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The Influence of Norms on Eating Behavior: An Impression Management Approach

By

Deborah A. Roth

A thesis submitted in conformity with the requirements for the degree of

Doctor of Philosophy

Graduate Department of Psychology

University of Toronto

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*A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy,
Graduate Department of Psychology, University of Toronto*

Abstract

Three studies explored social influences on eating. Prior to reporting these studies, the existing literature was reviewed. This literature appears inconsistent, with each group of studies (social facilitation studies, impression management studies, and modeling studies) suggesting that the presence of others has different effects on intake. We attempted to reconcile these inconsistencies and proposed that all three literatures could be best understood in terms of people's attempts to detect and use norms to govern behavior.

The three studies presented here were aimed at adding some cohesion to the existing literature and at demonstrating the value of the normative interpretation of eating. In Study One, participants ate alone, in the presence of a non-eating observer, or in the presence of a co-acting companion. Participants ate significantly fewer cookies in the Observed condition than in the Alone condition. In the Co-action condition, participants tended to match the intake of their companions. In Study Two, participants ate either alone or while observed by the experimenter. Furthermore, subjects were led to believe that prior participants had either eaten a lot (Augmentation Norm condition) or a little (Inhibition Norm condition); subjects in a control condition (No Norm condition) were not informed about prior intake. Results showed that while participants adhered to the norms when they were alone, the presence of the observer suppressed this effect, with subjects eating minimally across norm conditions. In Study Three, three experimental groups were all exposed to an Augmentation Norm; one ate alone, one ate in front of a mirror (intended to increase

self-awareness) and one was observed by the experimenter as they ate. A control group of participants ate alone and was not informed about prior intake. While participants adhered to the Augmentation norm when they were alone and in front of the mirror, they again ate minimally when they were observed. The results from all three studies were interpreted in the context of two norms – a norm of minimal eating and a matching norm that prescribes that people model the intake of their companions. The origins of these norms were discussed, as were the limitations of the studies and directions for future research.

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Table of Contents

General Introduction	1
A Review of the Literature	3
Social Facilitation of Eating: We eat more in the presence of others than we eat when we're alone	3
-Social facilitation of eating in humans: Obesity as a starting point	3
-Should we expect dieter/nondieter differences	7
-Other explorations into social facilitation of eating	10
-The work of John de Castro: Social facilitation of eating is a ubiquitous phenomenon	12
-Why does social facilitation of eating occur?	14
-Can a normative interpretation be advanced for the social facilitation phenomenon	19
Impression Management: Self-presentational concerns typically lead to social inhibition of eating	20
-What is self-presentation and why do we engage in it?	20
-The role of situational and dispositional factors in impression management	24
-The social meaning of weight and eating	26
-Eating as a self-presentational tactic: The work of Pliner and colleagues	30
-Should the weight of our companions affect our self-presentational concerns	34
-The role of self-awareness in eating	36
-A special case of attention: What is the effect of an observer on amount eaten?	40
-Do we always need to eat minimally in order to make a good impression?	42
-Can the normative interpretation be applied to the impression management literature?	42
Modeling: People tend to match the intake of their companions	43

-Are obese individuals and dieters differentially affected by modeling effects?	43
-Two studies demonstrate the power of social influence	48
-Can the normative interpretation be applied to the modeling literature?	50
Three studies exploring the influence of norms on social eating behavior	51
Study One	54
Method	55
-Participants	55
-Materials and Procedures	57
Results	62
-Manipulation Checks	62
-Intake Data	63
-Replication Check	64
-Comparisons across the three conditions	64
-A focus on the co-action condition: Was eating driven by modeling effects?	66
Discussion	68
Study Two	71
Method	75
-Participants	75
-Materials and Procedure	76
Results	80
-Effectiveness of the social condition manipulation	80
-Effectiveness of the norm manipulation	81
-Intake data	82
-Hunger ratings	82
-Main analysis	83
-Modeling data	85
-Reasons for eating	88
Discussion	89
Study Three	91
Method	96

-Participants	96
-Materials and Procedures	97
Results	103
-Manipulation Checks	103
-Intake Data	106
-Hunger ratings	106
-Main analysis	106
-Modeling Data	108
-Reasons for Eating	110
Discussion	111
General Discussion	114
-Why do women adhere to a norm of minimal eating and where did it come from?	115
-Why do people adhere to the matching norm?	118
-What are the limitations of these studies?	120
-What do we mean by “social” in social influences?	120
-Can we draw conclusions based on the sample?	122
-Future Research	123
References	126
Footnotes	133
Table One: Mean intake of cookies in Study One	135
Table Two: Mean intake of cookies in Study Two	136
Table Three: Perception by subjects of whether they ate matched the intake of others, ate more than others, or ate less than others in Study Two	137
Table Four: Mean intake of cookies in Study Three	138

General Introduction

Brillat-Savarin is renowned for coining the phrase, “Tell me what you eat and I’ll tell you what you are” (1825, p.13). Although some modern researchers have been interested in the social meaning of the *types* of food that people eat, the current work focuses on the social meaning of the *amount* of food that people consume. In this vein, Brillat-Savarin’s aphorism may be best re-worked to read, “Tell me *how much* you eat and I’ll tell you what you are.”

