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Restrained Eaters' Food-Related Thoughts in a Suppression  
Paradigm

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A Thesis  
in  
The Department  
of  
Psychology

Presented in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy at  
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## ABSTRACT

### Restrained Eaters' Food-Related Thoughts in a Suppression Paradigm

Constantina Giannopoulos, Ph.D.  
Concordia University, 1995

Restraint refers to a chronic, deliberate concern about limiting food consumption. The present research examined restrained and unrestrained eaters' frequency of food-related thoughts and ability to suppress food-related thoughts. In Study 1, questionnaires were administered to a large sample to measure dietary restraint and the extent to which individuals thought about food. Restrained relative to unrestrained eaters reported thinking more about food. In Studies 2 and 3, restrained and unrestrained eaters were led to eat cookies under the guise of a study of taste preference. Subsequently, they were asked to suppress thoughts about the tasting while thinking aloud. Restrained relative to unrestrained eaters experienced more intrusions of cookie-related thoughts. Implications for dietary restraint are discussed.

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## Restrained Eaters' Food-Related Thoughts in a Suppression Paradigm

Dieting appears to be an important concern for North American women regardless of their actual weight. Data from North American surveys indicate that approximately 40% of women and 24% of men are dieting at any one point in time (Horm & Anderson, 1993; Polivy & Herman, 1983). It has been argued that dieting is so common among women that it can be considered normal eating behavior (Polivy & Herman, 1987). Goods and services aimed at weight reduction have developed into a 30 billion dollar industry in North America (Brownell & Rodin, 1994).

Researchers have compared chronic dieters, referred to as restrained eaters, to individuals who have few concerns about dieting, referred to as unrestrained eaters, on various aspects of eating behavior. Restraint refers to a chronic, deliberate, concern about limiting food consumption. The most widely used instrument to identify restrained and unrestrained eaters is the Restraint Scale (RS), originally constructed and later revised by Herman and his colleagues (Herman & Mack, 1975; Herman & Polivy, 1980). The revised RS is a valid scale that assesses concerns about dieting and weight fluctuations (Heatherton, Herman, Polivy, King & McGree, 1988) and it successfully predicts the eating behavior of restrained relative to unrestrained eaters (see Herman & Polivy, 1988a, for a review). The Three Factor Eating Questionnaire (TFEQ; Stunkard & Messick, 1985) and

the Dutch Eating Behavior Questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986) are more recently developed measures of eating behavior and include scales of restraint. Laessle, Tuschl, Kotthaus, and Pirke (1989) compared the validity of the revised RS with the other scales developed to measure restraint and concluded that each scale measures different components of the general construct of restraint, with the revised RS measuring concerns about body weight and shape, a desire for thinness, and problems with disinhibited eating.

Regardless of the scale used, research comparing restrained and unrestrained eaters has focused on normal weight women in laboratory eating situations. In general, it has been shown that restrained relative to unrestrained eaters do not adjust for previous food intake in a normative fashion when eating (Herman & Mack, 1975; Hibscher & Herman, 1977; Ruderman & Christensen, 1983). In a typical demonstration of this effect, subjects are first asked to eat a predetermined amount of food (a preload) and are then asked to engage in subsequent eating under the guise of a taste test. Restrained eaters counterregulate in that they consume more food after a large preload (e.g., a large milkshake) than after a small or no preload. This subsequent greater consumption seems linked to the perception of having initially eaten a great deal, as the actual caloric level of the preload does not seem to

influence restrained eaters' propensity to counterregulate (Polivy, 1976). Preloads matched on volume, appearance, and taste but of different caloric values have similar impact on restrained eaters. In contrast, unrestrained eaters regulate their eating by consuming less food after a large preload than after a small or no preload. Administering a preload that is (perceived to be) highly caloric to restrained eaters disrupts their dietary restraint. This disruption of restraint is one form of disinhibited eating.

Other disinhibited eating occurs for restrained eaters following mood induction (Cools, Schotte, McNally, 1992; Schotte, Cools, & McNally, 1990). For example, Cools, Schotte, and McNally (1992) had female undergraduate students identified on the revised RS as either restrained or unrestrained eaters view one of three 20-min film segments (i.e., a travelogue {neutral affect}, a comedy film {positive affect}, and a horror film {negative affect}). A 400g bag of popcorn was made available to subjects during the viewing of the film. Subjects were asked to eat as little or as much as they liked and the amount of popcorn eaten was the measure of food consumption. Results indicated that exposure to a horror and comedy film increased food consumption in restrained relative to unrestrained eaters. The authors argued that emotional states, regardless of valence, may induce overeating in restrained eaters. In addition, anxiety (Herman, Polivy,

Lank, & Heatherton, 1987), depression (Ruderman, 1985), and ego threats (Heatherton, Herman, & Polivy, 1991) have been shown to result in increased food consumption for restrained relative to unrestrained eaters. Alcohol consumption has also been shown to lead to disinhibited eating in restrained but not unrestrained eaters (Polivy & Herman, 1976a, 1976b), just as it may lead to other forms of disinhibited behaviors (e.g., Steele & Josephs, 1990).

A model has been proposed by Polivy and Herman (1984) to account for disinhibited eating. The model proposes that in most circumstances the amount of food individuals consume depends more on social and psychological factors than on physiological factors and that this is especially true of restrained eaters. At the extreme ends of a unidimensional continuum defined in the model are the zones of satiety and hunger. In these extreme zones, eating is regulated by physiological factors both for restrained and unrestrained eaters. Between these extremes, in the zone referred to as that of biological indifference, eating is mediated by psychological, social, and environmental factors for both restrained and unrestrained eaters. Because dieters frequently disregard physiological states of hunger and satiety, the model posits that the width of the zone of biological indifference is greater for dieters. A diet zone within the zone of biological indifference is also proposed to account for inhibition of eating. The diet zone is

defined by the diet boundary which is "the dieter's self-imposed quota for consumption on a given occasion" (p. 150). As such, when the dieter is within the diet zone, consumption is constrained by the diet boundary. The boundary is central to the model, and Polivy and Herman (1984) consequently label theirs a boundary model. The model posits that if the boundary is exceeded, consumption will be regulated in terms of reaching the zone of satiety, and will be greater for dieters than nondieters because the former need to consume more food to attain the satiety zone (due to chronic disregard for physiological cues).

In the model, inhibition is construed as a deliberate, active, avoidance of food consumption. Any stimulus that distracts restrained eaters from attempts to inhibit intake may trigger increased food consumption. Herman and Polivy (1984) thus link cognition to behavior. Yet the frequency and type of food-related cognition for restrained eaters is not defined in the model beyond the posited deliberate attempt to follow self-imposed dietary rules. The boundary model remains a descriptive model of observed differences between restrained and unrestrained eaters in eating behavior. It is largely based on the behavioral research on restraint described above. Herman and Polivy (1988b) have suggested that the cognitive makeup of restrained eaters may create a vulnerability to disinhibited eating; however, there has been little empirical research on the cognitive



aspects of dietary restraint.

A general view in this area of research is that restrained eaters attempt to avoid food-related thoughts as such thoughts may lead them to eat (Collins, Rothblum, & Wilson, 1986; Lebow, 1989). This view seems partly based on the finding that hunger leads to increased preoccupation with food. In the classic study of starvation of Franklin, Sciele, Brozek, and Keys (1948), subjects (who were conscientious objectors) agreed to lose 25% of their body weight. During weight loss, subjects exhibited extreme preoccupation with food, including its preparation, serving, and aroma. Research has also linked eating disorders with a preoccupation with food. Individuals with eating disorders, who attempt to maintain low weight, are described as having a cognitive focus on food (e.g., Brumberg, 1988; Lebow, 1989). Typically, such individuals are described as experiencing "intrusive and intense thoughts of food" (Lebow, 1989, p.86).

Other researchers have examined the mental accessibility of food words in clinical and control samples using (color-naming) Stroop tasks. Channon, Hemsley, and de Silva (1988) instructed anorexic and control subjects to name as quickly as possible the color in which various presented words were printed. They found that food-related words interfered with anorexic subjects' ability to name the colors to a greater extent than for control subjects,

suggesting an increased accessibility of food-related thoughts for anorexic subjects. In a subsequent study, Ben-Tovim, Walker, Fok, and Yap (1989) obtained parallel findings for bulimic relative to control subjects. Similarly, when non-clinical subjects do not eat for a 24 hour period, they also exhibit greater interference relative to control subjects in color naming of food words (Channon & Hayward, 1990). The latter finding again suggests that hunger may increase the accessibility of food-related thoughts.

