1974) and learning behavior (Singh, Swanson, Letz & Sanders, 1973) of obese individuals. Many of these studies have been criticized as merely measuring compliance as opposed to externality. Heretick (1979) hypothesized that obese were not externally controlled
but were controlled by the wishes of the experimenter. By manipulating
the instructions given by the experimenter, Heretick revealed that
obese were more inclined to be influenced by experimental demand
than were normal weight individuals.

Rodin and Slochower (1974) dealt with the problem of experimen­
tal demand by demonstrating that obese show evidence of being
stimulus bound even on incidental learning tasks which are designed
to minimize the effects of conscious compliance. Rodin and Slow­
chower employed confederates of different weights and disposition in
an incidental learning and compliance experiment. Obese were not
significantly more compliant overall but instead were responsive to
the weight and behavior of the confederate. The obese complied more
with normal weight, "nice" personality confederates. Weight and
personality had no effect on the compliance of normal weight subjects.
Normal weight individuals did better than obese on the incidental
learning task under high distraction.

Another experiment investigated the effect of weight of con­
federate on compliance (Elman, Schroeder & Schwartz, 1977).
Obese individuals modeled a normal weight model's compliance
significantly more than a similar (obese) model's compliance while a
normal weight complied more with an obese model. There was no
difference in the overall compliance between normal weight and obese
but weight of confederate did affect the amount of compliance of both
normals and obese.

The effects of normal weight models on obese is somewhat contrary to what one would expect from the modeling literature which stresses the similarity of the model as a variable that increases the probability of modeling (Maccoby & Wilson, 1957). Freedman and Doob (1968) suggest that perhaps in our society obesity is considered a deviance. Obese (deviants) are concerned about the acceptability of their behavior in the presence of a nondeviant, especially when the deviant behavior is socially undesirable. The probability of a deviant modeling another deviant is lower than a deviant modeling a nondeviant. Since obese subjects may be considered deviant they are more likely to comply with (or model) the behavior of a normal weight model (nondeviant). As mentioned previously normal weight individuals modeled the behavior of the obese individuals. These findings are also explained using the rationale presented by Freedman and Doob (1968). Freedman and Doob suggest that nondeviants (in this case normal weight individuals) may be concerned about offending a deviant (obese individual) and therefore model the behavior of the deviant. These explanations are post hoc and seem to accommodate the data, yet appear to not add much more than a restatement of the findings in different terminology. Certainly research is necessary to clarify the complex effects and add confidence in the suggested underlying cognitive rationale.
Restrained and Unrestrained Eating

Nisbett's set point theory. Nisbett (1972) presented a different twist on the externality theory with his set-point hypothesis. As mentioned previously obesity is influenced by cellular determinants. Adipose cell number and size play an important role in determining whether an individual will be obese. According to Nisbett the number of adipose cells remains relatively stable throughout adult life. The size of the cells, however, can vary depending on the eating patterns of the individual. When an adipose cell is at its optimal size it is said to be at its set-point. According to Nisbett individuals vary in their adipose tissue set-points. These set-points may be established by heredity or by nutritional childhood conditions. Because set-points vary across individuals Nisbett suggests that for some people obesity is a "normal" or "ideal" body composition. Some individuals who we have labeled obese may be actually maintaining an optimal body fat level for their particular set-point. Obesity may be a natural state for the individual whereas weight reduction would place him/her below some physiologically dictated normal state. Such a person would be hungry all the time. Nisbett discusses the similarities between the behavior of dieting human and hungry nonhuman organisms. Deprived organisms, just as dieting humans, are externally oriented towards food cues. Since deprived organisms are always hungry and always looking for food, external cues have great importance.
Acting on Nisbett's hypothesis Herman and Mack (1975) attempted to categorize individuals on the basis of their relative deprivation. They developed a scale to distinguish between restrained and unrestrained individuals. The scale appears to be reliable and free from social desirability (Kickham & Gayton, 1977). Restained eaters are described as individuals who are concerned with weight gain and attempt to control eating. These individuals are relatively deprived and consequently below set-point. Unrestrained individuals, those who are not as concerned about weight gain, are presumably at set-point and not relatively deprived. Herman and Mack thought that if degree of restraint, independent of a person's weight, could be shown to be a predictor of behaviors which have been associated with obesity, the notion of externality may be found to be a consequence of dieting or restraint. The restrained-unrestrained distinction might also account for the conflicting results reported in the externality literature. Though most obese people are restrained there are some obese people who are unrestrained. There are also some normal weight people who are restrained eaters (Hibsher & Herman, 1977). Past research no doubt included unrestrained subjects in their obese population and restrained subjects in their normal weight population. Since unrestrained people behave similarly to normal weight people they may have confounded the results of past research. Similarly restrained normal weights may have further complicated the results.
According to Herman and Mack (1975) Nisbett's set-point position is able to interpret externality and restraint synonymously. Establishing a parallel between externality and restraint should not necessarily undermine Schachter's finding that externality is the characteristic of obese individuals that accounts for their eating behavior. Restrained normal weights should resemble obese with respect to externality and differ only in the extent to which food consumption has been effectively inhibited. If level of restraint could predict externality independent of weight it would suggest externality as being a function of being below set-point.

Disinhibitors of restraint. Research has demonstrated restrained eaters produce data similar to obese individuals in response to anxiety and preloading (Herman & Polivy, 1975; Hibsher Herman, 1977; Spencer & Fremouw, 1979) distraction, (Herman, Polivy, Pliner, Threlkeld & Munic, 1978) and emotionality (Polivy, Herman & Warsh, 1978). Preloading seems to have an especially interesting effect on eating behavior of the restrained eater. If a dieting individual perceives a preload, a predetermined amount of food/liquid consumed by the individual, to be of high caloric content he/she may become disinhibited and display counter-regulatory eating behaviors (Polivy, 1976; Spencer & Fremouw, 1979). The preload acts as a suppression releaser and leads to binge eating by the restrained individual.
Herman and Polivy (1976) were interested in finding out what other variables might act as disinhibitors. An obvious variable to study was alcohol. Restrained and unrestrained subjects were told that the experimenters were interested in finding the effects of different drugs on taste. All subjects were told they had been given Vitamin C when in fact half the subjects had been given an alcohol tonic mixture and the other half just tonic. Contrary to expectation alcohol was found to inhibit the consumption of ice cream by the restrained subjects. Polivy and Herman explain this contradiction in terms of a finding by Ritchie (1965, cited in Polivy & Herman, 1976). According to Ritchie, alcohol has an important cognitive component. In order for an individual to become disinhibited through alcohol consumption the individual must know he/she has consumed the alcohol. A follow up study by Polivy and Herman (1976b) replicated the original alcohol study varying information provided to the subjects. It was found that when restrained eaters knew they were drinking alcohol they consumed more ice cream. Knowledge of consumption seemed to increase the anxiety of the unrestrained and decrease their ice cream consumption. As has been demonstrated before, anxiety decreased consumption for normal weights. A similar process appeared to be affecting the behavior of unrestrained eaters.

Variables that maintain restraint. Recent research is concerned with what variables maintain restraint. A study by Herman, Polivy,
and Silver (1979) investigated the effects of an observer on the eating behavior of the restrained and unrestrained eaters. It was hypothesized that the presence of an observer would increase self consciousness of the subjects and promote greater restraint in individuals for whom restraint is a salient behavioral objective. Nondieters were not expected to be affected by the presence of the observer. As expected unrestrained eaters were unaffected by the presence of the observer but strongly affected by preload size, with a large preload leading unrestrained eaters to eat less, ad lib, than a small preload in both the observed and unobserved conditions. The ad lib eating of restrained subjects was affected by both the observer and preload size. In the presence of an observer the restrained eaters' consumption closely paralleled the unrestrained subjects with the small preload leading restrained eaters to eat more ad lib than a large preload. When the restrained eaters were not observed, preload size had the typical effect on ad lib eating of restrained eaters with high preload leading to high consumption and small preload resulting in low ad lib consumption.

Effects of model on eating behavior. A follow up study examined the effects of modeling on restrained and unrestrained eating behavior. Previous research had shown that modeling affects obese and normal weight subjects equally (Nisbett & Storms, 1974) with both imitating the eating behavior of the normal weight model.

In a field study Krantz (1979) demonstrated that obese ate more
when eating alone than when in a group of friends. Normal weights, however, were not affected by the presence of group members and ate the same amount in the presence of friends and alone. Attempting to account for these differences Krantz suggests that self consciousness about weight manifests itself in a tendency for obese to suppress eating among a group of their friends. However, a study by Wing and Jeffery (1978) found the relationship of the model to the observer had no effect on the modeling behavior of obese or normal weight individuals. Obese and normal weights modeled friends or strangers equally.