Is the amount that we eat affected by the presence of others¹? Absolutely. Visser (1991) writes that humans “turn the consumption of food, a biological necessity, into a carefully cultured phenomenon” (p. ix). The more pressing questions concern *how* eating is affected by the presence of others. The answer to this question is very complex and seems to depend on which group of studies one reads in the broad domain of “social influences on eating.” Studies that examine social facilitation of eating, as the term implies, find that people eat more in groups than they eat when they are alone. Researchers interested in the role that impression management plays in eating behavior have found that level of intake varies as a function of how important it is for people to make a “desirable” impression within a given situation. These studies suggest that the presence of others often inhibits eating – in other words, that eating minimally is used as a way to make a good impression. Finally, studies of modeling demonstrate that people tend to eat more in the presence of an individual who eats a large amount as compared to when they are in the presence of a person who eats just a little. These modeling studies clearly demonstrate that the presence of others can facilitate or inhibit eating, depending on the intake of these “others.”

The studies to be presented here attempt to add some coherence to these seemingly disparate studies. A normative interpretation will be advanced as a way to accomplish this goal.

Examination of the various literatures suggests that different types of norms play a significant role in the amount that people eat. In the present studies, we were particularly interested in two types of norms. Modeling studies suggest that people are motivated to conform to the intake of their companions (a “matching norm”). In other words, people sometimes eat a fair bit in the presence of others – if these “others” eat a lot. Impression management studies, however, suggest that there is also a norm for minimal or restrictive eating that seems to be held particularly strongly by young women in our culture. Social eating behavior becomes interesting when different types of norms – such as the matching norm and the restrictive eating norm – are in conflict. In such situations, the “eater” must come to some conclusion – probably on a non-conscious level – about how to behave. The current studies examine this issue – how people resolve self-presentational dilemmas in social situations brought on by the presence of conflicting norms for appropriate eating behavior.

Also of interest in the current studies was whether dieters and nondieters differ in terms of the amount that they eat in various social situations. The interest in this individual difference variable stemmed from the assumption that dieters should be more concerned than nondieters with the impression that they make when they eat. While previous literature has generally shown that nondieters are susceptible to social influences on eating, the present studies were premised on the belief that dieters, by virtue of their greater concern with eating and body weight, should be *more* susceptible.

A Review of the Literature

Social Facilitation of Eating: We eat more in the presence of others than we eat when we are alone

Social Facilitation of eating in humans: Obesity as a starting point

Studies on social facilitation² of eating in humans³ began to appear in the literature in 1979. Interest in how much people eat in groups as compared to how much people eat when they are alone emerged from two bodies of literature. Schachter (1968) proposed that obese individuals and normal weight individuals approach eating in very different ways. While the amount eaten by normal weight individuals is guided primarily by internal physical state (e.g., how hungry or sated they are), the intake of obese individuals is guided by external cues. Schachter (1968) identified a number of external factors that could affect eating behavior – most of a sensory nature (smell, sight, and taste of food). However, he wrote that “other people’s actions” (p. 753) could also play a role. Although Schachter did not expand on this notion, it appears that he was suggesting that obese individuals would be easily swayed by the behavior of those around them (perhaps more analogous to our current conception of modeling behavior, rather than our current conception of social facilitation of eating) regardless of whether they were hungry or full.

Other researchers were interested in obesity as “a form of social deviance” (Krantz, 1979, p. 19). According to Krantz, “concern with physical appearance, coupled with prevalent attitudes that obese individuals lack self-control might...be expected to exert influences on the behavior of obese individuals” (p. 19). DeJong and Kleck (1986) identified obesity as “body stigma” (a term coined by Erving Goffman in 1963) and wrote that obesity is different from other body stigmas such as scars or physical handicaps because there is “a perception that they

[the obese] could escape their deviant status if only they could muster sufficient willpower” (p. 65). Given these views, it would not be surprising if obese individuals strictly limited their eating in social situations in the hopes of dispelling the belief that they became overweight through their out-of-control eating.

In summary, early research on social influences on eating was geared at resolving this inherent conflict. Do obese people always eat minimally in the presence of others due to their self-presentational concerns, or do they sometimes overindulge in response to external cues of a social nature?

Krantz (1979) explored just this conflict, hypothesizing (in line with the social deviance view) that due to self-presentational concerns, obese people would select more food in the natural environment when they were planning to eat alone as compared to when they were planning to eat with others. Assuming that normal weight individuals have fewer self-presentational concerns around food and eating, Krantz (1979) also expected that meal choice of normal weight individuals would not be affected by the social context of the meal. Both hypotheses were supported, with obese individuals selecting more food when they were planning to eat alone as compared to when they were planning to eat with others and with the choices of normal weight individuals unaffected by the social context of their meals. Krantz’s study did have methodological flaws – most notably, the dependent measure was food *choice* rather than actual food intake. Krantz also failed to consider whether or not subjects were acquainted with their companions. This is likely an important factor in social eating behavior. It is reasonable to expect that impression management concerns would be less salient in the presence of people whom we know well as compared to when we are in the presence of people whom we know less

well. In many university cafeterias, large tables (and crowds at mealtimes) necessitate sharing a table with strangers, which may heighten impression management concerns and inhibit eating. Krantz's methodology was also such that he could not ascertain whether people knew if they would be eating alone or accompanied when they selected their meals or whether this decision was made after the meal was selected according to the availability of seating, running into a friend, etc. Since only food choice and not actual intake was measured, the reader cannot be sure whether intake of the food that had already been purchased was influenced by social condition. Despite these problems, Krantz's study was a useful contribution in that it introduced the idea that impression management concerns can influence eating.