More recently, in an attempt to address cognitive aspects of restraint, King, Polivy, and Herman (1991) examined the relationship between dietary restraint and the processing of social information. Female undergraduates were asked to complete two tasks. First, on a free response measure, restrained and unrestrained eaters were asked to indicate the things that they spent time thinking about. Second, restrained and unrestrained eaters were asked to read a one-page essay describing the physical appearance and behavior of a fictitious female target. After a short delay, subjects were asked to reproduce the essay as completely as possible. The number of food-related items recalled was calculated for each subject. In regard to the first measure, restrained relative to unrestrained eaters reported spending more time thinking about their weight, eating, and dieting. In regard to the social perception

measure, restrained relative to unrestrained eaters remembered more weight- and diet-related items than appearance-related items when remembering information about another person. It is important to note, however, that the extent to which restrained and unrestrained eaters reported thinking about food was not specifically addressed. These findings are consistent with the view that restrained relative to unrestrained eaters have an increased accessibility of food-related thoughts.

At present, the empirical research on cognitive aspects of dietary restraint is limited. In particular, restrained eaters' ability to suppress food-related thoughts has not, to our knowledge, been studied. Yet the importance of addressing the relation of thought suppression to dieting behavior has been noted (Herman & Polivy, 1993). A growing body of research on thought suppression, not specifically related to food and eating, has developed on the basis of work by Wegner and his colleagues (e.g., Wegner, 1992; Wegner, Schneider, Carter, & White, 1987). According to Wegner (1992), thought suppression involves the active elaboration of topics unrelated to the unwanted thought, thereby avoiding the return of the unwanted thought. Wegner (1992) has argued that thought suppression involves a conscious, active attempt at directing attention away from a specific thought. Attempts at thought suppression succeed when unwanted thoughts no longer occupy attention, and fail

when such thoughts recur. Research indicates that preventing unwanted thoughts from recurring is often difficult and only partially successful. Self-distraction strategies in which alternative thoughts are generated to occupy attention may facilitate thought suppression. However, such strategies do not fully prevent the return of the unwanted thought.

In the initial set of studies by Wegner and colleagues (1987), subjects engaged in a thought suppression task which required them to not think of the neutral target white bear. Subjects verbally reported their stream-of-consciousness as they attempted to suppress thoughts of white bear. During this period, they also indicated intrusions of unwanted thoughts by ringing a bell. Audio recordings of subjects' responses were coded for instances of white bear thoughts and frequency of bell rings. Findings indicated that subjects had difficulty suppressing the white bear target. On average, subjects experienced more than one white bear thought per minute. Intrusions of unwanted thoughts were found to be most frequent at the onset of suppression, and to decrease across the 5-min period. Wegner et al. (1987) posit that subjects' failure to suppress even seemingly innocuous thoughts is due, in part, to the process of self-distraction typically used during suppression. When asked to suppress a thought, people often search their current environment or available memory for cues to thought content.

Available cues will be used as a basis for generating associations to other related thought content, which will also come to occupy attention. This tactic may prove beneficial in generating novel thoughts for the short-term. However, thoughts generated in this way are unlikely to be fully engaging or interesting, increasing the possibility that attention will eventually wander back to the task at hand and, in turn, to the unwanted thought. Numerous recurrences of the thought are expected as this cycle repeats itself during suppression attempts. Thus, according to Wegner, thought suppression is prone to failure because it is difficult to generate alternative thought content on demand that can hold attention for an extended period of time.

Following this initial research by Wegner and his colleagues (1987), there has been a proliferation of studies examining the consequences of deliberate thought suppression in a number of domains. These studies address the conditions that facilitate or hinder thought suppression, and the findings are consistent with the model proposed by Wegner (1992; 1987; 1990). Specifically, these studies have addressed the suppression of thoughts of pain (Cioffi & Holloway, 1993), of sexually exciting thoughts (Wegner, Shortt, Blake, & Page, 1990), and of thoughts as a function of acute or chronic mood (Conway, Howell, & Giannopoulos, 1991; Howell & Conway, 1992; Wenzlaff, Wegner, & Roper,

1988).

### The Present Research

Empirical research on the cognitive aspects of dietary restraint is limited. Yet, cognitive aspects of restrained eating are of interest because the mediators of the eating behavior of restrained eaters are presumed to be cognitive in nature (Polivy & Herman, 1987). The ability to suppress food-related thoughts may be an important aspect of the mental control of eating, particularly for restrained eaters. The present research is the first of its kind and examines the relationship between dietary restraint and thought suppression.

The present studies primarily address the hypothesis that restrained relative to unrestrained eaters have more difficulty suppressing food-related thoughts.<sup>1</sup> This hypothesis is based on the assumption that restrained relative to unrestrained eaters have an increased accessibility of food-related thoughts. In particular, one might argue that after consuming food that is typically a target of regulation, restrained relative to unrestrained eaters will have greater difficulty suppressing food-related thoughts; restrained relative to unrestrained eaters may then be more likely to continue eating. The present research addressed restrained and unrestrained eaters ability to suppress food-related thoughts after having eaten. To further address differential accessibility, the

present studies also examined restrained relative to unrestrained eaters' ability to express thoughts about an earlier eating episode. It is hypothesized that if restrained eaters have a cognitive focus on food, then when given the opportunity to express thoughts about eating, they will do so at a higher rate than unrestrained eaters. The hypothesis that restrained relative to unrestrained eaters will have more food-related intrusions during a suppression task and more food-related thoughts during an expression task is consistent with the assumption that restrained eaters have an increased accessibility of food-related thoughts. This assumption is supported by much of the research reviewed above and was further addressed in a first study by asking restrained and unrestrained eaters to report the frequency with which they experience food-related thought.

The main focus of the present series of studies is the ability of restrained relative to unrestrained eaters to suppress food-related thoughts, and the extent to which restrained eaters engage in more food-related ideation when asked to do so. It should be noted that the present research does not aim to address the rebound effect. The rebound effect is an increase in the frequency of previously suppressed thoughts and was initially demonstrated by Wegner et al. (1987) for a neutral suppression target. Recent research reveals that the rebound effect does not occur for

emotional material (Murdis, Merckelbach, van den Hout, & de Jong, 1992; Roemer & Borkovec, 1994) or for personally relevant events (Kelly & Kahn, 1994). In the present studies, food-related thought is the suppression target and food is highly personally relevant to restrained eaters.



## Study 1

Little empirical research exists on the cognition of restrained relative to unrestrained eaters. The extent to which restrained relative to unrestrained eaters think about food has not been specifically addressed. An increased preoccupation with food could impact negatively on the eating behavior of restrained eaters. This first study was conducted to clarify whether restrained relative to unrestrained eaters have a preoccupation with food. Restrained and unrestrained eaters were compared on the extent to which they reported thinking about food.

### Method

#### Subjects and Procedure

Subjects were Concordia University undergraduate students who approached a booth on campus that advertised the need for volunteers to participate in research. At the booth, individuals completed a packet of questionnaires for various research projects conducted by members of our research group. Students who completed the packet became eligible to win lottery prizes. All other projects were unrelated to eating. Included in the packet was the revised Restraint Scale (Herman & Polivy, 1980) with one additional item evaluating the extent to which individuals think about food. This additional item followed the last item on the revised RS (see Appendix A). There were four other questionnaires in the packet and all questionnaires were

presented in counterbalanced order. As in previous research on restraint, only the data of female subjects were analyzed. The present sample consisted of 254 women between the ages of 18 and 46 years ( $M = 24.37$ ,  $SD = 6.10$ ,  $Mdn = 23.00$ ,  $Mode = 21.00$ ).

Restraint Scale: The revised Restraint Scale (revised RS; Herman & Polivy, 1980) is a 10-item, face-valid questionnaire which assesses attitudes towards eating, frequency of dieting, and weight fluctuation (see Appendix A). The revised RS was selected over other measures of restraint because it is brief and has been used extensively to identify chronic dieters. The revised RS also has adequate levels of test-retest reliability and concurrent validity (Ruderman, 1986). Although extent of thinking about food is not specifically assessed by the revised RS, one item on the revised RS assesses whether individuals feel they give "too much time and thought to food." This time and thought item was not included in the calculation of subjects' restraint scores. Consequently, a proportional decrease was made to the usual cut-off scores of 16 and 15 used to identify restrained and unrestrained eaters, respectively (e.g., Polivy, Herman, & Howard, 1988). For the present study, subjects scoring 14 and above were classified as restrained eaters and those scoring 13 and below were classified as unrestrained eaters (see Appendix B for the distribution of RS scores). This selection

procedure yielded 100 restrained ( $M = 17.73$ ,  $SD = 2.98$ ,  $Mdn = 17.00$ ,  $Mode = 14.00$ ) and 154 unrestrained ( $M = 7.45$ ,  $SD = 3.41$ ,  $Mdn = 7.50$ ,  $Mode = 7.00$ ) eaters. The RS scores ranged between 0 and 27.

Thinking of food item: Subjects were asked to respond on a 7-point scale, with endpoints labelled rarely (1) and always (7) to the following item: "To what extent do you find yourself thinking about food?" This item followed the last item on the revised RS (see Appendix A).