The study that further stimulated interest in the proposed research manipulated the similarity of the model by varying their dieting status (Polivy, Herman, Younger & Erskine, 1979). Following a large preload restrained subjects were placed in an eating situation with a confederate who either stated she was a dieter or not a dieter. In the diet condition the confederate stated either "That's enough sandwiches for me. I'm sticking to my diet." or "These sandwiches are terrific. To heck with my diet." These statements were made after consuming two sandwich quarters. After the first statement the confederate ate no more sandwich quarters. After the statement, "To heck with my diet." six additional quarters were consumed. In the nondieting condition the confederate stated "That's enough for me. I'm full." or "These sandwiches are terrific. I could eat a ton of them." Again both statements were made after the consumption of
two sandwiches. No more sandwiches were consumed after the first statement. After the statement ending with "I could eat a ton of them." six more sandwiches were consumed. The results of this experiment were somewhat confusing and contrary to previous findings. Restrained subjects consumed less than unrestrained in all comparable conditions. As in Nisbett and Storms (1974) amount of sandwiches consumed varied with amount eaten by the confederate. Subjects in the two sandwich condition ate less than those in the eight sandwich condition for both restrained and unrestrained eaters. A main effect was found for dieting status with subjects paired with a dieter model consuming less than subjects paired with a nondieter.

**Standard setting.** Polivy et al. (1979) discuss possible reasons why a dieting model suppressed eating for restrained and unrestrained eaters. According to Polivy et al. the model, by mentioning a diet may have alerted restrained subjects to their personal standard of dieting. The mention of dieting may also have set a norm of minimal consumption for both restrained and unrestrained subjects. Standards in the form of goal setting have been shown to affect eating behavior of obese individuals in weight loss programs (Bellack, 1974; Chapman & Jeffrey, 1978; Collins, 1978). The effect of standards on behavior has also been demonstrated in the literature on self-awareness. Self-awareness refers to a state where individuals focus their attention inward on themselves. Researchers have demonstrated an increased
adherence to a salient standard by inducing a state of self-awareness (Beaman, Klentz, Diener & Svanum, 1979; Carver, 1974, 1975; Schier, Feningstein & Buss, 1974). There is reason to believe that obese are in a relatively constant state of self-awareness. Recent literature suggests that obese (restrained) are highly self-conscious (Krantz, 1978; Polivy et al., 1979; Younger & Pliner, 1976). General characteristic levels of self-consciousness have been measured by a self-awareness scale developed by Feningstein, Schier and Buss (1975). This scale measures an individual's tendency towards self-awareness by measuring his levels of "private" self-consciousness (it also has a subscale for what is called "public" self-consciousness). Individuals high in private self-consciousness are found to behave similarly to individuals who have been placed in a state of self-awareness through experimental manipulation (i.e. mirrors or cameras, Carver & Scheier, 1978).

As mentioned previously high self-awareness leads to increased adherence to standards. Based on the definition of restraint, it would seem that a salient standard for restrained eaters would be dieting. If a restrained eater is reminded of his/her standard the saliency of the standard is increased and behavior is more likely to be in line with the salient standard.

Many studies (Nisbett & Storms, 1974; Krantz, 1979; Wing & Jeffrey, 1978) have investigated the effects of model presence on
consummatory behavior. Modeling, however, appears to be related to a number of variables. Model's similarity to the subject and the model's appearance are thought to affect modeling behavior. Previously set standards that conflict with the standard set by the model may also affect modeling behavior. Such conflicting standards have begun to be discussed in the self-awareness literature (Beaman et al., 1979).

It is important to investigate the effects of these conflicting standards on subjects' eating behavior.
CHAPTER 2
EXPERIMENT 1

The first study of the present research program examined the effects of standard setting on the eating behavior of restrained and unrestrained eaters. For one half of the subjects the experimenter set a standard as to how many crackers were normally eaten in the prescribed situation. For the remaining subjects no standard was set.

It was expected that subjects in the Standard conditions would eat less than subjects in the No Standard conditions. Level of Restraint was predicted to be positively correlated with private self-consciousness as measured on the Self Consciousness Scale. If the restrained eater was more self-conscious, as was suggested by Krantz (1978) and others, the standard was expected to have a greater effect on their eating behavior than on the eating behavior of the unrestrained subjects.

Method

Subjects. The subjects were 65 female students enrolled at the University of Montana. Participation in experiments partially fulfilled the requirements of introductory psychology courses.

Procedure. During a regular class period the first week of the quarter 197 female students were given the Restraint questionnaire (Herman & Mack, 1978) and Self-Consciousness Scale (Feningstein, Schier & Buss, 1975). A median split was computed on the Restraint

30
Scores (Med = 16). Individuals scoring above the median were identified as restrained eaters while those below the median were labeled unrestrained eaters. Thirty-four Restrained and 31 Unrestrained female students were contacted and asked to participate in a taste experiment. Subjects were told that the study involved taste perception and it would be necessary for all subjects to be comparably hungry when participating in the experiment. Thus, subjects were asked to refrain from eating anything for three hours prior to the experimental session. Subjects were scheduled to arrive on the half hour beginning at 12:00 noon until 6:00 p.m. Five experimenters were employed in the study, three females and two males.

Half of the subjects were greeted by a female experimenter and half were greeted by a male experimenter. All subjects were told that they were involved in a taste perception experiment. The experimenter stated that previous research had indicated that recent consumption and physiological states affected taste ratings. Each subject was asked to fill out a questionnaire indicating how hungry they were, what they had eaten in the past three hours and when they had last eaten. (See Appendix A.) The experimenter then explained that in order for all subjects to begin the taste perception experiment equally their physiological states should be similar. Subjects were given 6 oz. of liquid Nutrament in an opaque cup and instructed to drink the liquid. Subjects were told that the liquid was very nutritious and contained
about 600 calories, the size of a typical lunch. The purpose of the preload, as in Polivy et al. (1979) was to make any further consumption exceed the amount a restrained subject, with restraint intact, would normally eat.

The experimenter then placed two bowls of crackers (30 Wheat Thins in one bowl, 40 Cheese Nips in the other bowl) and a cup of water on a table in front of the subject and explained the procedure for the taste test. Subjects were asked to rate the two different kinds of crackers on a number of dimensions. Subjects were told to taste as many crackers as they wished from each bowl while rating that type of cracker.

In the Standard condition the experimenter stated that most people required about one of each type of cracker in order to make accurate ratings. Pilot data revealed that when no information was provided as to how many crackers were necessary for people to make their judgments subjects ate an average of 5.8 crackers. Based on this finding it was determined that a standard of two crackers (one of each kind) would be an appropriate number to provide a standard of low consumption. In the No Standard conditions no mention was made of how many crackers were normally eaten. Following the standard manipulation the experimenter left the room for five minutes stating that he/she needed to do some other work. (Specific instructions are in Appendix B.)
After five minutes the experimenter returned to the experimental room and administered the Self-Consciousness Scale, Restraint Questionnaire and a questionnaire for measuring manipulation effectiveness, suspicion, and general demographic information. The subjects were weighed, their height measured and debriefed. (Examples of questionnaires and debriefing are presented in Appendix C.)

Results

Manipulation checks. Checks on the experimental manipulation were made through analyses of responses to the post experimental questionnaire. The standard manipulation had been selected to indicate that only a very low number of crackers (two) was required to make accurate ratings. Thus if the manipulation was effective subjects in the Standard condition should report a lower number on the past experimental question asking how many crackers "most people needed to make taste ratings" than subjects in the No Standard condition. Indeed the mean of the Standard condition was lower than the mean of the No Standard condition, 3.03 vs 5.80, \( t(48) = 3.15, p < .005 \). Further manipulation checks indicated subjects in all conditions were highly accurate in reporting the number of calories in each cup of liquid preload. Only three out of 65 subjects gave a value different than the 600 when answering "How many calories did each cup of liquid contain?" Thus the correct perception of the number of calories
was adequately communicated. In order for binge eating to occur it was also important that subjects consider the number of calories in each cup of liquid to be relatively large. Such was the case with 92% of the subjects indicating that the liquid was medium to highly caloric.

**Major analyses.** A three way ANOVA (analysis of variance) (2 X 2 X 2, presence/absence of standard by restraint level and sex of experimenter) was conducted on the number of crackers eaten by the female participants. The results of the analysis are shown in Table 1. The standard setting manipulation had the predicted significant effect on the number of crackers eaten $F(1, 57) = 5.55, p = .02$, with subjects exposed to the standard eating less ($M = 4.00$) than subjects in the No Standard condition ($M = 5.40$).

A second main effect demonstrated a significant difference $F(1, 57) = 6.56, p = .01$ with subjects in the presence of a male experimenter eating less ($M = 3.90$) than those in the presence of a female experimenter ($M = 5.45$). Although the sex of the experimenter by presence/absence of standard interaction was not significant $F(1, 57) = 1.79, p = .19$, examination of the means using a Neuman-Keuls test revealed the lower eating in the Standard condition was due primarily to the suppression of eating by the female subjects in the presence of a male experimenter ($p < .05$) as shown in Table 2.

As predicted level of restraint was positively correlated with private self-consciousness, $r(63) = .41, p < .001$ indicating restrained
persons are more self-aware in general than unrestrained persons. Restraint was also positively correlated with public self-consciousness \( r(63) = .46, p < .001 \). However a main effect on cracker eating for level of restraint was not obtained.