Klesges, Bartsch, Norwood, Kautzman & Haugrud (1984) also reported on a naturalistic study of eating behavior. In this methodologically precise study, people were observed as they ate meals in a variety of different restaurants. Unlike Krantz's study, group differences based on body weight were not found. Rather, a main effect of social setting was reported, with all individuals eating more in groups than they did when they were alone. Klesges et al. (1984) wrote that "perhaps eating with others provides more encouragement, support and modeling for eating than eating alone does. Similarly, eating alone may not be considered as pleasant and, as a result, people may eat less" (p. 39). Regarding the fact that obese-normal differences were not found, the authors point out that the literature suggests that "overweight individuals do not consume more food than normal-weight individuals do" (p. 40). Degree of acquaintance may have also played a role in their findings. When people go to restaurants to eat, they usually go with friends or family. Among familiar companions, all subjects – even those who were overweight – may have felt comfortable eating a fair bit in the presence of others.

Edelman, Engell, Bronstein and Hirsch (1986) avoided some of these methodological problems by performing a clever naturalistic-laboratory study. Members of the United States Army, who were accustomed to testing new foods and meals, served as subjects. Overweight and normal weight males were given a large piece of lasagna to taste either alone or in the company of four or five other men who were also tasting the food. Although overweight individuals ate more overall than did normal weight individuals, they were not differentially affected by the social manipulation. Rather, all men, regardless of weight, ate more in the company of others than they did when they were alone. Edelman et al. (1986) remarked that “in the social condition, subjects talked with each other and lingered at the table. Many continued by nibbling at their leftover food as they sat talking. In the isolated condition, both overweight and normal-weight subjects appeared to want to finish eating and leave as soon as they could” (p. 81). With reference again to the importance of degree of acquaintance, it can be assumed that the companions in this study also knew one another, given that they were fellow employees at an Army Research and Development Center. Again, this could have obscured the self-presentational concerns that may have been more salient had people been eating in the presence of strangers or people whom they knew less well.

With only three published studies examining obese-normal differences in food intake under varying social conditions, it is difficult to draw any conclusions. In general, it does seem as if the presence of others facilitates food intake for both obese and normal weight individuals – at least when individuals are reasonably well-acquainted with one another. Krantz’s (1979) study suggests however, that social facilitation does not occur invariably across people or

situations. Extrapolating from his data on food *choice*, his study suggests that impression management concerns can lead to social inhibition of eating in obese individuals.

Should we expect dieter/nondieter differences?

Early eating research, as reviewed above, focused on potential differences between obese and normal weight individuals. A gradual shift occurred in the field such that attention shifted from obese/normal differences to dieter/nondieter differences. This shift was initiated by Nisbett (1972) who proposed that it was not weight *per se* that led an individual to be internal or external in orientation, but rather the extent to which the person was suppressing his weight below his biological set-point for weight. Resulting from both early nutritional experience and genetics, each person has a set-point for body weight, and Nisbett proposed that “obesity for some individuals would represent a ‘normal’ or ‘ideal’ body composition” (p. 435). If obese people, or any other people for that matter, try to maintain a weight below their set-point, they will start to display behavior characteristic of a hungry individual. This hunger-induced externality is clearly a biological defense mechanism aimed at bringing a person’s body weight back up to a level where the body functions optimally.

Herman and Mack (1975) turned their attention to normal weight individuals who were trying to lose weight. These individuals face an interesting conflict. Following from Nisbett, we would expect any biologically underweight people to behave like hungry organisms, eating quite a lot. But, Herman and Mack pointed out that “these individuals are also subject to the countervailing pressure exerted by cultural and social demands; namely to restrain their eating so as to maintain an ‘ideal’ weight which is fairly low in absolute terms and extremely low relative

to their set-point weight” (p. 649). In other words, these normal weight dieters should behave in the external fashion previously associated only with obese individuals.

Herman and Mack (1975) asked some participants to drink either one- or two-milkshake preloads, while others were randomly assigned to a no-preload condition. Then, all subjects were asked to taste and rate three flavors of ice-cream. The researchers proposed that highly restrained subjects would give up their restraint following the forced preload (since they had already been forced to break their diets), eating more ice-cream in the two milkshake condition than in the zero milkshake condition. Subjects who scored low on a measure of dietary restraint were expected to be guided by internal cues – eating less after two milkshakes than they would in the zero milkshake condition. One milkshake was expected to have an intermediate effect on both groups.