## Results and Discussion

All data were first examined for outliers within each group (Restrained vs. Unrestrained eaters). No outliers were found. The distribution met conditions of normality. In addition, there were no missing data. Restrained ( $M = 4.97$ ,  $SD = 1.32$ ) relative to unrestrained ( $M = 4.03$ ,  $SD = 1.50$ ) eaters reported thinking more about food,  $t(252) = 5.43$ ,  $p < .001$ . Parallel findings emerge if the full revised RS is used to identify restrained and unrestrained eaters. The difference in reported thought frequency across restrained and unrestrained eaters is also evident when one considers only younger (age < 26 years) or only older individuals separately. The present findings are consistent with previous research on dietary restraint which suggests similarities in a variety of findings (e.g., efforts to lose weight, body dissatisfaction, disinhibited eating) across age groups (Hetherington, 1994; Hetherington & Burnett, 1994). It is important to note that the questionnaires utilized in the present study were administered throughout the day, over an extended period of time (i.e., over the course of several weeks), and to the general population of undergraduates (i.e., the administration of questionnaires was not restricted to students of one discipline).

The present findings are consistent with the view that dieting can lead to (or exacerbate) a preoccupation with

food. The present findings also confirm clinical reports of individuals with eating disorders who tend to report increased preoccupation with food and eating. For instance, bulimia nervosa patients (Fairburn, 1982), who tend to be dieters (Polivy & Herman, 1983), describe being preoccupied with food and eating. One may expect the same to be true for normal weight dieters, although in a less extreme form. One might argue that restrained eaters would benefit from not thinking as much about food. In seeking such benefits, restrained eaters may attempt to suppress thoughts of food in their daily lives.

## Study 2

Study 2 was a laboratory study aimed at examining restrained and unrestrained eaters' ability to suppress food-related thoughts. Study 2 was based on the paradigm developed by Wegner and his colleagues (Wegner et al., 1987). Specifically, female restrained and unrestrained eaters were led to experience an eating episode in the laboratory and were then asked to suppress thoughts of this experience. The hypothesis was that restrained relative to unrestrained eaters would have more intrusions of food-related thoughts when they attempt to suppress such thoughts. Study 3 was a replication of Study 2.

### Method

#### Subjects

A booth for subject recruitment had been set up on campus requesting participants for research being conducted by members of our research group. At the booth, students completed a packet of questionnaires in order to qualify to win monetary prizes. In the packet, subjects indicated whether they were interested in participating in future paid research. A general information sheet included items concerning height and weight; other items concerned age, sex, and university major. Five questionnaires, including the revised RS, followed the general information sheet in counterbalanced order. The four other questionnaires were unrelated to eating. The packet of questionnaires used in

this recruitment procedure is not the same as in Study 1. Individuals whose native language was not English were excluded from the study sample. Individuals enrolled in Psychology were also excluded because most were beyond the introductory level. Finally, as the student population at Concordia University is highly heterogeneous, a more homogeneous sample was obtained by selecting individuals under 26 years of age. As in previous work on restraint, only female subjects participated. Also, as in previous work (e.g., Heatherton, Polivy, & Herman, 1991), to limit possible effects of weight, individuals who were underweight (>10% below ideal) or overweight (>10% above ideal) were also excluded. Percent underweight and overweight were calculated using the 1984 Desirable Weight Tables of the Metropolitan Life Insurance Company (Dunne, 1990). Consistent with previous research (e.g., Polivy, Herman, & Howard, 1988), subjects scoring 16 and above on the revised RS were classified as restrained eaters and those scoring 15 and below were classified as unrestrained eaters. Fourteen restrained ( $M = 21.50$ ) and 14 unrestrained ( $M = 9.07$ ) eaters participated in Study 1. Mean age of the sample was 21.6 years; range was 18 to 24. Mean weight was 63.2 kg; range was 47.9 to 67.3. Fourteen days elapsed from the end of the recruitment period to the beginning of the study. Subjects were each paid \$8.00 for their participation.

## Materials and Procedure

Subjects arrived at the laboratory having been previously informed on the telephone that they would be participating in a study on natural thought processes. This cover story was used to avoid demand characteristics related to eating and thought suppression. There was one subject present at each 1 hr experimental session. The two female experimenters that conducted each session were blind to subjects' restraint status. Subjects were greeted by the first experimenter and received a copy of the introduction to the study on natural thought processes which the first experimenter read aloud (see Appendix C). Subjects were informed that the study concerned the effects of music on natural thought processes and that they had been assigned to the no music control condition. They were also informed that they would be asked to complete several think aloud periods each involving being alone in the room and verbalizing their thoughts for approximately 5 min while being audiotaped (cf. Ericsson & Simon, 1984; Wegner, et al., 1987). During each 5 min period, the audio recording was to be continuous.

Initial think aloud period. In the first think aloud period, which followed completion of the introduction, subjects were asked to verbalize their current thoughts (i.e., think aloud) for 5 min. Subjects were informed that they were to say out loud whatever they were thinking, that



there were no restrictions as to what they could say, and that they should try to keep talking for the 5 min duration. An example of what someone might say when they were asked to think aloud was presented. The experimenter then demonstrated thinking aloud, following which subjects completed two practice examples, which were tape recorded with subjects' full knowledge (e.g., "think back to when you were 15 and tell me how many windows were in the place you lived"). Subjects thus became accustomed to thinking aloud under circumstances where it was comparatively easy. Following the practice example, subjects completed the first think aloud period with the experimenter absent from the room. This think aloud period was also tape-recorded with subjects' full knowledge.

The experimenter returned 5 min after her departure. She informed subjects that there would be a pause in the study because natural thought is often accompanied by pauses and researchers have found that study results are more valid when pauses are introduced. Subjects were given the option of waiting for approximately 10 min or participating in a taste preference study being conducted by other researchers in the Psychology department. All subjects chose to participate in the taste preference study. The latter study was fictitious. The aim was to engage subjects in eating.

Eating cookies. The so-called taste preference study was conducted in another room by the second experimenter.

Subjects were read a short introduction (see Appendix D). They were told the study concerned the effects of age on taste preferences. Next, they were asked to taste and rate five types of cookies. Each type was presented on a different plate. Approximately 120 g of cookies cut into quarters were placed on each plate, and the five plates were numbered from one to five. Subjects were informed that they could eat as much of the cookies as they wished. Subjects were provided with a sheet of paper and pen and asked to rank order (from 1 to 5) the cookies in terms of taste and then in terms of sweetness (see Appendix E). Subjects were left alone during the tasting. Each plate was weighed using a PFG 564 scale before and after subjects tasted the cookies (measurement was precise to .01 g). As such, amount consumed could be taken into account when examining subjects' subsequent ability to suppress food-related thoughts. An unopened bottle of spring water (355 ml) with a twist top that could be opened by hand was also made available to each subject. Amount of water consumed was measured by weighing the bottle before and after subjects consumed cookies and water. Subjects were unaware that the amounts of cookies and water consumed were being measured. After the tasting, the second experimenter returned, thanked subjects, and escorted them back to what was for them the thought processes study room. The first experimenter was waiting in the room.

Suppression. Subjects engaged in the suppression task following the tasting of the cookies. Subjects were asked by the first experimenter to think aloud as they had done previously and were additionally instructed to try to not think of what they did during the 10 min pause. The purpose of not specifically defining cookies as the suppression target was to avoid suspicion. By not specifying the food target, subjects were unaware that the study concerned the suppression of food-related thoughts. Subjects were asked to signal intrusions during the think aloud period by ringing a service bell that was placed on the table before them. Subjects were told that "every time you say anything related to what you did during the break or have it come to mind please press the bell." As before, subjects verbalized their thoughts for a 5 min period while the audio recorder was continuously operating and the experimenter was absent from the room. Audio recordings were later transcribed and coded for cookie-related intrusions.

Expression. The experimenter returned 5 min after her departure and informed subjects that they would be asked to complete a third think aloud period. Subjects were instructed to think aloud as done previously but to do the opposite of what they had been asked to do for the immediately preceding think aloud period; that is, to try to think of what they did during the 10 min pause. Again, subjects were asked to report thought instances by ringing

the bell (cf. Wegner et al., 1987). Subjects verbalized their thoughts for a 5 min period while the audio recorder was operating and the experimenter was absent from the room. These audio recordings were later transcribed and coded for cookie-related thoughts. After the 5 min expression period, the first experimenter returned to debrief and remunerate subjects (see Appendix F). During the debriefing, subjects were probed for suspicion in regards to the actual hypothesis of the study.

## Results and Discussion

Subjects were asked to suppress thoughts of the cookie tasting. As thoughts of cookies may be influenced by the amount eaten earlier, subjects' consumption of cookies and of water was measured and taken into account. Analyses revealed that restrained ( $M = 44.47$  g,  $SD = 15.72$ ) and unrestrained ( $M = 43.33$  g,  $SD = 17.84$ ) eaters did not differ in the amount of cookies eaten,  $t < 1$ . Similarly, there was no difference between restrained and unrestrained eaters in amount of water consumed,  $t < 1$ .