The sex of the experimenter by level of restraint interaction approached significance \( F(1, 57) = 3.48, p < .07 \). The Neuman-Keuls test showed the interaction to be due to the significantly lower (\( p < .05 \)) amount eaten by restrained persons in the presence of a male experimenter (\( M = 3.47 \)) compared to restrained eaters in the presence of a female experimenter (\( M = 6.18 \)). The means are displayed in Table 3.

Additional Analyses. A three way ANOVA conducted on the initial hunger scores of subjects revealed no significant differences in initial hunger scores. The results of the analysis are shown in Table 4. A second hunger score was collected following the liquid preload and taste perception task. An ANOVA conducted on these scores revealed greater reported hunger \( F(1, 57) = 8.23, p = .01 \), by subjects in the standard group (\( M = 3.21 \)) compared to subjects in the No Standard group (\( M = 2.12 \)). Subjects also reported they were significantly less hungry \( F(1, 57) = 4.61, p = .04 \) in the presence of a male experimenter (\( M = 2.25 \)) than in the presence of a female experimenter (\( M = 3.69 \)). These analyses are summarized in Table 5.

A significant sex of experimenter by level of restraint interaction also emerged \( F(1, 57) = 4.16, p = .05 \). A Neuman-Keuls
revealed that the interaction was due primarily to the differences in reported hunger level between restrained subjects in the presence of a male experimenter ($M = 1.71$) and restrained subjects with a female experimenter ($M = 3.29$) as displayed in Table 6.

The effects of an additional personality variable were investigated in a fourth ANOVA. Individuals who scored above the median on the private self-consciousness scale were classified high privates while those below the median were considered low privates. The $2 \times 2 \times 2 \times 2$ (sex of experimenter by restraint level by private self-consciousness level, by absence/presence of standard) analysis yielded no new significant findings.

The predicted results for the effect of standards should be strongest for subjects for which the standard was most salient. Thus subjects in the Standard condition who reported on the post experimental questionnaire that the experimenter had a standard in mind as to the "right" or the appropriate number of crackers one should eat should have been affected more strongly by the standard manipulation than subjects who were in the No Standard condition and who reported no perception of a standard. These two subgroups of subjects should represent the most extreme groups.

A $2 \times 2 \times 2 \times 2$ (sex of experimenter by restraint level by private self-consciousness level, by absence/presence of standard) analysis of variance was conducted on the number of crackers eaten. Using the
subset of subjects selected as noted above statistical results for the standard became even stronger $F(1, 25) = 7.44, p = .01$ while the results for experimenter sex weakened $F(1, 25) = 3.91, p = .059$. The restraint by sex of experimenter interaction was also more significant $F(1, 25) = 7.98, p = .01$ and a new sex by private self-consciousness interaction emerged $F(1, 25) = 7.12, p = .01$. Results are summarized in Table 7. A Neuman-Keuls computed on the means of the private self-consciousness by sex of experimenter interaction revealed the interaction to be due to the large number of crackers eaten by subjects low in private self-consciousness in the presence of a female experimenter. The means are presented in Table 8.

Scale score stability. The stability of the Restraint and Self-Consciousness Scales was examined by computing the test-retest correlation. All test-retest correlations were significant at the .001 level (restraint, $r(62) = .91$, private self-consciousness, $r(61) = .79$, public self-consciousness, $r(61) = .72$, social anxiety, $r(61) = .51$). The Restraint Scale and both subscales of the Self-Consciousness Scale appear to be highly stable. Though it is recognized that stability is not a sufficient determinant of test reliability it is thought to be a necessary component and provides some information as to the value of the measuring instrument (Nunnaly, 1978).

Discussion

Standard setting. As hypothesized subjects exposed to a social standard to eat low amounts did suppress their eating behavior. This
occurred for both restrained and unrestrained subjects (all were female). When provided with information as to how many crackers were needed by most people to make accurate judgments, subjects appeared to use the information as a reference point regulating their own eating. A number of post experimental questions were used to further investigate perceptions of the standard. Subjects in the Standard condition differed significantly from those in the No Standard condition in that they consistently indicated that fewer crackers were needed for most people to make their judgments (\( p < .05 \)). Subjects in the Standard condition also indicated they believed that the experimenter had wanted them to eat fewer crackers than subjects in the No Standard condition (\( p < .05 \)). Subjects in the Standard condition were also significantly more likely to state that the experimenter had a standard in mind as to how many crackers were appropriate than subjects in the No Standard condition (\( z = 1.93, p < .03 \)).

Apparently the standard suppressed eating to a lower level than what would seem to have been appropriate for the situation. Additional research with standard setting may lead to viable means of modifying eating patterns. Based on these findings researchers may also wish to investigate the possible presence of standard setting in previous research which may lead to reinterpretation of the findings, e.g. Polivy et al., 1979. The present data also support previous notions advanced by Bellack (1974), Chapman & Jeffrey (1978) and Collins (1978) concerning the importance of standard setting in weight control.
Sex of experimenter. A second main effect demonstrated that the sex of the experimenter influenced eating behavior. This finding may not be surprising when one considers all subjects were female introductory psychology students. Related results were reported by Conger, Conger, Costanzo, Wrightman and Matter (1980) who demonstrated the sex of a model to have a differential effect on the eating behavior of obese and normal weight subjects. Subjects in Conger's study ate less in the presence of an opposite sex model than in the presence of a same sex model. The authors attributed these differences to social origins. Females may think they are expected to eat less by males in order to maintain an image of femininity. Further research may provide further insight into this phenomenon.

It is important to note that the effects of this study are not merely due to the sex of the experimenter. If that were the case there would be no interactions or other main effects. Rather it appears that the standard effect is due primarily to the suppression of eating by females in the standard condition when in the presence of a male experimenter. The standard seems to have increased saliency when presented by a male experimenter. Again the tradition of American society and social norms may account for the increased salience brought about through the use of male experimenters. An interesting focus for further research may be the investigation of whether the increased salience of standards for male experimenters
are limited to eating behaviors or whether it extends to other areas (i.e., self-awareness, conformity).

The sex of experimenter by restraint interaction is also of interest. The restrained eaters were more affected by the sex of the experimenter than were the unrestrained eaters, with restrained subjects eating more in the presence of the female experimenter and suppressing intake in the presence of the male experimenter. This finding may be due to the relationship between restraint and self-consciousness. Restraint was significantly correlated with private and public self-consciousness as measured by the Self-Consciousness Scale. Because these measures of self-consciousness are related to how individuals see themselves as a social object (public self-consciousness) and their tendency to reflect about themselves (private self-consciousness) individuals high on these measures are more affected by societal norms (Diener & Srull, 1979; Carver & Humphries, cited in Carver, 1980). Thus, the social norms associated with the eating behavior of females may have increased saliency for individuals already high in self-consciousness. This may explain the differential effect of the sex of experimenter on restrained subjects.

The sex of experimenter effects are of special interest because many studies fail to publish the sex of the experimenter involved in the experimentation. The fact that outcomes may vary depending on the sex of the experimenter, as indicated in the present study, may have
implications for further research and require more cautious interpretations and applications of previously published studies.

**Hunger scores.** All subjects entered the experimental situation in a similar state of hunger as indicated by the initial ratings. Differences did emerge, however, for the second hunger score following the cracker tasting. Subjects who had been in the Standard condition reported they were hungrier than subjects who had been in the No Standard condition. This finding becomes interesting when the number of crackers eaten by subjects in each group is considered. Subjects in the Standard condition ate less than subjects in the No Standard condition thus, it is not surprising that subjects who ate less reported being less full. It should be mentioned that the difference in mean number of crackers eaten by the subjects in the no standard compared to the standard condition is relatively small (2.8). To consider this difference to have a meaningful effect on hunger level may be naive. Examination of the relationship between hunger level and other variables may offer a more reasonable interpretation.

Societal norms may again be employed to explain the differential reporting of hunger in the presence of the male and female experimenters. Subjects in the presence of a male experimenter reported they were less hungry than those in the presence of a female experimenter even though subjects ate more crackers in the presence of the female experimenter. This finding may appear to be problematic in
that subjects eating more crackers should report feeling less hungry following the reasoning developed above. It should be remembered however, that the male experimenter may have a more complex effect on the eating behavior of the female subject. Investigation of the relationship between the number of crackers eaten and the hunger scores for subjects in the presence of a male and female experimenter may provide an explanation (the means are displayed in Table 9). The standard effect appears to suppress eating which leads to the reporting of more hunger for subjects in the presence of the male and female experimenters when compared to the No Standard condition. At the same time subjects in the presence of a male experimenter ate less than those in the presence of a female experimenter but report they are less hungry in both the Standard and No Standard condition. Although not significant the interactions between sex of experimenter and standard for hunger scores ($p = .17$) and for the number of crackers eaten ($p = .18$) may be contributing something to the differential effects.