The data were in line with this novel hypothesis. Restrained eaters did not discriminate between one and two milkshakes; rather, both were sufficient to “eliminate restraint” (p. 655), leading them to consume significantly more ice-cream following the preload than they had in the no preload condition. The unrestrained eaters were more sensitive to the preload manipulation, eating the most in the no preload condition, less in the one milkshake condition and the least in the two milkshakes condition. Herman and Mack (1975) concluded that normal weight, unrestrained subjects behave in an “internal” fashion previously attributed to all normal weight people and that normal weight, restrained subjects behave in an external fashion, previously attributed only to obese people. This study initiated what has now been over twenty years of research demonstrating differences between dieters and nondieters, not only in terms of eating behavior, but also in terms of many other psychological constructs.

It is unfortunate that there is only one published study that compares how much dieters and nondieters eat when they are alone as compared to when they are in a group (in other words, fitting into our categorization as a study of “social facilitation”). Clendenen, Herman and Polivy (1994) asked dieters and nondieters to eat a meal (deli sandwiches and cookies) either alone, with one other person (pairs), or with three other people (fours). Furthermore, some subjects ate with friends while others ate with strangers.

Clendenen et al. (1994) did find evidence for social facilitation of eating, with all subjects (regardless of level of dietary restraint) who were assigned to eat in pairs or in groups of four eating significantly more than did subjects who were assigned to eat alone (intake by pairs and by groups of four did not differ). This effect was actually carried by deli food consumption; group size did not affect cookie consumption. To explore whether degree of acquaintance affected eating, the intake of groups of friends was compared to the intake of groups of strangers. Results showed that subjects ate more cookies when they were in groups of friends than when they were in groups of strangers. Degree of acquaintance did not affect consumption of deli food. Finally, restraint had no effect on intake, although restrained eaters did report feeling more comfortable in the presence of friends than in the presence of strangers, while unrestrained subjects felt equally comfortable with all types of companions. All subjects, regardless of restraint, ate more in the presence of friends than in the presence of strangers, and as stated above, this effect was carried by cookie consumption.

Clendenen et al. (1994) explored possible explanations for their findings. For their general finding of social facilitation of eating, they identified various factors inherent in the “alone” condition that might have inhibited eating. Subjects might have found solitary eating to

be less pleasant than social eating (as in Edelman et al., 1986) and they did indeed report feeling less comfortable during the meal than did participants who ate in groups. Clendenen et al. (1994) also pointed out that in the alone condition, “focus of attention was confined to food and eating” and that “exclusive focus on food tends to inhibit eating” (p. 11). In terms of the observed difference between subjects eating with friends as compared to strangers, Clendenen et al. proposed that “strangers [may have been] concerned with the impressions that they made on others, and were hesitant to eat ‘excessively.’ Friends may have felt more comfortable with each other, and less concerned with impression management” (p. 10).

It is unfortunate that the authors spent little time exploring the absence of group differences on the basis of restraint. They simply stated that “restrained subjects felt more comfortable when eating with friends than with strangers...however, these differences in personal comfort during the dining episode did not differentially affect subjects’ consumption” (p. 10). On an intuitive level, it still seems reasonable to expect that dieters will not *always* demonstrate social facilitation of eating and it is clear that firm conclusions cannot be drawn from this one study. Differences in the social eating behavior of dieters and nondieters is an area still ripe with research potential and was explored in the studies to be presented here.

Other explorations into social facilitation of eating

Other researchers have explored the general phenomenon of social facilitation of eating without interest in obese/normal differences or dieter/nondieter differences. Berry, Beatty and Klesges (1985) compared group and solitary eating in a laboratory setting. Male and female participants were asked to taste ice cream either alone or in groups of three or four. Social facilitation of eating was found, with participants eating more in group settings than in solitary

settings. The authors suggested that “subjects eating in a group serve as models of eating for one another” but cautioned that “modelling is only one mechanism that mediates social facilitation of eating” (p. 44).

There are various unanswered questions arising from Berry et al.’s (1985) study. First, it is unclear whether or not subjects knew one another before the study; as mentioned previously, acquaintance can affect social eating behavior. Another aspect of the study that was unclear was the composition of the groups. Male and female subjects participated in the study, but the authors did not indicate whether the groups were mixed or single sex. There is evidence to suggest that both men and women eat less in the presence of opposite-sex companions than in the presence of same sex companions (e.g., Conger, Conger, Costanzo, Wright & Matter, 1980; Mori, Chaiken & Pliner, 1987; Pliner & Chaiken, 1990), so again, this information may be important in understanding the observed patterns of intake. Finally, it is possible that Berry et al. screened out participants who may have had concerns associated with eating. They reported that subjects were excluded from the study if they had any history of eating difficulties and/or if they were “unwilling to participate fully in all requirements of the project.” It appears that participants were fully informed about the nature of the study during a class presentation and clearly knew when they signed up that the study would involve eating. This information may have prevented people who were concerned with eating or about the way that they look when they eat from signing up for the study, again affecting the pattern of obtained results.

Hirsch and Kramer (1993) were also interested in social influences on eating in “normal” populations. They studied social influences on eating in soldiers by comparing intake during social meals (defined as “eating with a small group” (p. 231)) and intake during non-social meals

(defined as “eating alone or as part of an undifferentiated large group of 50 to 70 people” (p. 231)). Results showed that caloric intake over a two-week period varied directly with the number of social meals. It is reasonable to assume here that social meals were eaten in the presence of acquaintances.