Suppression. Audio recordings were transcribed and coded for intrusions of cookie-related thoughts occurring during the suppression period. The recordings were coded for the following thought indices by a judge blind to subjects' restraint status: 1) bell rings and mentions of cookies occurring simultaneously, 2) bell rings occurring alone, and 3) mentions of cookies occurring alone. Coding categories of this type have been used in previous research (e.g., Wegner et al., 1987). For each minute of the suppression period, the sum of the number of intrusions for the three coding categories was calculated for each subject. For the suppression period, a second judge blind to restraint status coded a random sample of 10 recordings; the codings of the two judges were significantly correlated,  $r_s = .98, .99, .98, 1.00, \text{ and } .97$  for the first through fifth minute, respectively. See Table 1 for the means of cookie-

Table 1

Mean Number of Cookie-Related Intrusions for Restrained and Unrestrained Eaters in Study 2

Group	Minute of suppression period				
	First	Second	Third	Fourth	Fifth
Restrained					
(n=14)					
M	3.21	1.50	1.57	0.64	0.86
SD	1.71	2.58	1.50	1.51	1.23
Unrestrained					
(n=14)					
M	2.34	0.86	0.14	0.36	0.28
SD	2.87	1.87	0.36	0.74	0.82

related intrusions for restrained and unrestrained subjects. There were no missing data, subjects participated in all tasks. A 2 (Restrained vs. Unrestrained eater) x 5 (Time Interval) analysis of covariance (ANCOVA) with amount of cookies eaten as a covariate was conducted on the number of intrusions experienced by subjects during the suppression period. Tests for normality and homogeneity of variance revealed that these assumptions were not violated. The covariate was not significant,  $F < 1$ . As expected, restrained ( $M = 7.50$ ,  $SD = 5.29$ ) relative to unrestrained ( $M = 4.00$ ,  $SD = 4.50$ ) subjects tended to exhibit more intrusions of cookie-related thoughts when asked to not think of the cookie tasting,  $F(1,25) = 3.82$ ,  $p < .06$ . A main effect for time also emerged,  $F(4,104) = 11.18$ ,  $p < .001$  (see Appendix G for source table). Thought intrusions systematically decreased over the 5 min suppression period both for restrained and unrestrained subjects. The Restraint x Time interaction was not significant,  $F < 1$ . Figure 1 illustrates the mean number of cookie-related intrusions as a function of restraint group and time interval. An examination of the means revealed that restrained relative to unrestrained subjects had more intrusions for each minute of the 5 min suppression period. This difference in intrusions was not due to differential amounts of speech during the suppression period for restrained and unrestrained subjects. Transcripts were

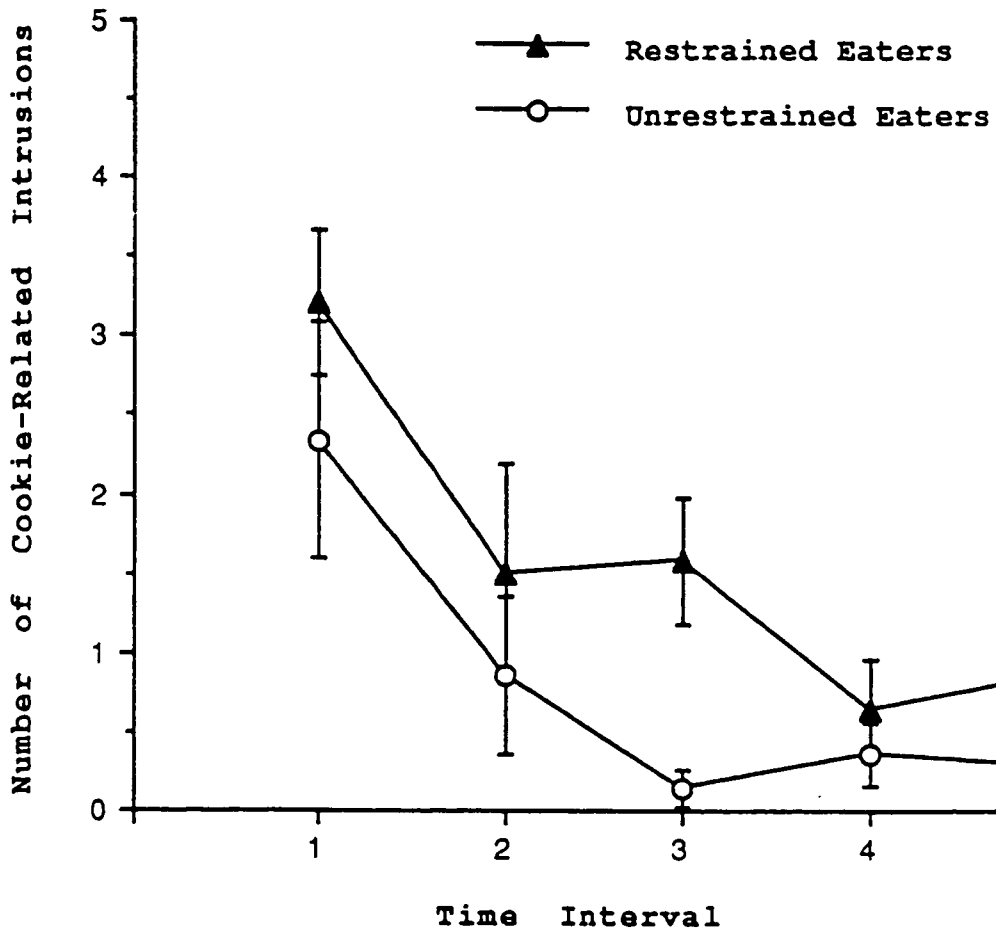


Figure 1. Mean number of cookie-related intrusions during the suppression period as a function of restraint group and time interval (Study 2).



coded for number of words of all type spoken; no significant difference emerged between restrained ( $M = 655.78$  words,  $SD = 171.03$ ) and unrestrained ( $M = 660.14$  words,  $SD = 154.53$ ) subjects for total number of words spoken,  $t < 1$ . Overall, the findings indicate that restrained relative to unrestrained subjects experienced more difficulty suppressing cookie-related thoughts.

Expression. Audio recordings were transcribed and coded for instances of cookie-related thoughts occurring during the expression period. For each minute of the expression period, the sum of the number of instances of cookie-related thoughts for the above-mentioned coding categories was calculated for each subject. A second judge blind to subjects' restraint status coded a random sample of 10 recordings; the codings of the two judges were significantly correlated,  $r_s = .99, .98, .99, 1.00,$  and  $1.00$  for the first through fifth minute, respectively. A 2 (Restrained vs. Unrestrained eater)  $\times$  5 (Time Interval) ANCOVA with amount of cookies eaten as a covariate was conducted on the number of cookie-related thoughts during the expression period. Tests for normality and homogeneity of variance revealed that these assumptions were not violated. No significant effects emerged,  $F_s < 1$  (see Appendix G for source table). As depicted in Table 2, the mean numbers of cookie-related thoughts for restrained subjects were 4.14, 4.00, 3.92, 3.78, and 3.76 for the first

Table 2

Mean Number of Cookie-Related Thoughts for Restrained and Unrestrained Eaters in Study 2

Group	Minute of expression period				
	First	Second	Third	Fourth	Fifth
Restrained					
(n=14)					
M	4.14	4.00	3.92	3.78	3.76
SD	1.46	1.17	0.99	0.70	1.12
Unrestrained					
(n=14)					
M	4.07	4.00	4.00	3.87	3.85
SD	0.92	0.96	0.68	0.77	0.76

through fifth minute, respectively. For unrestrained subjects the corresponding means were 4.07, 4.00, 4.00, 3.87, and 3.85. In addition, restrained ( $M = 661.57$  words,  $SD = 152.73$ ) and unrestrained ( $M = 664.92$  words,  $SD = 149.50$ ) subjects did not differ in the total number of words of all type spoken during the expression period,  $t < 1$ . In sum, the findings indicate that restrained and unrestrained subjects did not differ in the expression of cookie-related thoughts when given an opportunity to talk about their prior eating.

To summarize, restrained relative to unrestrained eaters in Study 2 evidenced more intrusions of cookie-related thoughts during the suppression period. This finding is consistent with the view that restrained eaters have an increased accessibility to food related thoughts. Nevertheless, the effect was not strong perhaps due to the relatively small sample size and to some experimental sessions being scheduled over mealtimes.

### Study 3

Study 3 was conducted as a replication of Study 2. In Study 3, sample size was increased and sessions were not scheduled between 11:30 a.m. and 1:30 p.m. and after 5:30 p.m. to avoid subjects being very hungry or sated. These changes were expected to render more evident the difference between restrained and unrestrained eaters in thought intrusions. Study 3 also included an expression task, just as in Study 2. Restrained and unrestrained eaters in Study 2 did not differ in the number of instances of cookie-related thoughts during the expression period. Yet further examination seemed warranted.