A similar relationship emerges from the sex of experimenter and level of restraint interaction with restrained subjects in the presence of a male experimenter eating less than restrained subjects in the presence of a female experimenter but reporting they are more full. The self-consciousness level and social norms explanation may again be used to interpret the results. Since restraint is
significantly correlated with self-consciousness, individuals who are restrained may be more in tune with societal norms and with their own feelings therefore more likely to be influenced by the presence of a male experimenter who may serve to strengthen the impact of social norms.

Additional analyses. Further analyses provided additional support for the previously discussed findings and defined an additional relationship. The effect of the standard manipulation was even stronger when subjects were selected who thought the experimenter had a standard in mind as to the "right" number of crackers one should eat. The increased saliency of the standard for these subjects is demonstrated in their eating behavior with subjects in the Standard condition eating an average of 3.35 crackers compared to an average of 4.0 crackers eaten by the subjects in the Standard condition which had included all subjects.

The additional relationship revealed by further analysis was the sex of experimenter by level of self-consciousness interaction. Level of private self-consciousness interacted with sex of experimenter to further emphasize the relationship between self-consciousness and sex of the experimenter. Individuals low in private self-consciousness seemed to feel free to eat a high number of crackers in the presence of a female experimenter. This finding also supports the interpretation based on social norms in that even individuals low in private
self-consciousness appeared to be affected by the presence of a male experimenter and suppressed their eating to a level equal to individuals high in private self consciousness.

Even though restraint was related to self-consciousness the expected restraint by standard interaction did not emerge. There was also no difference in the eating behavior of restrained compared to unrestrained eaters. It was predicted that restrained eaters would display binge eating in the No Standard condition, however this was not the case. In considering possible reasons why binge eating did not occur a reexamination of past research was made.

The design of the present study had been modeled after Polivy et al. (1979). In order to determine the amount of liquid preload necessary for binge eating to occur Polivy had calculated an average number of ounces (6) a restrained person might need to feel comfortably full based on her previous work with Herman (Herman et al., 1979). In the reexamination of the literature it was discovered that 6 ounces of liquid preload may not have been a sufficient amount to lead subjects to the perception that they had overeaten enough so that binge eating would occur. In studies where binge eating did occur experimenters used a cognitive manipulation allowing subjects to consume a food substance until they felt full thereby allowing subjects to label their physiological state as full (Nisbett, 1968; Schachter et al., 1968). Other studies asked subjects to consume a larger quantity of food possibly
making the fullness manipulation more plausible in the eyes of the subject (i.e. 16 oz., Spencer & Fremouw, 1979; 15 oz., Hibscher & Herman, 1977). Based on this information two additional studies were run to determine which procedure would be the best for creating binge eating. The findings of the studies led to a procedural change for Experiment 2 which combined cognitive aspects with a minimum amount of liquid consumed by each subject. Subjects were asked to drink at least 6 ounces of liquid Nutrament and as much more as they needed to feel comfortably full.
CHAPTER 3

EXPERIMENT 2

Experiment 1 demonstrated that standard setting affects the eating behavior of both restrained and unrestrained eaters. Since no binge eating occurred it was not possible to fully investigate the possible differential effects of standards on restrained vs unrestrained eaters in terms of binge eating. With the previously discussed procedural changes it was predicted binge eating would occur for restrained subjects in the No Standard condition of the present study. To further emphasize the high caloric nature of the liquid preload and increase the potential for binge eating subjects were informed that the number of calories in each cup of the liquid was 700, as opposed to the 600 used in the first study.

Although standard setting may be effective in suppressing eating behavior it must be remembered that the conditions which are set up in the laboratory are contrived. The experimenter attempts to control all variables except the one(s) of interest to determine the effects of the manipulated variable(s). In the natural environment, many forces are working on an individual in any one situation (McGuire, 1973). Designing experimental situations that include variables which are present in real life settings may also increase the external validity of the results obtained. Other stimuli present in the eating environment may be more salient than the standard set by a dieter or significant other. One such stimulus which has been shown to affect eating
behavior of individuals in the natural environment is the presence and behavior of others (Herman et al., 1979; Krantz, 1978; Nisbett & Storms, 1974; Polivy et al., 1979; Wing & Jeffrey, 1979).

Even though an individual may adopt an eating standard for him/herself, the behavior of the other people present during consumption may undermine the standard setting effects. This second study investigated the effects of conflicting stimuli on the eating behavior of restrained and unrestrained eaters. The procedure was identical to Experiment 1 with the addition of a confederate who ate 12 crackers in every condition.

If the preset standard set by the experimenter remained salient it was expected that subjects in the Standard condition would model the behavior of a confederate less than subjects in the No Standard condition. Using the procedure explained previously concerning the preloading it was predicted that the restrained eaters would binge eat in the No Standard condition. The restrained eaters were expected to be more affected by the standard manipulation than the unrestrained eaters.

Method

Subjects. The 66 female subjects employed in this study were selected from a new pool of 193 female students. Level of restraint was based on the median split used in Experiment 1. Two subjects were deleted from the study leaving 16 subjects per condition. Subjects who had participated in Experiment 1 were ineligible for Experiment 2.
Participation in the experiment partially fulfilled the requirements for the students' introductory psychology course at the University of Montana.

**Procedure.** The procedure for Experiment 2 was identical to Experiment 1 except for the changes mentioned above concerning the pre-loading and the addition of a confederate. Five experimenters were employed in the study, two female and three male. A female confederate was present and consumed six of both types of cracker in all experimental conditions. To avoid any suspicion a subject might have concerning the presence of the confederate the experimenter explained that in order to save time two subjects would be run simultaneously. For half of the subjects the confederate was in the experimental room when the subject arrived. For the others the confederate arrived shortly after the subject. In the latter case the experimenter explained that they were waiting for another subject and went to the hall to look for her. The experimenter then signaled the confederate, who was waiting in the hall, to come to the experimental room. The confederate was a college age female of normal height and weight. The confederate and subject were seated in adjacent rooms for the first portion of the study (see diagram Appendix D). Although the door between the rooms was open the subject and the confederate were seated with their backs to the door to avoid eye contact. After the experimenter explained the procedure the confederate and subject filled out the preconsumption
questionnaire as in Experiment 1 and drank the liquid preload. The confederate was given 6 oz. of water in an opaque cup while the subject drank 6 oz. of Nutrament. Pitchers of liquid had been placed on the tables where the confederate and subject were seated. Subjects were required to drink the 6 oz. of Nutrament in the cup in front of them and as much more as they needed to feel comfortably full. After the pre-loading the subject and the confederate were seated together at a table where two bowls of crackers were placed for each of them (Wheat Thins and Cheese Nips) and a cup of water for each. In the Standard conditions the experimenter stated that most people required one of each type of cracker in order to make accurate judgments. In the No Standard conditions no mention was made of how many crackers were normally eaten. The experimenter instructed the subject and confederate to refrain from talking to each other so as not to disturb their eating. The experimenter then left the room for five minutes. During the taste period the confederate consumed six of each type of cracker. After five minutes the experimenter returned and administered the SCS, Restraint Scale and general information scales as in Experiment 1.

Results

Manipulation checks. Checks on the manipulation were made through analyses of responses to the post experimental questionnaire. Individuals in the Standard condition stated that most people ate.
significantly fewer crackers to make their judgments ($M = 3.03$) compared to individuals in the No Standard condition ($M = 7.74$) $t_{(1, 52)} = 5.15$, $p < .001$. Subjects in all conditions were highly accurate when reporting the number of calories in each cup of liquid preload. Only six out of 64 subjects were incorrect when answering the post experimental question "How many calories did each cup of liquid contain?" The six incorrect subjects were distributed approximately equally across conditions. Ninety-eight percent of the subjects indicated that the liquid was medium to highly caloric. In order for the model to have an effect on the subjects' eating behavior subjects had to be aware of the model and the model's eating behavior. As noted earlier the actual number eaten by the model was 12. All subjects noticed that the confederate had eaten more than two crackers. The estimates of the number of crackers eaten by the model did not differ for restrained ($M = 8.9$) or unrestrained ($M = 7.8$) eaters.

**Major analyses.** A 2 X 2 X 2 ANOVA (presence/absence of standard by restraint level by sex of experimenter) was conducted on the number of crackers eaten by the female participants. The results of the analysis are shown in Table 10. The main effects for the standards and restraint level were marginally significant. As predicted the number of crackers eaten by subjects in the Standard condition ($M = 6.41$) differed from the number of crackers eaten by subjects in the No Standard condition ($M = 8.63$) $F_{(1, 56)} = 3.176$, $p = .08$. The number of crackers
eaten by restrained subjects ($M = 8.69$) was greater than the number eaten by the unrestrained ($M = 6.34$) subjects $F(1, 56) = 3.54, p = .065$, indicating the hypothesized binge eating. No interactions approached significance.

**Additional analyses.** An ANOVA conducted on initial hunger scores revealed a significant difference between reported hunger levels for restrained ($M = 3.06$) and unrestrained ($M = 4.75$) eaters $F(1, 56) = 7.99, p = .01$ as indicated in Table 11. No significant differences emerged from the analysis of variance conducted on the second hunger score. Results are summarized in Table 12.