The Work of de Castro: Social facilitation of eating is a ubiquitous phenomena

The final social facilitation studies to be reviewed are those done by John de Castro and his colleagues. These studies were based on food diaries kept by community volunteers over a seven-day period. Participants were men and women, none of whom reported being on diets at the time the data were collected. They recorded in their diaries not only what they ate at meals, but also the social context in which they ate.

de Castro’s studies have shown strong evidence of social facilitation of eating (albeit with only one data set to which he continues to add new participants). His data show that people eat more when they are in groups than when they are alone. Furthermore, de Castro has demonstrated that meal size increases with the number of people present at the meal. While the presence of one other person at a meal increases intake by 28 percent (as compared to meals eaten alone), meals eaten with six or more people present are an impressive 76 percent larger than are solitary meals.

Redd and de Castro (1992) examined social facilitation with an experimental study. Subjects were instructed to eat alone on some days and to eat in groups on other days and to record what they had eaten at those meals. When subjects ate alone, they consumed 212 kcal less per day than when they ate in groups.

de Castro and his colleagues have taken pains to ensure that their findings are not artifactual – and indeed they do not seem to be. They reported that the “people present/meal size correlation” was strong and positive for meals consumed with or without alcohol, for all locations (at home, at restaurants), for meals eaten on weekdays and weekends (although the correlation was stronger on weekends) and for all meals (breakfast, lunch, dinner and snacks) (see de Castro, 1991; de Castro, Brewer, Elmore & Orozco, 1990). A study by Feunekes, de Graaf, and van Staveren (1995) failed to replicate this last finding. Using de Castro’s food diary method, Feunekes and her colleagues also calculated “people-present/meal size correlations.” In their two studies, these correlations were significant when all meal types were combined; however, when correlations were examined by meal type, they were significant only for breakfast in the first study and for snacks in the second study.

de Castro also reported (1994) that the “people present-meal size correlation” is significant for all types of companions, although it is stronger in groups of family and friends than in groups consisting of “other companions.” Given the importance of this issue (as discussed earlier), it is unfortunate that this study is flawed. Participants were asked to record the nature of the companions with whom they had eaten each social meal. The first problem with the data is that de Castro has not reported on how he dealt with meals eaten in the presence of mixed companions (e.g., friends *and* family). He divided companions into five types: friends, family, spouse, work associate and “other.” This “other” category is perhaps most troubling. de Castro reported that “others” include roommates (who are often friends), lovers (who most likely don’t differ much from spouses), classmates (again, often friends) and “others.” He then compared the intake of participants eating alone to the intake of participants accompanied by

each companion type. Most troubling were F ratios in the neighborhood of 100. Although there is no doubt that some of the results should have been significant, these large F 's lead the reader to wonder whether the data were incorrectly analyzed.

Putting aside these statistical issues, the results showed that people eat more with any type of companion than they do when they eat alone. de Castro then ran analyses of variance in which he compared intake with one type of companion to intake with all other types of companions (minus the companion type of interest to that analysis). In an awkward explanation, de Castro reported that "meals ingested with spouse, family, or friend, are significantly larger than meals ingested with others but without the companion type, while meals ingested with co-workers were significantly smaller" (p. 448). No mention was made of the "other" category. It is unfortunate that the data in this study were analyzed in such a confusing manner given the importance of the topic in the present context. It is clear that the issue of degree of acquaintance is still an important one to pursue, but would probably be best carried out in a controlled laboratory environment, along the lines of Clendenen et al.'s (1994) study.

Why does social facilitation of eating occur?

As this literature has been reviewed, various explanations for the social facilitation effect have been described. Most explanations have been based on intuition or observation with the most common theme being that solitary eating is simply less pleasant than social eating. As a result, people seem to rush through solitary meals, while social meals may last longer, giving people more opportunity to eat. Clendenen et al. (1994) also argued that in solitary eating situations, attention is directed completely at food and eating, increasing the likelihood that people will stick to their dietary standards – e.g., to diet or simply not to eat to the point of

uncomfortable satiation. In social eating situations, where attention is divided between food and various aspects of the social environment, people may eat more than they had intended, not realizing that they are full (or over-full) until the meal is over.

In general, researchers have not systematically explored why people tend to eat more in groups than they do when they are alone. de Castro has proposed several explanations for what he considers to be a ubiquitous phenomenon; unfortunately he seems to be unaware of much of the literature on eating, making some of his explanations less reasonable than others.

In his 1989 paper, de Castro first proposed various explanations for social facilitation of eating. His first suggestion is based on Zajonc's 1965 paper on social facilitation. de Castro suggests that the presence of others may increase arousal, thereby increasing the *rate* of eating, and in turn increasing the amount eaten. The leap from Zajonc's ideas to human eating is, however, a large one. de Castro's use of Zajonc's concepts implies that eating is the dominant response when food is available, but the eating literature suggests that this assumption is overly simplistic. People do not always eat when food is available; rather, numerous factors play a role. As it turns out, de Castro did not find support for this hypothesis; rate of eating does not seem to be influenced by the number of people present at a meal.