#### Method

##### Subjects

The subject recruitment and selection procedures were identical to that of Study 2. Subjects were 26 restrained ( $M = 19.50$ ) and 25 unrestrained ( $M = 9.80$ ) eaters. Mean age of the sample was 21.7 years; range was 18 to 24. Mean weight was 64.2 kg; range 48.6 to 68.1. Ten days elapsed from the end of the recruitment period to the beginning of Study 3. Subjects were debriefed and were each paid \$8.00 for their participation.

##### General Overview

The design and procedure were identical to that of Study 2. There was one subject present at each 1 hr experimental session. The two female experimenters were

blind to subjects' restraint status. Subjects practiced thinking aloud and then completed a first think aloud period, under the guise of a study on natural thought processes. Next, they engaged in eating cookies under the guise of a taste preference study that was scheduled during a pause in the main study. The second think aloud period was then completed during which subjects were asked to not think of what they did during the pause. Next, subjects completed the third think aloud period in which they were asked to think of what they did during the pause. Subjects were then debriefed.

#### Materials and Procedure

The materials and procedure used in Study 3 were identical to those of Study 2.

## Results

As in Study 2, subjects' consumption of cookies and of water was measured. Analyses revealed that restrained ( $M = 37.41$  g,  $SD = 14.80$ ) and unrestrained ( $M = 38.75$  g,  $SD = 12.41$ ) eaters did not differ in the amount of cookies eaten,  $t < 1$ . Similarly, there was no difference between restrained and unrestrained eaters in the amount of water consumed,  $t < 1$ .

Suppression. Audio recordings were transcribed and coded for intrusions of cookie-related thoughts for the suppression period using categories identical to those of Study 2. A second judge blind to subjects' restraint status coded a random sample of 20 recordings; the codings of the two judges significantly correlated,  $r_s = .99, 1.00, .97, 1.00,$  and  $.98$  for the first through fifth minute, respectively. Table 3 illustrates the means of cookie-related intrusions for restrained and unrestrained subjects. There were no missing data, subjects participated in all tasks. A 2 (Restrained vs. Unrestrained eater) x 5 (Time Interval) ANCOVA with amount of cookies eaten as a covariate was conducted on the number of intrusions experienced by subjects during the suppression period. Tests for normality and homogeneity of variance revealed that these assumptions were not violated. The covariate was not significant,  $F < 1$ . As in Study 2, restrained ( $M = 8.61$ ,  $SD = 5.10$ ) relative to unrestrained ( $M = 3.76$ ,  $SD = 2.55$ ) subjects exhibited more

Table 3

Mean Number of Cookie-Related Intrusions for Restrained and Unrestrained Eaters in Study 3

Group	Minute of suppression period				
	First	Second	Third	Fourth	Fifth
Restrained					
(n=26)					
M	3.42	1.50	1.54	0.96	1.19
SD	2.21	1.17	1.80	1.48	1.67
Unrestrained					
(n=25)					
M	1.70	0.90	0.48	0.40	0.24
SD	1.24	1.07	0.65	0.64	0.52

intrusions of cookie-related thoughts when asked to not think of what they did during the cookie tasting,  $F(1,48) = 13.20$ ,  $p < .001$ . A main effect for time also emerged,  $F(4,196) = 24.65$ ,  $p < .001$ . Thought intrusions decreased over the 5 min suppression period both for restrained and unrestrained subjects. The Restraint x Time interaction was not significant,  $F(4,196) = 2.01$  (see Appendix G for source table). Figure 2 illustrates the mean number of cookie-related intrusions as a function of restraint group and time interval. An examination of the means revealed that restrained relative to unrestrained subjects had more intrusions for each of the 5 min periods. This difference in intrusions was not due to differential amounts of speech during the suppression period for restrained and unrestrained subjects. Transcripts were coded for number of words of all type spoken; no significant difference emerged between restrained ( $M = 700.69$  words,  $SD = 170.38$ ) and unrestrained ( $M = 684.72$  words,  $SD = 150.84$ ) subjects for total number of words,  $t < 1$ .

Expression. Audio recordings were transcribed and coded for intrusions of cookie-related thoughts occurring during the expression period. A second judge blind to restraint status coded a random sample of 20 recordings; the codings of the two judges significantly correlated,  $r_s = .99, .97, .98, 1.00$ , and  $.99$  for the first through fifth minute, respectively. A 2 (Restrained vs. Unrestrained



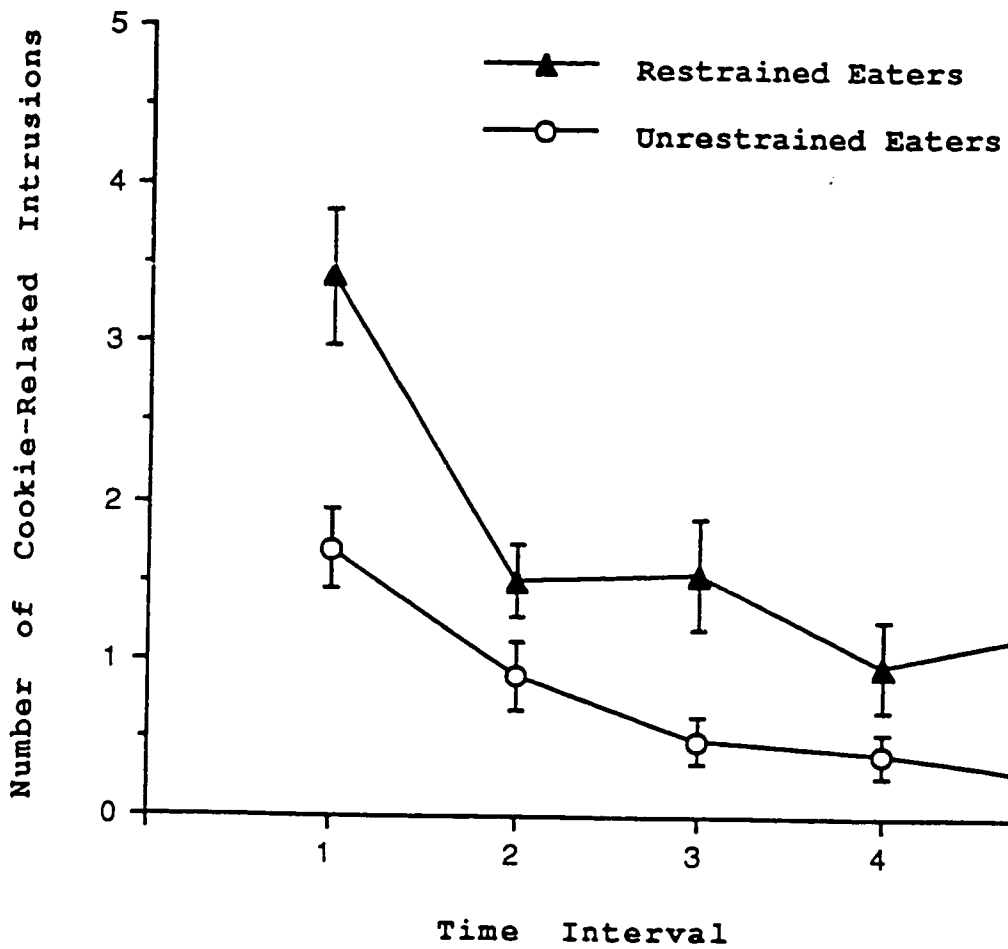


Figure 2. Mean number of cookie-related intrusions during suppression period as a function of restraint group and time interval (Study 3).

eater) x 5 (Time Interval) ANCOVA with amount of cookies eaten as a covariate was conducted on the number of cookie-related thoughts during the expression period. Tests for normality and homogeneity of variance revealed that these assumptions were not violated. No significant effects emerged,  $F_s < 1$  (see Appendix G for source table). As Table 4 illustrates, the mean numbers of cookie-related thoughts for restrained subjects was 4.43, 4.38, 4.23, 4.27, and 4.12 for the first through fifth minute, respectively. For unrestrained subjects, the corresponding means were 4.40, 4.36, 4.32, 4.24, and 4.04. In addition, restrained ( $M = 752.43$  words,  $SD = 132.19$ ) and unrestrained ( $M = 755.12$  words,  $SD = 136.98$ ) eaters did not differ in number of words of all type spoken during the expression period,  $t < 1$ .