As was found in Experiment 1 restraint was significantly correlated with private self-consciousness $r(62) = .21, p = .05$. However the relationship between restraint and public self-consciousness was only marginally significant $r(62) = .18, p = .06$. Both of these correlations are noticeably smaller than those found in Experiment 1.

The effects of an additional personality variable were investigated in a fourth analysis of variance. As in Experiment 1, no new significant effects were revealed with the inclusion of private self-consciousness. Data were reanalyzed taking into account subjects' response to the post experimental question asking whether the experimenter had a standard in mind as to the "right" or appropriate number of crackers that one should eat in order to make their judgments. Unlike
Experiment 1 the internal analysis did not reveal any significant effects. Results of this final analysis are reported in Table 13.

Scale score stability. The stability of the Restraint and Self-Consciousness scales was examined by computing the test-retest correlation. All test-retest correlations were significant at the .001 level (restraint, $r(61) = .91$, private self-consciousness, $r(61) = .80$, public self-consciousness, $r(61) = .83$, social anxiety, $r(61) = .82$).

Discussion

Standard setting. As hypothesized, subjects exposed to social standard to eat low amounts ate less than subjects who were not provided with a social standard even in the presence of a model who did not conform to the social standard. Standard setting affected restrained and unrestrained eaters equally. When provided with information as to how many crackers were needed by most people to make accurate judgments subjects appeared to use the information and suppress their intake in the direction of the social standard. Post experimental questions were analyzed to further investigate perceptions of the standard. Subjects in the Standard condition differed significantly from those in the No Standard condition in that they consistently indicated that fewer crackers were needed for most people to make their judgments ($p < .001$). Subjects in the Standard condition also indicated they believed that the experimenter had wanted them to eat fewer crackers ($p < .005$). Subjects in the Standard condition were
also significantly more likely to state the experimenter had a standard in mind as to how many crackers were appropriate than subjects in the No Standard condition ($z = 2.83, p < .01$).

**Restraint Level.** A second main effect demonstrated that level of restraint influenced eating behavior with restrained eaters eating more than unrestrained eaters. This increased eating should be due to the binge eating that restrained are noted for after a preload that gives the perception of consuming more calories than they should. It may seem that this finding could be interpreted another way. Restrained eaters may have been more affected by the model's behavior than the unrestrained eaters. Thus, restrained ate more in the presence of an overeating model. This interpretation, however, would not be consistent with previous literature by Polivy et al. (1979) who found restrained and unrestrained to be affected equally by an eating model or Nisbett and Storms (1974) who report similar results for obese and normal weights.

Furthermore, if the increase in eating in the present study had been due entirely to the effects of the model the results of Experiment 2 should have paralleled the results of Experiment 1 with restrained and unrestrained eaters eating equal amounts of food in the No Standard condition. The means may have been inflated due to the model's behavior, but the relative pattern should have been the same. The results of Experiment 2 however revealed a new pattern of
means as indicated in Table 14. The restrained eaters ate more than
the unrestrained eaters in both the Standard and the No Standard con­
ditions. Since the restrained and unrestrained are equally affected by
the model, according to past research, the observed difference in the
pattern of means most likely occurred because of the binge eating by
restrained subjects. Because of a lack of binge eating in Experiment 1
a change was made in Experiment 2. It appears that the procedural
change was successful in obtaining the desired effect.

Although there were no significant interactions further observa­
tion of the cell means revealed an interesting pattern. It appears that
the standard was effective in bringing the eating of restrained eaters
down to the level consumed normally by unrestrained eaters, without
a standard, in the presence of an overeating model. This finding is
important in that it lends support to the hypothesis that standard setting
may be a viable method of controlling binge eating, even in the presence
of overeating models. Restrained eaters who have a tendency to binge
eat after breaking restraint may be able to control binge eating
through more explicit application of standards. Further studies may
wish to encourage individuals to eat their own personal standards,
perhaps based on knowledge about others, and observe if the effect of
the standard is maintained.

Sex of experimenter. It is interesting to note that none of the
sex of experimenter effects found in Experiment 1 were apparent in
Experiment 2. It is possible that the presence of the confederate may have detracted from the expectations and norms possibly brought to mind by the male experimenter discussed in Experiment 1. The female confederate may have acted as a disinhibitor, decreasing the effect of additional social norms associated with the male experimenter. Subjects may also have thought that the experimenter would not be able to determine which subject had eaten from which bowl and therefore were not as concerned about maintaining an image. Additional research may investigate this finding systematically.

Hunger. At first glance the difference in reported initial hunger score of restrained and unrestrained eaters could be problematic. It would be expected that individuals who were more hungry might eat more crackers thereby confounding the experiment. However, even though restrained eaters reported less initial hunger they consumed more crackers than the unrestrained eaters in all conditions. Since the results of the experiment were opposite to what would be predicted based on the initial hunger scores the problem of differences in initial hunger level is dismissed.

The post experimental hunger scores in Experiment 2 did not differ across conditions. This finding may appear to be inconsistent with the results of Experiment 1 where subjects in the Standard condition had reported more hunger than subjects in the No Standard condition. The results of Experiment 1 were explained by the fact
that subjects in the Standard condition had eaten less than those in the No Standard condition thus should be more hungry. In Experiment 2 the subjects in the Standard condition also ate fewer crackers than subjects in the No Standard condition but subjects in both of these conditions ate more than subjects in the comparable conditions of Experiment 1. The increased eating by all subjects in Experiment 2 compared to subjects in Experiment 1 may account for the low post experimental hunger scores.

The post experimental hunger scores may also have been affected by the procedural changes discussed earlier. Subjects in Experiment 2 were asked to drink 6 ounces of liquid and as much more as they needed to fill themselves up. If they followed the instructions given by the experimenter, all subjects should have been equally full.

Conclusions

Before discussing the implications of the present studies and directions for future research one issue should be addressed. As in most psychology studies the potential for demand characteristics was present. It is possible that some subjects would decrease the amount they ate if they perceived that such an outcome was desired by the experimenter. It would appear in the present research that subjects were informed that a low number of crackers was adequate to make the taste ratings, but it was also clear that large numbers of crackers were available and hence some people might well sample a greater
number. It is difficult to distinguish between standard setting and demand characteristics. The standard setting in the present studies was based on the statement of a social norm. In some respects a social norm can be considered a demand to act in an appropriate manner. In the present studies the experimenter did inform the subjects in the Standard condition as to what was the typical response in that particular situation. These instructions could be interpreted as demanding a particular response from the subject, however it should be remembered that the experimenter also informed the subjects they were free to eat as many crackers as they needed to make their judgments as there were plenty of crackers available. It is also interesting to note that the subjects suppressed eating in the Standard conditions but the mean number of crackers eaten in all standard conditions was always higher than the actual standard set by the experimenter. If demand characteristics were accounted for the effects one might expect eating of subjects in the Standard condition to more closely approximate the number stated by the experimenter. The post experimental suspicion check may also provide insight into the question of experimental demand (Diener, Dineen, Endresen, Beaman & Fraser, 1975). Only 8 of 135 total subjects expressed suspicion when questioned about the experimental manipulation. Although experimenter demand can not be entirely ruled out it does not appear to account for the pattern of results obtained and is not considered to be a cause for undue concern in the present studies.
One purpose of the present research program was to investigate possible factors that would reduce binge eating of restrained eaters. Although restrained eaters are more concerned about dieting than unrestrained eaters and regularly monitor their food intake; once they have broken their diet they have a tendency to binge eat. It is the binge eating that appears to be problematic for the restrained eaters and causes these individuals who are concerned about their weight to consume large quantities of food. A number of studies have been conducted investigating what variables cause binge eating to occur (Herman & Polivy, 1976; Polivy, 1976; Polivy & Herman, 1976; Spencer & Fremouw, 1979). More recently researchers have been concerned with inhibiting the binge eating response. One study demonstrated the control of binge eating through the use of an observer (Herman et al. 1979). A follow-up study attempting to investigate the effects of a dieting and non dieting model on restrained and unrestrained eaters (Polivy et al. 1979) suggested a possible variable, standard setting, which may also serve to inhibit binge eating.

The findings of the present studies demonstrated that standard setting did suppress eating of both restrained and unrestrained eaters following a liquid preload. The standard effect appeared to be relatively robust. Even in the presence of a model who did not adhere to the preset standard subjects suppressed their eating in the standard conditions.
The results of the present study have several implications for past and future research. Foremost among these is the methodology for inducing binge eating. In the present studies it was revealed that both a preload and a cognitive manipulation are necessary to produce binge eating. The preload alone, even in large quantities, was not enough to produce binge eating. In conjunction with the large preload, a cognitive manipulation which convinces the subject that he/she is full is necessary. The methodology for binge eating as developed by the present study should prove useful for researchers in future studies involving eating behavior.

Another important methodological issue which emerged from the present studies revolves around the sex of the experimenter. It was shown that the sex of the experimenter interacted with the other experimental variables. For this reason, future research should isolate the sex of the experimenter in order to assess the full impact of this variable. Moreover, past research should be carefully examined to determine if the sex of the experimenter may have been overlooked in the analyses of the results. It may be that some past research should be replicated using both sexes to determine if the results are generalizable.