Along the same lines as the arousal hypothesis, de Castro wondered whether the presence of others increases anxiety or elation, leading to an increase in intake. This hypothesis clearly demonstrates de Castro's lack of familiarity with the eating literature since anxiety does not invariably lead to increased eating. The work of Herman, Polivy and their colleagues (e.g., see Heatherton, Herman & Polivy, 1991; Herman, Polivy, Roth & Heatherton, 1999) suggests that the effect of anxiety (or other sorts of distress) on eating is dependent not only on the type of

distress to which a person is exposed, but also on the type of person. In general, ego-focused anxiety tends to lead to increased eating in dieters but to slightly decreased eating in nondieters.

Less is known about the effect of positive mood on eating. Cools, Schotte and McNally (1992) showed participants a neutral film, a comedy film, or a horror film and measured popcorn intake. A regression analysis showed that both comedy and horror films were associated with increased food intake as dietary restraint increased. Although the horror film seemed to have a greater disinhibitory effect on subjects with higher restraint scores, the comedy film also led to increased eating in those individuals. The authors write that “emotional arousal – positive as well as negative – can disinhibit restrained eating” (p. 351).

Returning to de Castro’s hypotheses regarding emotional arousal, it is reasonable to make two statements. First, the presence of others may well affect emotional state. And, furthermore, these shifts in emotional state *should* affect eating. Yet, for de Castro’s subjects (who were all unrestrained eaters), increased anxiety or elation should actually lead to slightly decreased eating rather than increased eating. As it turns out, de Castro did not find strong support for either the anxiety or elation hypotheses.

de Castro also suggested in the 1990 paper that the presence of others may “produce a disinhibition of eating” (p. 1134). His use of the word “disinhibition” is problematic given that de Castro excludes dieters from his studies. Herman and Polivy (1984) proposed a boundary model to explain human eating behavior. According to this model, it is only dieters who initially inhibit their eating. Rather than depending on satiety as a “stop-eat” mechanism (as nondieters presumably do), dieters set up for themselves a diet boundary. If their intake remains at a level below this boundary, their diets have been maintained; if some factor causes them to surpass the

boundary, or if the boundary is somehow rendered inoperative (e.g., by the milkshake preload), then their diets are said to have been broken. It is the eating that extends beyond the diet boundary that is referred to as “disinhibited eating.”

In explaining “disinhibition,” de Castro goes on to write that “observing someone else eating may remove constraints on eating that otherwise would limit the amount ingested” (p. 1134). Perhaps what he is referring to is actually the phenomenon of modeling. As will be reviewed later, people tend to eat more in the presence of a companion who eats a lot as compared to when they are in the presence of a companion who eats just a little. This is an interesting proposition – perhaps social facilitation (and by extension, social inhibition) is driven by modeling effects. This issue will be explored in more detail in the first study of this dissertation.

de Castro writes that “social factors might also act by distracting the individual from the eating process and thereby releasing cognitive restraints” (p. 1134). Again, de Castro’s terminology is problematic given that nondieters are not typically described as having cognitive restraints. Yet, his proposition is interesting and certainly in line with the anecdotal explanations for social facilitation of eating that have been presented in the literature. It seems that during social eating, attention is directed away from food and eating, sometimes leading people to eat more than they otherwise would. When one is alone, there are fewer distractions, and both physiological and cognitive standards for appropriate eating can be more carefully attended to.

Finally, de Castro proposed a “time extension model” to explain his findings. This model posits that the presence of others is associated not only with greater intake, but also with greater duration of meals. Given that his data are all correlational in nature, de Castro (1990) writes that

“it is not clear...whether social factors operate to extend the duration of intake and this in turn causes the increment in consumption or whether social factors increase intake that increases the time required to consume the meal” (p. 1134). Both of these propositions are interesting and thought-provoking, but not without problems. de Castro has simply labeled a phenomenon that he has observed – namely, that group meals last longer than solitary meals. Yet, he does not explain *why* this is the case. The first proposition inherently makes sense – when we are in groups, we spend more time at the table (being social) and may end up eating more than we had intended. In effect, being in a group may render people less “internal” in nature. As has been mentioned previously, our attention is divided among many things in social situations and people may be less attuned to their internal feelings of satiety than they would be when they eat alone. This is certainly in line with Edelman et al.’s (1986) casual observations from their study of army personnel in which they described their subjects “lingering” at the table and chatting during social meals. The second proposition - that social factors increase intake therefore making people spend more time at the meal - is less clear. Why does the presence of others increase intake in the first place? This is a core issue in the study of social influences on eating and de Castro does little to advance possible answers to the question.

Two other studies have tested the time extension hypothesis with mixed findings. Feunekes et al. (1995) looked at the time extension hypothesis using path analysis. They reported that “the path model supports the existence of social facilitation of meal size by extending meal duration, which was partly due to a more sociable atmosphere” (p. 557). Although this finding is interesting, it also fails to *explain* the phenomenon.

Clendenen et al. (1994) is the only study however that has actually tested the time extension model in the laboratory. These researchers did not find clear support for de Castro's proposition. Their data showed that pairs took significantly longer to eat than did groups of four who took significantly longer to eat than did control subjects. Pairs did eat (nonsignificantly) more than groups of four. In order to lend support to de Castro's hypothesis, Clendenen et al's study would have had to demonstrate that groups of four took longer to eat, and ate more, than did pairs.