Table 4

Mean Number of Cookie-Related Thoughts for Restrained and Unrestrained Eaters in Study 3

Group	Minute of expression period				
	First	Second	Third	Fourth	Fifth
Restrained					
(n=26)					
M	4.43	4.38	4.23	4.27	4.12
SD	1.39	1.29	1.39	1.40	1.24
Unrestrained					
(n=25)					
M	4.40	4.36	4.32	4.24	4.04
SD	1.35	1.35	1.55	1.64	1.51

## General Discussion

The present research examined restrained and unrestrained eaters' frequency of food-related thoughts and ability to suppress food-related thoughts after having eaten. In Study 1, questionnaires were administered to a large sample of undergraduate students to measure dietary restraint and the extent to which individuals think about food. Findings indicate that restrained relative to unrestrained eaters think more of food. In Studies 2 and 3, an eating episode was created in a laboratory setting: Restrained and unrestrained eaters were led to eat cookies under the guise of a taste study. After eating, they were asked to try to not think of the eating episode, allowing us to address restrained and unrestrained eaters' ability to suppress cookie-related thoughts. Results demonstrated that restrained relative to unrestrained eaters experienced more intrusions of cookie-related thoughts. In Studies 2 and 3, restrained and unrestrained eaters were later asked to think of the eating episode in order to address their readiness to think about eating. Restrained and unrestrained eaters did not differ in their expression of cookie-related thoughts. Some of the possible reasons for this similar degree of expression are addressed below. Overall, the present findings suggest that when attempting to suppress food-related thoughts, restrained relative to unrestrained eaters evidence an increased accessibility of such thoughts. The

fact that restrained eaters have particular difficulty keeping food-related thoughts out of awareness may undermine their chronic, deliberate attempts at limiting their food intake.

The negative consequences of food-related thoughts on the eating behavior of restrained and unrestrained eaters can be construed in terms of the boundary model of eating proposed by Herman and Polivy (1984). This model attempts to account for the major findings in the restraint literature, which as noted earlier address conditions of eating behavior. The model proposes that restrained eaters impose a diet boundary by following rules for limiting their food intake, and that this inhibition is deliberate. The boundary model does not specifically address accessibility of food-related thoughts. In light of the present findings, one might argue that an increased accessibility of food-related thoughts may interfere with restrained eaters' capacity to think of or adhere to the rules that enable them to respect their diet boundary. In light of the limits on attentional resources (Hasher & Zacks, 1979), intrusions of food-related thoughts may compete with thoughts of rules.

Increased thoughts of food may also play a role in various instances of disinhibited eating on the part of restrained eaters. Previous research has shown that emotional arousal, overeating or perceived overeating, stress, and alcohol lead to disinhibited eating. These

factors are thought to affect restrained eaters by disrupting the control that they normally try to exert over their eating (Herman & Polivy, 1988). Thought suppression as construed here and by Wegner (1992) is a resource dependent process. It seems likely that the factors leading to disinhibited eating limit restrained eaters' available attentional resources, thereby making it more difficult for them to suppress thoughts of food. More thoughts of food may hasten disruption of the control restrained eaters normally exert over their eating.

In the present research, restrained and unrestrained eaters did not differ in their expression of thoughts concerning their prior eating. One might argue that the expression task adopted in Studies 2 and 3 did not allow for the differential assessment of accessibility of food-related thoughts for restrained and unrestrained eaters. That is, in the present research individuals were asked during the expression period to specifically think of having previously tasted and rated the cookies, thereby recollecting a vivid, novel, and recent event that is by its very nature highly accessible. Indeed, in Studies 2 and 3, both restrained and unrestrained eaters expressed a relatively high number of cookie-related thoughts during the expression period.

In addition, restrained and unrestrained eaters did not differ in the amount of cookies eaten. As such, restrained eaters did not disinhibit when faced with eating what could

be considered "forbidden" food. It may be argued that the particular mode of presentation of the cookies in the present studies may have precluded the disinhibition effect from occurring. In the present research, cookies were presented in quarters. As such, restrained eaters had the option of eating as much or as little as they wished. By eating small portions of cookies, restrained eaters may have perceived their eating as having remained under control and may have perceived themselves as not having violated any of their predetermined dietary rules.

#### Suppression in other contexts

In Studies 2 and 3, restrained relative to unrestrained eaters had more difficulty suppressing food-related thoughts the full length of the suppression period. Yet this period was limited to five minutes. It is unclear whether restrained eaters would continue to experience greater difficulty with suppression if they attempted to suppress their thoughts for a longer period of time. It could be argued that outside the laboratory setting, thoughts of food for the restrained eater would surface and subside depending on myriad circumstances (e.g., time of day, cooking, walking by a French pastry shop, running errands), allowing restrained eaters to engage in successful suppression with time. Perhaps with a longer time period, restrained eaters' thoughts would wander or be directed to other topics of interest. Nevertheless, five minutes of increased

intrusions, which is what was demonstrated in the present research, may well be consequential in daily life for the eating behavior of restrained eaters.

The thought suppression that restrained eaters engaged in for the present research may differ from that practiced in daily life. In the present laboratory studies, thought suppression was not self-initiated by restrained eaters and the external instruction to suppress thoughts may have made this task more difficult for restrained eaters. However, in the present laboratory studies restrained eaters were likely highly motivated to make effortful attempts at suppression because their performance was being monitored. Although too much effort expended at suppressing food-related thoughts may backfire (cf. Baumeister & Steinhilber, 1984), such great effort is likely for restrained eaters under certain circumstances (e.g., late evenings) in daily life.

It could also be argued that the laboratory setting of Studies 2 and 3 did not allow restrained eaters to utilize the distractors available to them in their everyday lives. In an attempt to suppress thoughts of food, restrained eaters may use a variety of available environmental and behavioral distractors, such as watching television, going for a walk, or talking to someone. Through experience with their own intrusive food-related thoughts, restrained eaters may have learned to use specific distractors that were unavailable in the laboratory situation we created. The



present research, by highlighting the heightened accessibility of food-related thoughts for restrained eaters, suggests the great importance of their use for a range of distractors.

The findings of the present research, as with most research on dietary restraint, were based on responses of undergraduate women. It is therefore not clear whether these findings can be generalized to other segments of the population. The dieting behaviors and cognitions of men, for example, may be different from those of women.

Although in the present studies subjects were not specifically asked to suppress thoughts of cookies (they were asked to try not to think of what they did during the pause), one might argue that a different type of food (e.g., oranges) could produce different findings. Certainly, it could be argued that a dieter would have more difficulty suppressing thoughts of chocolate cheesecake as opposed to celery sticks. However, it is more likely that unwanted food-related intrusions would be "forbidden" in nature. Indeed, the bulk of previous research on restraint addresses eating behavior for "forbidden" foods (e.g.s., M&Ms, cashews, cookies, ice cream, and cakes).

#### Clinical Implications

The present findings have implications for weight loss interventions. An increased accessibility of food-related thoughts may jeopardize restrained eaters' efforts at weight

control, particularly when food is readily available (e.g., at a buffet). As such, treatment programs could include a cognitive component focusing explicitly on the consequences of such increased accessibility. In addition, it may be argued that thought stopping as a clinical technique may be effective. Unfortunately, evidence for the effectiveness of the technique of thought stopping is weak (Reed, 1985). A more appropriate coping strategy for restrained eaters may be to deliberately think about food and the consequences of eating. Restrained eaters may then be better able to direct their thoughts in an adaptive manner from the concrete and sensual to the level of rules and goals. A focus on food-related cognitions is consistent with the view of Herman and Polivy (1993) who suggest that thinking that goes beyond the sensory properties of food may be beneficial to dieters and that it may even lead to the suppression of eating. Ultimately, weight loss interventions should be aimed at helping dieters interpret and respond to their own thoughts and feelings, in particular to their greater accessibility of food-related thoughts.

The present findings also have implications for binge eating. Binge eating has been recognized as a clinical problem (Stunkard, 1993) that includes both the ingestion of a large amount of food in a short period of time and a sense of loss of control during the binge. An increased accessibility of food-related thoughts coupled with a narrow

cognitive focus may place restrained eaters at increased risk for experiencing binges. As such, restrained eaters who are prone to binge eating may benefit from therapeutic interventions aimed at appropriately coping with an increased accessibility of food-related thoughts.

Additionally, from a clinical perspective, Freud (1926/1959) argued that intrapsychic conflict is associated with a failure to inhibit unacceptable thoughts, wishes, or desires and that attempts at suppression (or in its extreme form repression) may have negative consequences to individuals' emotional and physical well-being. As such, attempts by chronic dieters to eliminate food-related thoughts may lead to maladaptive functioning. Researchers have also considered the possible benefits of the intrusion of unwanted thoughts. Martin and Tesser (1989) have argued that intrusive thinking may help motivate individuals to solve problems and attain difficult goals. Taylor and Schneider (1989) have also argued that intrusive, unwanted, thoughts may play an important role in various aspects of coping. One might argue that intrusions of unwanted food-related thoughts may allow restrained eaters to find meaning in their attempts at weight suppression.

#### Future Research

It remains for future research to further examine the nature of thought suppression in chronic dieters. One extension of the present research would be to examine the

natural evolution of thought suppression in chronic dieters. For example, the content of food-related thoughts in restrained and unrestrained eaters over the course of several weeks or even over the course of several diets could be examined. Do chronic dieters attempt to suppress food thoughts? A second line of future research could examine the consequences of thought suppression on eating. Will chronic dieters who continuously suppress food-related thoughts experience increased rates of eating? Perhaps specific types of food-related cognitions mediate subsequent eating behavior. A third line of future research could be aimed at examining individual differences in ability to suppress food-related thoughts. Perhaps successful dieters are better able to suppress food-related thoughts. In addition, prior dieting episodes as well as current dieting status could also be examined as possible determinants of successful suppression. A final possible direction for future research could be the extension of the present research to other populations, including individuals with eating disorders.