The final implication which becomes evident from the results of the present studies involves the effectiveness of standard setting. The present study was able to demonstrate that standard setting is
effective in suppressing eating, a finding that may have impact on past as well as future research. In terms of past research, it appears that a review of the literature may be appropriate to determine if results may have been confounded due to unintended standard setting. In conducting future research, care should be taken to avoid unintended standard setting. It is also possible that the concepts of standard setting, as explored in the present setting, may be successfully extended to weight loss programs.
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Pliner, P. Effect of external cues on thinking behavior of obese and normal subjects. *Journal of Abnormal Psychology*, 1973, 82, 233-238. (b)


Schachter, S. Some extraordinary facts about obese humans and rats. *American Psychologist*, 1971, 26, 129-144. (b)


FOOTNOTE

1 Two subjects were deleted from the analysis based on the standard test for outliers. The number of crackers eaten by these two subjects was three standard deviations above the mean number of crackers eaten by the subjects in the group they had been assigned.
APPENDIX A

EATING HISTORY QUESTIONNAIRE
1. How many hours has it been since you last had something to eat?

2. What was it that you ate?

3. How hungry are you at this time?

____:____:____:____:____:____:____:
1 2 3 4 5 6 7

very not hungry
hungry at all
APPENDIX B

INSTRUCTIONS

EXPERIMENT 1 & EXPERIMENT 2
Experiment 1

Hi (subject's name) I'm (experimenter's name) Dr. Beaman's research assistant. As stated on the telephone this experiment deals with taste perception. Previous research has indicated that recent consumption, that is what you've eaten most recently, and your physiological state have a significant effect on taste ratings. We'd like you to answer a few questions about your recent eating history before we begin. Please answer the questions accurately. I know that the person who called you said not to eat anything for three hours before the experimental session. I also know that it is hard enough to remember to come to an experiment let alone remember three hours beforehand that you are not supposed to eat anything. If you forgot and have eaten something please write it down so we can determine if there will be any taste interactions.

(experimenter gives subject the eating history questionnaire)

It is important that all of our subjects have similar eating experiences and be equally full before beginning the taste test. For this reason it is necessary that you drink this liquid. This liquid is very nutritious and contains about 600 calories, the size of a typical lunch.

(subject consumes liquid)

Now we will begin the taste test. Two bowls of crackers will be placed in front of you. We'd like you to judge these crackers on a number of dimensions. Indicate your judgments on the scales provided.
We have lots of crackers so feel free to eat as many as you need to make your judgments.

**Standard condition.** It may be helpful to know that most people are able to make an accurate judgment by eating one of each type of cracker.

You'll have five minutes to complete the ratings. I'll be outside while you complete the taste test.

(experimenter leaves the room and returns five minutes later)

Now I'd like you to fill out these questionnaires.

(experimenter gives the subject the SCS, Restraint, and general information scales)

Finally, I'll need to take your height and weight. Please step over here.

(experimenter weighs and measures the subject, gives credit card and debriefs)
Experim ent 2

Confederate Present Condition

Hi (subject) I'm (experimenter) Dr. Beaman's research assistant.

This is (confederate's name). In order to save time we're running two students simultaneously. Just so I don't forget, here are your experimental credit cards.

(give student and confederate credit cards)

As you know this experiment deals with taste perception. Previous research has indicated that recent consumption, that is what you've eaten most recently, and your physiological state have a significant effect on taste ratings. We'd like you to answer a few questions about your recent eating history before we begin.

(give student and confederate hunger questionnaire)

It is important that all of our subjects have similar eating experiences and be equally full before beginning the taste test. Please drink the cup of liquid in front of you and as much more from the pitcher as you need to feel comfortably full. The liquid is very nutritious and each cup contains about 700 calories, the size of a typical lunch.

(experimenter leaves for five minutes)

Now we will begin the taste test.

(seat student and confederate at cracker table)

We'd like you to judge these crackers on a number of dimensions. Indicate your judgments on the scales provided. Please rate the
crackers in the order they are presented. We have plenty of crackers so feel free to eat as many as you need to make your judgments.

**Standard condition.** It may be helpful to know that most people are able to make accurate judgments by eating one of each kind of cracker.

You'll have 5 minutes to complete the ratings. I'll be outside while you complete the taste test. We'd like you to concentrate on the rating task so we ask that you refrain from talking to each other during this aspect of the experiment.

(experimenter leaves and returns 5 minutes later)

Now I'd like you to fill out these questionnaires.

(experimenter presents suspicion check and questionnaire pack)

Finally I'll need to take your height and weight. Please step over here.

(weigh student, take measurement and debrief)
Experim ent 2

Confederate Absent Condition

Hi (subject name) I'm (experimenter name) Dr. Beaman's research assistant. In order to save time we're running two students simultaneously. I'm waiting for the second subject to arrive before we begin. Let me check out in the hall to see if she's coming.

(experimenter brings confederate into room)

(introduce subject and confederate)

In order to save time I'll be running you two simultaneously. Just so I don't forget here are your experimental credit cards.

(give student and confederate credit cards)

As you know this experiment deals with taste perception. Previous research has indicated that recent ....

***The remainder of the instructions are identical to the instructions for the confederate present condition.
APPENDIX C

POST RATING QUESTIONNAIRE PACKAGE
Do you think the experimenter was actually interested in testing or measuring something besides what he/she said he/she was trying to do? If so state briefly what you think it was that he/she was actually interested in.
1. How interesting did you think this experiment was?

1  2  3  4  5  6  7

very interesting  uncertain  not very interesting

2. How hungry are you at this time?

1  2  3  4  5  6  7

very hungry  uncertain  not very hungry

3. How many crackers did you eat in the study today (total)?

4. How many total crackers have most people needed to make their taste ratings?

**5. How many cups of liquid did you drink to become comfortably full (include the one required cup in your count)?

6. How many calories did each cup of liquid contain?

7. Do you think this amount of calories is a large, medium or small amount to have consumed?

8. Do you think from what the experimenter said, that he/she had some standard in mind as to the "right" or the appropriate number of crackers you should eat?

If yes, how many (total crackers)?
In spite of what the experimenter told you, give your honest answer to the following questions.

9. What do you think the appropriate number of crackers to eat would have been (total)?

10. How many total crackers do you think the experimenter really wanted you to eat?

11. How many total crackers do you really think that most people must eat to make an accurate set of decisions about the characteristics of the crackers?

**12. How many crackers do you think the other person in this study ate?**

13. Have you ever taken a liquid similar to the one you were given?

   If yes, what was it?

**These questions were excluded for Experiment 1.**
Self Consciousness Scale

Age _______ Sex _______

Phone No. ________________

Name _________________________________ Class: F So J S Other

PLEASE CIRCLE THE NUMBER WHICH MOST CLOSELY REFLECTS HOW YOU FEEL:

0 = EXTREMELY UNCHARACTERISTIC
1 = MODERATELY UNCHARACTERISTIC
2 = SOMETIMES UNCHARACTERISTIC AND SOMETIMES CHARACTERISTIC
3 = MODERATELY CHARACTERISTIC
4 = EXTREMELY CHARACTERISTIC

1. I'm always trying to figure myself out. 0 1 2 3 4
2. I'm concerned about my style of doing things. 0 1 2 3 4
3. It takes me time to overcome my shyness in new situations. 0 1 2 3 4
4. Generally, I'm not very aware of myself. 0 1 2 3 4
5. I reflect about myself a lot. 0 1 2 3 4
6. I'm concerned about the way I present myself. 0 1 2 3 4
7. I have trouble working when someone is watching me. 0 1 2 3 4
8. I'm often the subject of my own fantasies. 0 1 2 3 4
9. I'm self-conscious about the way I look. 0 1 2 3 4
10. I never scrutinize myself. 0 1 2 3 4
11. I usually worry about making a good impression. 0 1 2 3 4
12. I get embarrassed very easily. 0 1 2 3 4
13. I'm generally attentive to my inner feelings. 0 1 2 3 4
14. I'm constantly examining my motives. 0 1 2 3 4
15. One of the last things I do before I leave my house is look in the mirror. 0 1 2 3 4
16. I don't find it hard to talk to strangers. 0 1 2 3 4
17. I sometimes have the feeling that I'm off somewhere watching myself. 0 1 2 3 4
18. I'm concerned about what other people think of me. 0 1 2 3 4
19. I feel anxious when I speak in front of a group. 0 1 2 3 4
20. I'm alert to changes in my mood. 0 1 2 3 4
21. I'm usually aware of my appearance. 0 1 2 3 4
22. Large groups make me nervous. 0 1 2 3 4
23. I'm aware of the way my mind works when I work through a problem. 0 1 2 3 4
Restraint Scale

Name ___________________________ Phone Number ________________

Age ___________ Sex _______________ Year in College ____________

Height _______________ Weight _____________

Please circle the answer that most closely reflects how you feel.