In summary, the time extension hypothesis is poorly developed and has garnered mixed support in the literature. Future researchers would do best to continue to examine the time extension hypothesis in the laboratory, as did Clendenen et al. Not only should researchers more carefully explore whether group meals are indeed longer (and larger) than are solitary meals, but they must also delineate the mechanisms underlying the time extension effect should it indeed occur.

Can a normative interpretation be advanced for the social facilitation phenomenon?

Of the three groups of studies presented here (social facilitation studies, impression management studies and modeling studies), the social facilitation literature lends itself least clearly to a normative interpretation. It is probable that within a group, individuals model the eating behavior of their companions. Yet, even in a simple pair of eaters, this phenomenon is difficult to measure. Who drives the eating? The only reasonable answer to this question is that intake is driven by a process of reciprocal modeling, with each member of the group setting an example as well as taking the behavior of others as a cue for appropriate intake.

Why, though, do people eat more in groups than they eat when they are alone? It is possible that a greater number of models results in more modeling, and therefore greater intake – the members of the groups may have an additive effect. This would help to explain de Castro's power function; unfortunately, neither Clendenen et al. nor Klesges et al.⁴ found support for the idea that our intake increases as the number of people present at the meal increases. Another possibility is that the person in the group who eats the most may be particularly salient and it may be that person who sets the norm for eating in the group.

Although researchers have not yet examined whether modeling effects underlie social facilitation of eating, finding out whether it does is not difficult. In the existing literature, the intake of one "target" member of a group is typically studied. For example, in de Castro's studies, we only know about the intake of the subject who is keeping a food diary – we know nothing about the intake of his/her companions, or even if they ate at all (which, as will be discussed later, may be a very important factor). In future studies, knowing how much *each* member of a group eats would be useful. Data of this sort (as were collected in the first study to be presented here) will allow researchers to gain a clearer understanding of whether modeling effects do indeed underlie social facilitation.

Impression Management: Self-presentational concerns typically lead to social inhibition of eating

What is self-presentation and why do we engage in it?

The second group of studies to be reviewed examines the use of eating as a self-presentational or impression management tactic (the two terms will be used interchangeably here). The clearest definition of self-presentation comes from Leary and Kowalksi (1990).

According to them, impression management is the “the process by which individuals attempt to control the impressions others form of them” (p. 34).

The idea that humans are invested in the impressions that they make on others is not new. James (1910) distinguished between “me,” the self as known and “I,” the self as knower. According to James, there were three parts of “me:” the material me, the spiritual me, and most relevant to this discussion, the “social me.” James defined the social me as “the recognition [a man] gets from his mates” (p. 42). He also wrote that an individual has “as many social selves as there are individuals who recognize him” (p. 42). In other words, James believed that people have the ability to tailor their self-presentations to the situations in which they find themselves (or more precisely, to the people with whom they find themselves).

The name most associated with the concept of self-presentation is that of Erving Goffman, a sociologist who took a unique perspective in his studies of self-presentation. According to Baumeister (1986), “Goffman...was dubious and skeptical of personality” (p. vii). Instead, he focused on overt behavior, using what he called “dramaturgical principles” (1959, p. xi). Goffman developed his theories of self-presentation by being an observer – carefully studying the ways in which people interact within their natural environments. He suggested that people within a social situation should be viewed as “performers” who, as a “team,” reciprocally define the situation. For Goffman, this process of defining the situation was the whole “point” of engaging in self-presentation.

Many modern psychologists have also focused on self-presentation, each suggesting slightly different motives for engaging in such behavior. Baumeister (1982) suggested that there are two motives underlying self-presentation. The most obvious motive is that we engage in

self-presentational behavior in order to reap social rewards, usually in the form of liking or admiration from others. Baumeister also suggested though that we engage in self-presentation in order to obtain self-fulfillment. Living up to our ideals, particularly in the presence of others, is esteem boosting.

Baumeister (1982) concedes that not all self-presentational behavior is motivated by a desire to impress self and others. Rather, we sometimes use our self-presentations for “some other manipulative effect” (p. 22). This view is congruent with the theory of strategic self-presentation advanced by Jones and Pittman (1982). In their view, people engage in self-presentation in order to maintain or augment power in relationships. From this perspective, it is clear that people do not always want to make “good impression.” Jones and Pittman defined five classes of self-presentational strategies and indeed, one of these classes is ingratiation - presenting ourselves as likeable. People may also be motivated, however, to present themselves as competent (“self-promotion”), moral (“exemplification”), dangerous (“intimidation”) or weak and dependent (“supplication”). Researchers in the area of self-presentation are careful to state that people are motivated to make “desired” impressions, rather than “good” impressions, since making a good impression may not always help us to accomplish our social goals.