#### Summary

To our knowledge, the present studies examining restrained and unrestrained eaters' ability to suppress food-related thoughts are the first of their kind. Researchers have focused primarily on the eating behavior of restrained and unrestrained eaters, paying less attention to

cognition. The current research adds to the relatively small number of studies that have examined accessibility of food-related thoughts and contributes to a better understanding of dietary restraint. Restrained eaters' increased accessibility of food-related thoughts may well contribute to the initiation of disinhibited eating.

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## Footnotes

<sup>1</sup>The present studies were conducted prior to the review by Lowe (1993) that underlines the differential impact on eating behavior of the frequency of dieting and overeating on the one hand, and current dieting status on the other. The present research is the first to address the suppression of food-related thoughts for individuals with chronic dieting concerns; subjects were identified solely with the revised Restraint Scale, with current dieting status not being assessed. There remains no empirical basis for positing current dieting status as a determining factor in the suppression of food-related thoughts.

Appendix A  
Revised Restraint Scale



QUESTIONNAIRE R

Please read each of the following questions carefully and circle the letter of the answer which best applies to you.

1. How often are you dieting?  
(A) Never (B) Rarely (C) Sometimes (D) Often (E) Always
2. What is the maximum amount of weight (in pounds) that you have lost within one month?  
(A) 0-4 (B) 5-9 (C) 10-14 (D) 15-19 (E) 20 plus
3. What is your maximum weight gain in a week?  
(A) 0-1 (B) 1.1-2 (C) 2.1-3 (D) 3.1-5 (E) 5.1 plus
4. In a typical week, how much does your weight fluctuate?  
(A) 0-1 (B) 1.1-2 (C) 2.1-3 (D) 3.1-5 (E) 5.1 plus
5. Would a weight fluctuation of 5 pounds affect the way you live your life?  
(A) Not at all (B) Slightly (C) Moderately (D) Very Much
6. Do you eat sensibly in front of others and splurge alone?  
(A) Never (B) Rarely (C) Often (D) Always
7. Do you give too much time and thought to food?  
(A) Never (B) Rarely (C) Often (D) Always
8. Do you have feelings of guilt after overeating?  
(A) Never (B) Rarely (C) Often (D) Always
9. How conscious are you of what you are eating?  
(A) Not at all (B) Slightly (C) Moderately (D) Extremely
10. How many pounds over your desired weight were you at your maximum weight?  
(A) 0-1 (B) 2-5 (C) 6-10 (D) 11-20 (E) 21 plus



Appendix B  
Frequency Table  
Distribution of Scores on the Revised RS in Study 1

Frequency Table

Distribution of Scores on the Revised Restraint Scale in Study 1

Group	RS Score	Frequency
Unrestrained Eaters (n=154)	0	2
	1	3
	2	8
	3	12
	4	10
	5	14
	6	13
	7	15
	8	15
	9	14
	10	13
	11	11
	12	10
	13	14
Restrained Eaters (n=100)	14	15
	15	13
	16	12
	17	12
	18	12
	19	10
	20	7
	21	8
	22	5
	23	2
	24	1
	25	1
	26	1
	27	1

Appendix C  
Introduction to Studies 2 and 3

## Introduction

I'm going to go over the instructions with you now, and I'm going to read them outloud. The reason that we do this is so that everyone gets exactly the same information.

In this study, we are looking at how music affects people's thought processes. We are interested in people's natural thinking. Research suggests that music affects people in different ways. On the one hand, it has been shown that some people are more easily distracted when listening to music. And, on the other hand, it has also been shown that they can concentrate more on certain kinds of tasks. We are looking at this issue to better understand it.

Now, let me tell you what I mean when I say natural thought processes. Often, in daily life, we think of things, we plan things in our minds. We do this naturally, in our heads, it is as if we are talking to ourselves, the only difference being that we do not talk aloud.

For example, when we wait for the bus, or when we are on the metro, we might think of all sorts of things. Such as where we are going and what we have to do that day. If you are waiting for the bus, for example, you might see a nice sports car go by and you might think to yourself, " Oh, what a nice car! " This is what I mean when I say natural thought processes. That is, we often think to ourselves as if we are talking outloud, but we really do not say

anything.

In this study, we want to better understand people's natural thought processes and we are asking people to talk aloud. We want them to say what they are thinking of. We have two groups in this study, one group listens to music and the other group does not listen to music. You have been randomly assigned to the no music condition. The people in the no music group do everything that the people in the music group do, except listen to music.

In the next little while, you, yourself will be asked to think aloud. Now, before we go on, I want to give you an example of what someone could say when they think aloud. I'll read it to you:

"I can't believe how fast time is going by. I have three papers to write this semester. My part-time job is going well. The job itself is kinda boring, but the money is good. I am getting tired of winter. It's not that I really mind winter. I like snow and I like skiing. It's just that I find that winter is too long. I definitely prefer the summer. The weather is warm, you are always outside doing things, having fun. Hmmm... I have a class after this. After my class, I think I'll go see a movie. I'll ask Peter, to see if he wants to go with me. God, I have to start working on papers. Maybe I'll just go home and do some work after my class. Yeah, that's what I'll do."

So, that is an example of what someone can say when they think aloud. Once again, this is just an example. When I ask YOU to think aloud, I want you to say everything that comes to your mind. There are no limits or restrictions as to what you can say. You will be left alone in this room with this tape recorder. I tape record people, so that I can go back and look at the recordings later on, once everyone has come in. The tapes are anonymous and confidential. The tapes will be identified by a number only. So, just think out loud; simply say what is on your mind. If you find yourself stopping, just remember, we'd like you to keep talking. Because we are looking at natural thought processes it isn't the same if you stop.

Before we start, let's do a practice example. Let's say that I was asked to think outloud --to say everything that I am thinking of right now- this is what I would say, and I'll do it in a minute. Now, the tape recorder will be on as I am doing it. It has a built in microphone, so there is no need to adjust it (experimenter turns on audio recorder and says what is on her mind). So, that is an example of thinking aloud.

Now, before we continue, let's practice with some examples. Let's try it with the recorder. Now, as we are doing these practice examples, I'll stay with you. But, as I said earlier, when you are asked to think aloud you'll be alone, so that you are more comfortable.



So, as you are doing these examples, I want you to say whatever comes to your mind. Think aloud as you come up with about 10 different names of streets anywhere in Montreal. Now, I want you to tell me everything that goes through your head. So if you have a picture in your mind or if you see yourself crossing the street as you are coming up with the names, I want you to tell me that. I'll start you off "this building is on Guy St....".

Here is an other practice example. Once again, say whatever is on your mind. Think back to when you were about 15 years old. Now think of where you lived. Can you remember? Please think outloud and tell me how many windows were in the place you lived?

Now that we have gone through the practice examples, let me remind you about what the study is about. I will be asking you to think outloud. Now that you have a good idea of what we will be doing, I would like you to take a few minutes to read this consent form, and if you wish please sign it. I'll just rewind the tape.

O.K. Now, I will leave the room, and for the next five minutes or so, I want you to think outloud. Once again, there are no limits as to what you can say --it can be anything. Simply say everything that comes to your mind. Say outloud what you are thinking of. I'll turn the tape recorder on. I'll leave you and come back in about 5 minutes. O.K., go ahead.

(Experimenter returns after 5 minutes). O.K. It's been 5 minutes. We have finished the first part of the study. I'll put this on pause. Before we continue with the second part of the study, it is important that we take a break. Natural thought is often accompanied by pauses. Researchers have found that results are more valid when people take a break. Usually, people sit here for about 10 minutes during the break. But there are other people here who are doing other studies. One group of researchers (down the hall) are interested in the relationship between aging and taste preferences. In their work, they ask people of different ages to taste different kinds of common foods and to rate them. If you would be interested in doing this during the break I'll ask the person to drop by.

(When subject returns) So, now we will continue with the thought processes study. This is a bell that we'll be using. Earlier, you were asked to think aloud. Now, we are going to do something similar. I want you to say what is on your mind as you did before. Now I'm going to ask you to think aloud for about 5 minutes and I'm going to ask you to try not think of what happened during the break. Whatever you do, try not to think of what you did during the break. Every time you say anything related to what you did during the break or have it come to mind please press this bell. So, just tap it like this (experimenter presses the bell).

Again, think aloud for the next 5 minutes, try not to

think of what you did during the break. Every time you say anything related to what you did or have it come to mind, press the bell. Is it clear what I'm asking you to do? Here's the bell. I'll get this going again (take recorder off pause) and I'll be back in about 5 minutes.