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 within 1 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 lbs 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're eating?
   Not at all  Slightly  Moderately  Very Much

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

THANK YOU
Debriefing

In order to make our explanation of the study as useful and interesting to you as we can we are going to wait until we analyze all of our data before we provide an explanation. If you're interested in finding out more about this study and the outcome of the study you can self address an envelope and we'll send you the results at the end of the quarter or you can talk to Marilyn Preston or Dr. Beaman and they will be glad to explain the details of the experiment.

Even though I'm unable to tell much about the experiment at this time it is important that you do not tell friends or other 110 students about the procedures involved in this study. If they know about the study ahead of time they would not enter the experimental situation in the same state that you were in when we began the study. I've emphasized the importance of control in the experiment a number of times so you know how important it is that all subjects come to the experimental situation equally. If subjects are familiar with the procedures of a study before the actual experiment the data we collect may be inaccurate. All scientists are concerned about publishing misleading and incorrect information so you must agree not to discuss this study with anyone until the end of the quarter. Will you agree to that?

As in all experiments any responses you've made will be completely confidential. Your name will be associated with your data only until we can assign you a number and then your name will be completely removed from the information.
APPENDIX D

DIAGRAM
Diagram of setting for Experiment 2
Table 1

Number of crackers eaten by sex of experimenter by restraint level by absence/presence of standard for Experiment 1

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>40.337</td>
<td>.1</td>
<td>40.337</td>
<td>6.559</td>
<td>.013*</td>
</tr>
<tr>
<td>Standard</td>
<td>33.927</td>
<td>.1</td>
<td>33.927</td>
<td>5.551</td>
<td>.022*</td>
</tr>
<tr>
<td>Restraint</td>
<td>2.172</td>
<td>.1</td>
<td>2.172</td>
<td>.355</td>
<td>.553</td>
</tr>
<tr>
<td>Sex X Standard</td>
<td>10.983</td>
<td>.1</td>
<td>10.983</td>
<td>1.797</td>
<td>.185</td>
</tr>
<tr>
<td>Standard X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restraint</td>
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<td>.1</td>
<td>.036</td>
<td>.006</td>
<td>.939</td>
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<tr>
<td>Sex X Standard X</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>.1</td>
<td>3.336</td>
<td>.546</td>
<td>.463</td>
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<tr>
<td>Residual</td>
<td>348.409</td>
<td>57</td>
<td>6.112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>459.849</td>
<td>64</td>
<td>7.185</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2

Mean number of crackers eaten by presence/absence of standard by sex of experimenter for Experiment 1

<table>
<thead>
<tr>
<th>Sex of Experimenter</th>
<th>Group</th>
<th>Standard</th>
<th>No Standard</th>
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<tr>
<td></td>
<td>Female</td>
<td>5.18a</td>
<td>5.75a</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.75b</td>
<td>5.06a</td>
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<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>n</th>
<th></th>
<th>M</th>
<th>n</th>
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<td>17</td>
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<tr>
<td>Male</td>
<td>16</td>
<td></td>
<td></td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

*Means with common subscripts don't differ at the .05 level.*
Table 3

Mean number of crackers eaten by restraint level by sex of experimenter for Experiment 1

<table>
<thead>
<tr>
<th>Sex of Experimenter</th>
<th>Level of Restraint</th>
<th>Restrained</th>
<th>Unrestrained</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>M</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.18a</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.47b</td>
<td>17</td>
</tr>
</tbody>
</table>

*Means with common subscripts don't differ at the .05 level.*
Table 4

Initial hunger score by sex of experimenter by restraint level by presence/absence of standards

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>.395</td>
<td>1</td>
<td>.395</td>
<td>.116</td>
<td>.735</td>
</tr>
<tr>
<td>Standard</td>
<td>6.241</td>
<td>1</td>
<td>6.241</td>
<td>1.827</td>
<td>.182</td>
</tr>
<tr>
<td>Restraint</td>
<td>3.630</td>
<td>1</td>
<td>3.630</td>
<td>.887</td>
<td>.350</td>
</tr>
<tr>
<td>Sex X Standard</td>
<td>.527</td>
<td>1</td>
<td>.527</td>
<td>.154</td>
<td>.696</td>
</tr>
<tr>
<td>Sex X Restraint</td>
<td>9.185</td>
<td>1</td>
<td>9.185</td>
<td>2.689</td>
<td>.107</td>
</tr>
<tr>
<td>Standard X Restraint</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
<td>.99</td>
</tr>
<tr>
<td>Sex X Standard X</td>
<td>7.572</td>
<td>1</td>
<td>7.572</td>
<td>2.217</td>
<td>.142</td>
</tr>
<tr>
<td>Residual</td>
<td>194.714</td>
<td>57</td>
<td>3.416</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>221.60</td>
<td>64</td>
<td>3.463</td>
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</tr>
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</table>
Table 5

Post experimental hunger score by sex of experimenter by restraint level by absence/presence of standard

<table>
<thead>
<tr>
<th>Source</th>
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<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>10.859</td>
<td>1</td>
<td>10.859</td>
<td>4.618</td>
<td>.036*</td>
</tr>
<tr>
<td>Restraint</td>
<td>2.687</td>
<td>1</td>
<td>2.687</td>
<td>1.143</td>
<td>.290</td>
</tr>
<tr>
<td>Sex X Standard</td>
<td>4.533</td>
<td>1</td>
<td>4.533</td>
<td>1.928</td>
<td>.17</td>
</tr>
<tr>
<td>Sex X Restraint</td>
<td>9.784</td>
<td>1</td>
<td>9.784</td>
<td>4.161</td>
<td>.046*</td>
</tr>
<tr>
<td>Standard X Restraint</td>
<td>1.802</td>
<td>1</td>
<td>1.802</td>
<td>.766</td>
<td>.386</td>
</tr>
<tr>
<td>Sex X Standard X Restraint</td>
<td>4.417</td>
<td>1</td>
<td>4.417</td>
<td>1.878</td>
<td>.176</td>
</tr>
<tr>
<td>Residual</td>
<td>132.040</td>
<td>57</td>
<td>2.352</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>188.215</td>
<td>64</td>
<td>2.941</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6

Mean post experimental hunger score by level of restraint by sex of experimenter for Experiment 1

<table>
<thead>
<tr>
<th>Level of Restraint</th>
<th>Restrainted</th>
<th>Unrestrained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3.29a</td>
<td>2.87ab</td>
</tr>
<tr>
<td>n</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1.71b</td>
<td>2.87ab</td>
</tr>
<tr>
<td>n</td>
<td>17</td>
<td>15</td>
</tr>
</tbody>
</table>

*Means with common subscripts don't differ at the .05 level.*
Table 7

Number of crackers eaten by level of restraint by level of private self-consciousness by sex of experimenter by group presence/absence of standards for Experiment 1*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>40.848</td>
<td>1</td>
<td>40.848</td>
<td>7.442</td>
<td>.01**</td>
</tr>
<tr>
<td>Restraint</td>
<td>10.428</td>
<td>1</td>
<td>10.428</td>
<td>1.900</td>
<td>.18</td>
</tr>
<tr>
<td>Private</td>
<td>13.418</td>
<td>1</td>
<td>13.418</td>
<td>2.445</td>
<td>.13</td>
</tr>
<tr>
<td>Sex</td>
<td>21.468</td>
<td>1</td>
<td>21.468</td>
<td>3.911</td>
<td>.05*</td>
</tr>
<tr>
<td>Standard X Restraint</td>
<td>.015</td>
<td>1</td>
<td>.015</td>
<td>.003</td>
<td>.95</td>
</tr>
<tr>
<td>Standard X Private</td>
<td>.022</td>
<td>1</td>
<td>.022</td>
<td>.004</td>
<td>.95</td>
</tr>
<tr>
<td>Standard X Sex</td>
<td>.148</td>
<td>1</td>
<td>.148</td>
<td>.027</td>
<td>.87</td>
</tr>
<tr>
<td>Restraint X Private</td>
<td>2.995</td>
<td>1</td>
<td>2.995</td>
<td>.546</td>
<td>.46</td>
</tr>
<tr>
<td>Restraint X Sex</td>
<td>43.846</td>
<td>1</td>
<td>43.846</td>
<td>7.989</td>
<td>.00**</td>
</tr>
<tr>
<td>Private X Sex</td>
<td>39.108</td>
<td>1</td>
<td>39.108</td>
<td>7.125</td>
<td>.01**</td>
</tr>
<tr>
<td>Standard X Restraint X Private</td>
<td>6.300</td>
<td>1</td>
<td>6.300</td>
<td>1.148</td>
<td>.29</td>
</tr>
<tr>
<td>Standard X Restraint X Sex</td>
<td>.398</td>
<td>1</td>
<td>.398</td>
<td>.073</td>
<td>.79</td>
</tr>
<tr>
<td>Standard X Private X Sex</td>
<td>.083</td>
<td>1</td>
<td>.083</td>
<td>.015</td>
<td>.90</td>
</tr>
<tr>
<td>Restraint X Private X Sex</td>
<td>.356</td>
<td>1</td>
<td>.356</td>
<td>.065</td>
<td>.80</td>
</tr>
<tr>
<td>Standard X Sex X Restraint X Private</td>
<td>1.217</td>
<td>1</td>
<td>1.217</td>
<td>.222</td>
<td>.64</td>
</tr>
<tr>
<td>Residual</td>
<td>137.217</td>
<td>25</td>
<td>5.489</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>297.512</td>
<td>40</td>
<td>7.438</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*This analysis was conducted using the data collected from a subset of subjects.
Table 8