O.K. We have finished the second part of our study of natural thought processes. In this part, I'll ask you once again to think aloud. Now I'm going to ask you to do the opposite of what you just did. In the next 5 minutes, try to think of what you did during the break -so try to think of when you were tasting the cookies. Every time you say anything related to what you did during the break or have it come to mind, please press the bell.

Again, think aloud as you did before, this time try to think of what you did during the break -so try to think of when you were tasting the cookies- and press the bell each time you say anything related to it or have it come to mind. Is that clear? I'll just get this going again, and I'll come back in about 5 minutes.

Appendix D  
Introduction to Fictitious Taste Preference Study for  
Studies 2 and 3

## INSTRUCTIONS

In this study, we are interested in looking at age differences in taste perception. We are studying this because past research suggests that age may have different effects on people's taste preferences. One effect is that increased age is accompanied by a decrease in taste perception. Older people seem to be less sensitive to taste than young adults. In this study, we are interested in better understanding age differences in the sweet component of taste. Sweetness is one component of taste. The three other components are: sour, salty, and bitter.

We are asking people of different ages to taste and rate different types of sweet foods. One type of food we ask people to taste is cookies. We are asking people to taste and rate five different types of cookies. This takes about 5 minutes. If you are interested in doing this please read and if you wish sign the consent form (experimenter provides the consent form). Here are the rating sheets. The instructions are right on top. Feel free to taste the cookies in any order. You may also go back and forth from one type of cookie to another. There is water here if you'd like any. Do you have any questions? Take your time. I will be back in about five minutes.

Thank-you very much for participating in this study. I can now take you next door and you can continue with Dina's study.

Appendix E  
Cookie-Rating Sheets for Fictitious Taste Preference Study  
for Studies 2 and 3.

GENERAL INFORMATION

Please indicate the following:

AGE: \_\_\_\_\_

SEX: Male \_\_\_\_\_ Female \_\_\_\_\_

SECTION I

In this section, we are interested in your overall preferences. When making your judgements please consider all aspects of the cookie (e.g., taste, smell, appearance).

Please taste the cookies.

Rank order the five types of cookies from the one you prefer the most to the one you prefer the least.

Cookie Number

\_\_\_\_\_ Most preferred cookie

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ Least preferred cookie

SECTION II

In the first section we were interested in people's overall preferences. In this section, we are interested in a more specific judgement. We are asking you to judge the cookies on SWEETNESS. In doing this, feel free to taste the cookies in any order.

Please rank order the five types of cookies from the one you feel is the sweetest to the one you feel is the least sweet.

Cookie Number

_____	Sweetest cookie
_____	
_____	
_____	
_____	Least sweet cookie



Appendix F  
Debriefing

## Debriefing

You have now completed basically all of the tasks included in this study. At this point, I would like to talk to you a little bit more about the details of the study, and to answer any questions you might have about it. (Ask each subject whether they were aware of the actual hypothesis.)

At the beginning of the study, you were informed that the study concerned music and how music relates to natural thought processes. Actually, there is a bit more to the study than I told you initially. Let me tell you what the study is actually about, and then I'll explain why it was presented in this way.

First of all, this study is not looking at the effects of music on natural thought. In fact, there is no music in this study. There is also no separate taste preference study. What you did in that study was part of this one. We are interested in the relationship between people's chronic dieting and their ability to suppress or express thoughts of food.

You were asked to think aloud. In one part, you were asked to try not to think of what you did during the break; that is, to not think of the cookie-tasting episode, this is what we call the suppression task. In another part, you were asked to try to think of what you did during the break -to think of the cookie-eating episode. This is the expression task.

The major hypothesis in this study is that people who are chronic dieters will have more difficulty suppressing the thought of food compared to people who are rarely dieting. The reason for this is that food for them is very salient. They are often very aware of what they eat. Although they try to avoid overeating, they are often concerned about what they eat and how much they eat. When dieting, people sometimes try to suppress thoughts, especially thoughts about food.

For example, sometimes (especially in the evenings) people who are dieting find it very difficult to stop thinking about food. So, in order to avoid eating or risk getting "off" their diets, they will often use various strategies to get their minds off food (e.g. get out of the house or distract themselves by doing something else). They may try various things to suppress the thought of food.

Thought suppression is what we are looking at in this study. We are looking to see how dieting behavior will affect thought suppression.

Also, we are looking to see how dieting will affect the expression of food-related thoughts. We think that people who diet often compared to people who have few dieting concerns will have less difficulty expressing thoughts of food because food is very much on their minds. Therefore, when given the chance to talk about it, they will do so more easily. To summarize, the study is looking at the relation

of chronic dieting to the suppression and expression of food-related thoughts.

You may be wondering why I did not tell you this at the beginning. Why didn't I tell you that we were interested in the effects of chronic dieting on suppression and expression?

It is because it would have probably make you feel self-conscious. You would know exactly what we were interested in, and you might feel obliged to do what seemed expected of you. This would create a big problem. And it would not be clear what the results would then mean, since you would basically know what the study was about. You should know that we went to great lengths to conceal the real nature of the study so that we could get the most accurate results possible. This problem comes up in other research as well.

It would be the same thing if I was interested in non-verbal behavior, in how people hold their hands and feet while talking with someone, and told you that for the next 20 minutes, I would watch your hands and feet. It would not make sense, because you would not act natural. It is to avoid this kind of problem that we did not tell you about all the details of the study.

By the way, not all psychological research is like this. In most research, people can be told all the details of the study.

Do you have any questions? One last thing. I would

much appreciate it if you did not discuss the details of the study with other students here at Concordia. We are conducting the study over the next few weeks, and it would cause very serious problems if people came into the study, and knowing from the start what it was all about. It is basically the same problem as if I would have told you all about it at the beginning.

I would really appreciate your comments about the study. Is there anything in the procedure that you found difficult?

If you would like a copy of the results of this study, we would be happy to mail you a copy. If you are interested please write your name and address on this envelope. Thank you (give \$8.00). Could you please fill in the receipt form?

Thank you very much for participating today. If you have any concerns later on, or more questions, please feel free to get in touch with Dr. Conway. His telephone number and office are indicated on this slip. You can keep this.

Appendix G  
Source Tables (A to D) for Analyses Conducted  
in Studies 2 and 3

Source Table A

The 2 (Restrained vs. Unrestrained Eater) x 5 (Time Interval) ANCOVA with amount of cookies eaten as a covariate on number of intrusions during the suppression period in Study 2

	SS	DF	MS	F	p
<b>Between-Subjects Effects</b>					
<b>Source</b>					
Within Cells	132.94	25	5.32		
Cookies Eaten	1.13	1	1.13	.21	.65
Restraint	20.30	1	20.30	3.82	.06
<b>Within Subjects Effects</b>					
<b>Source</b>					
Within Cells	228.86	104	2.20		
Time Interval	98.43	4	24.61	11.18	.001
Restraint x Time Interval	5.11	4	1.28	.58	.68

Source Table B

The 2 (Restrained vs. Unrestrained Eater) x 5 (Time Interval) ANCOVA with amount of cookies eaten as a covariate on number of cookie-related thoughts during the expression period in Study 2

	SS	DF	MS	F	p
<b>Between-Subjects Effects</b>					
<u>Source</u>					
Within Cells	68.17	25	2.73		
Cookies Eaten	.95	1	.95	.35	.56
Restraint	.02	1	.02	.01	.93
<b>Within Subjects Effects</b>					
<u>Source</u>					
Within Cells	56.60	104	.54		
Time Interval	1.69	4	.42	.77	.54
Restraint x Time Interval	.11	4	.03	.05	.99



Source Table C

The 2 (Restrained vs. Unrestrained Eater) x 5 (Time Interval) ANCOVA with amount of cookies eaten as a covariate on number of intrusions during the suppression period in Study 3

	SS	DF	MS	F	p
<b>Between-Subjects Effects</b>					
<b>Source</b>					
Within Cells	217.29	48	4.53		
Cookies Eaten	.05	1	.05	.01	.91
Restraint	59.77	1	59.77	13.20	.001
<b>Within Subjects Effects</b>					
<b>Source</b>					
Within Cells	244.64	196	1.25		
Time Interval	123.08	4	30.77	24.65	.001
Restraint x Time Interval	11.02	4	2.75	2.01	.17

Source Table D

The 2 (Restrained vs. Unrestrained Eater) x 5 (Time Interval) ANCOVA with amount of cookies eaten as a covariate on number of cookie-related thoughts during the expression period in Study 3

	SS	DF	MS	F	p
<b>Between-Subjects Effects</b>					
<u>Source</u>					
Within Cells	254.89	48	5.31		
Cookies Eaten	.73	1	.73	.14	.71
Restraint	.01	1	.01	.01	.98
<b>Within Subjects Effects</b>					
<u>Source</u>					
Within Cells	235.98	196	1.20		
Time Interval	3.44	4	.86	.71	.58
Restraint x Time Interval	.19	4	.05	.04	.99