Mean number of crackers eaten by sex of experimenter by level of self-consciousness for Experiment 1

<table>
<thead>
<tr>
<th>Level of Private Self Consciousness</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>4.11a</td>
<td>6.44b</td>
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<tr>
<td>n</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3.67a</td>
<td>3.63a</td>
</tr>
<tr>
<td>n</td>
<td>12</td>
<td>11</td>
</tr>
</tbody>
</table>

*Means with common subscripts did not differ at the .05 level.*
Table 9
Mean number of crackers eaten and mean post experimental hunger
score by sex of experimenter by presence/absence of standard
for Experiment 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Standard</th>
<th>No Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex of Experimenter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>5.18a</td>
<td>5.75a</td>
</tr>
<tr>
<td>n</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.75b</td>
<td>5.06a</td>
</tr>
<tr>
<td>n</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Mean number of crackers eaten by group by sex of experimenter

<table>
<thead>
<tr>
<th>Group</th>
<th>Standard</th>
<th>No Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex of Experimenter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3.88a</td>
<td>2.25b</td>
</tr>
<tr>
<td>n</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.50b</td>
<td>2.00b</td>
</tr>
<tr>
<td>n</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Mean hunger scores by group by sex of experimenter

*Means with common subscripts did not differ at the .05 level.
Table 10

Number of crackers by restraint level by sex of experimenter by presence/absence of standard for Experiment 2

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>6.891</td>
<td>1</td>
<td>6.891</td>
<td>.278</td>
<td>.600</td>
</tr>
<tr>
<td>Standard</td>
<td>78.547</td>
<td>1</td>
<td>78.547</td>
<td>3.176</td>
<td>.080</td>
</tr>
<tr>
<td>Restraint</td>
<td>87.891</td>
<td>1</td>
<td>87.891</td>
<td>3.533</td>
<td>.065</td>
</tr>
<tr>
<td>Sex X Standard</td>
<td>.391</td>
<td>1</td>
<td>.391</td>
<td>.016</td>
<td>.901</td>
</tr>
<tr>
<td>Sex X Restraint</td>
<td>.766</td>
<td>1</td>
<td>.766</td>
<td>.031</td>
<td>.861</td>
</tr>
<tr>
<td>Standard X Restraint</td>
<td>.016</td>
<td>1</td>
<td>.016</td>
<td>.001</td>
<td>.980</td>
</tr>
<tr>
<td>Standard X Sex X Restraint</td>
<td>.391</td>
<td>1</td>
<td>.391</td>
<td>.016</td>
<td>.901</td>
</tr>
<tr>
<td>Residual</td>
<td>1388.875</td>
<td>56</td>
<td>24.801</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1563.984</td>
<td>63</td>
<td>24.825</td>
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</tbody>
</table>
Table 11

Initial hunger score by sex of experimenter by level of restraint

by presence/absence of standard for Experiment 2

<table>
<thead>
<tr>
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<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>.00</td>
<td>1</td>
<td>.00</td>
<td>.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Standard</td>
<td>.063</td>
<td>1</td>
<td>.063</td>
<td>.02</td>
<td>.882</td>
</tr>
<tr>
<td>Restraint</td>
<td>22.563</td>
<td>1</td>
<td>22.563</td>
<td>7.997</td>
<td>.006**</td>
</tr>
<tr>
<td>Sex X Standard</td>
<td>.00</td>
<td>1</td>
<td>.00</td>
<td>.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Sex X Restraint</td>
<td>.250</td>
<td>1</td>
<td>.250</td>
<td>.089</td>
<td>.767</td>
</tr>
<tr>
<td>Standard X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restraint</td>
<td>.563</td>
<td>1</td>
<td>.563</td>
<td>.199</td>
<td>.657</td>
</tr>
<tr>
<td>Sex X Standard X</td>
<td>1.00</td>
<td>1</td>
<td>1.00</td>
<td>.354</td>
<td>.553</td>
</tr>
<tr>
<td>Restraint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>158.000</td>
<td>56</td>
<td>2.821</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>182.437</td>
<td>63</td>
<td>2.896</td>
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</tbody>
</table>
Table 12

Post experimental hunger scores by sex of experimenter by level of restraint by presence/absence of standard for Experiment 2

<table>
<thead>
<tr>
<th>Source</th>
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<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>0.063</td>
<td>1</td>
<td>0.063</td>
<td>0.039</td>
<td>0.845</td>
</tr>
<tr>
<td>Standard</td>
<td>0.063</td>
<td>1</td>
<td>0.063</td>
<td>0.039</td>
<td>0.845</td>
</tr>
<tr>
<td>Restraint</td>
<td>2.250</td>
<td>1</td>
<td>2.250</td>
<td>1.392</td>
<td>0.245</td>
</tr>
<tr>
<td>Sex X Standard</td>
<td>1.563</td>
<td>1</td>
<td>1.563</td>
<td>0.967</td>
<td>0.330</td>
</tr>
<tr>
<td>Sex X Restraint</td>
<td>2.250</td>
<td>1</td>
<td>2.250</td>
<td>1.392</td>
<td>0.243</td>
</tr>
<tr>
<td>Standard X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restraint</td>
<td>0.000</td>
<td>1</td>
<td>0.000</td>
<td>0.000</td>
<td>1.00</td>
</tr>
<tr>
<td>Sex X Standard X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restraint</td>
<td>2.250</td>
<td>1</td>
<td>2.250</td>
<td>1.392</td>
<td>0.243</td>
</tr>
<tr>
<td>Residual</td>
<td>90.500</td>
<td>56</td>
<td>1.616</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>98.937</td>
<td>63</td>
<td>1.570</td>
<td></td>
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</tr>
</tbody>
</table>
Table 13

Number of crackers eaten by level of restraint by level of private self-consciousness by sex of experimenter by presence/absence of standard for Experiment 2*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>4.049</td>
<td>1</td>
<td>4.049</td>
<td>.158</td>
<td>.694</td>
</tr>
<tr>
<td>Standard</td>
<td>47.346</td>
<td>1</td>
<td>47.346</td>
<td>1.845</td>
<td>.185</td>
</tr>
<tr>
<td>Restraint</td>
<td>50.233</td>
<td>1</td>
<td>50.233</td>
<td>1.957</td>
<td>.172</td>
</tr>
<tr>
<td>Sex</td>
<td>39.154</td>
<td>1</td>
<td>39.154</td>
<td>1.535</td>
<td>.227</td>
</tr>
<tr>
<td>Private X Standard</td>
<td>17.955</td>
<td>1</td>
<td>17.955</td>
<td>.700</td>
<td>.41</td>
</tr>
<tr>
<td>Private X Restraint</td>
<td>.482</td>
<td>1</td>
<td>.482</td>
<td>.019</td>
<td>.892</td>
</tr>
<tr>
<td>Private X Sex Standard</td>
<td>9.024</td>
<td>1</td>
<td>9.024</td>
<td>.352</td>
<td>.558</td>
</tr>
<tr>
<td>Standard X Sex</td>
<td>2.787</td>
<td>1</td>
<td>2.787</td>
<td>.109</td>
<td>.744</td>
</tr>
<tr>
<td>Restraint X Sex Standard</td>
<td>55.102</td>
<td>1</td>
<td>55.102</td>
<td>2.147</td>
<td>.154</td>
</tr>
<tr>
<td>Private X Standard X Restraint</td>
<td>3.913</td>
<td>1</td>
<td>3.913</td>
<td>.152</td>
<td>.699</td>
</tr>
<tr>
<td>Private X Standard X Sex</td>
<td>3.920</td>
<td>1</td>
<td>3.920</td>
<td>.153</td>
<td>.699</td>
</tr>
<tr>
<td>Private X Sex X Restraint</td>
<td>.022</td>
<td>1</td>
<td>.022</td>
<td>.001</td>
<td>.977</td>
</tr>
<tr>
<td>Standard X Sex X Restraint</td>
<td>2.239</td>
<td>1</td>
<td>2.239</td>
<td>.087</td>
<td>.770</td>
</tr>
<tr>
<td>Standard X Sex X Restraint X Private</td>
<td>3.430</td>
<td>1</td>
<td>3.430</td>
<td>.134</td>
<td>.717</td>
</tr>
<tr>
<td>Residual</td>
<td>744.333</td>
<td>29</td>
<td>25.667</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1011.200</td>
<td>44</td>
<td>22.982</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*This analysis was conducted using data collected from a subset of subjects.
Table 14

Mean number of crackers eaten by level of restraint by presence/absence of standard for Experiment 1 and Experiment 2

<table>
<thead>
<tr>
<th>Experiment 2</th>
<th>Level of Restraint</th>
<th>Standard</th>
<th></th>
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