Leary (1995) identified three motives that underlie impression management – interpersonal influence, constructing and maintaining the self, and emotion regulation. The first two motives are clearly in line with those advanced by Baumeister. In terms of the first, we all know that “making a good impression” is important and Leary argues that our success at impression management has a major influence on the quality of our lives. For instance, whether or not we succeed at impressing others clearly influences our chances of attaining close

relationships and career success. Impression management behaviors are also important to the construction of the self. Overt behavior allows people to “try out” aspects of the self and those that are successful can be integrated into the self-concept. It is not a far leap from these first two motives to conclude that we also engage in impression management behaviors as a way to regulate emotion. Leary and Kowalski (1990) suggest that “people will often try to make impressions that will elicit esteem-enhancing reactions...from others” (p. 37). Furthermore, esteem can be derived from within. Leary and Kowalski (1990) explain that “self-esteem is affected by people’s evaluations of their [own] performances and others’ imagined reactions to them” (p. 37). The authors see these three motives as “distinct” but they concede that specific factors that underlie the motives also “overlap substantially” (p. 38).

Two major questions emerge when we consider self-presentation. First, is self-presentation deceptive? Most researchers do not see self-presentation as deceitful or manipulative. Basically, knowing how to “read” a situation and tailor one’s behavior to it is a crucial social skill. Goffman suggested that people withhold or downplay information about themselves that is not consistent with the image that they would like to present at any given time. Jones and Pittman (1982) concur, explaining that self-presentation involves “selective disclosures or omissions” (p. 233). In other words, humans are complex and multi-faceted and we can not possibly show all of ourselves at any given time. Rather, we draw from the situations what is appropriate and helpful to reveal at any given time.

In general, self-presentations are in line with our “real selves” and many researchers have commented on why it is unwise to engage in deceptive self-presentation. First, behaving in such a way sets us up for self-presentational failures. If there is “a crucial discrepancy between our

all-too-human selves and our socialized selves” (Goffman, 1959, p. 56), we run the risk of being found out and being seen as liars. Another issue concerns effort. Goffman distinguishes between “real” performances that come naturally and require little effort and “contrived” performances that do not come naturally and require plenty of effort. Once we engage in a deceptive self-presentation, we must remember to maintain that deception the next time we interact with the person whom we deceived. Simply put, behaving in line with our true selves requires less effort and opens up less chance for future self-presentational failures.

Second, is self-presentation purposeful? Most researchers argue that self-presentational behaviors are typically quite automatic, although some can be contrived. Jones and Pittman (1982) suggest that self-presentational behaviors are highly learned and as a result, are automatic, non-conscious reactions to situations. Leary and Kowalksi (1990) suggest that there is a continuum, with different levels of impression monitoring determined by situational and dispositional factors. At one extreme is impression oblivion; at the other is impression focus. We are most often, however, at the level of pre-attentive scanning. At this level, people do not “consciously [consider] how others might be perceiving them,” but rather “scan the social environment for information regarding how others regard them” (Leary & Kowalski, 1990, p. 36-7). Regardless of how conscious we actually are of our self-presentations, Goffman (1959) suggested that we all like to take a stance of “calculated unintentionality” (p. 9) – in other words, no one wants to be viewed as a person who carefully plans their social behaviors.

The role of situational and dispositional factors in impression management

Before moving on to the role that impression management plays in eating behavior, it is important to look at the role of situational and dispositional factors in impression management

behaviors. It is obvious that the importance of making a “desired” impression varies according to the situation. Leary (1995) identifies many factors that increase the importance of making a “desired” impression. For instance, our motivation may be particularly high when our behavior is very public, when we are interacting with people who have a great deal of control over our goal attainment, and when we expect to have future interactions with the people with whom we are interacting. A crucial factor, and one not identified by Leary, is the degree to which we know our companions. Clearly, it is most important to make a “desired” impression on people whom we do not know well since those whom we do know well have already formed an impression of us. For people whom we know well, one self-presentational failure will probably not affect their impressions of us; for people with whom we are just becoming acquainted, one failure can ruin our chances for any future interaction at all.

Various individual differences are also related to the importance that people ascribe to the impressions that they make on others. Some people, by definition, are particularly concerned with impression management, including those who score high on measures of self-monitoring (Snyder & Campbell, 1982), public self-consciousness (see Fenigstein, 1979; Fenigstein, Sheier & Buss, 1975), and social anxiety (see Leary, 1995).

Relevant to the current studies is the individual difference variable of dietary restraint. For all people, eating can serve as a self-presentational tactic (see Leary, 1995; Pliner & Chaiken, 1990), but for dieters -- who are particularly concerned with food, eating and physical appearance -- eating may serve as a particularly powerful tool for communicating aspects of themselves to others.

The social meaning of weight and eating

In the literature, much has been written about the social meaning of weight and eating. Although the research in this area makes it clear that being overweight is a self-presentational drawback and that being thin lends a self-presentational advantage, it remains unclear where these biases came from. An examination of the historical antecedents for these beliefs could occupy a researcher for many years; here, attention will be given to the nature of these stereotypes. With what do we associate fatness and overeating and with what do we associate thinness and minimal eating?

In general, overweight people are viewed negatively in our culture. DeJong and Kleck (1986), in an excellent review on the social psychological effects of overweight, report that fat people, in comparison to those of normal weight, are viewed as less smart, less likely to be selected as friends, less often thought to have many friends, and more likely to be viewed as lazy. DeJong and Kleck (1986) also reviewed studies that examined social outcomes for overweight people. This body of literature suggests that overweight people have less chance of being admitted to college than do normal weight people (although their high school grades do not differ), have a more difficult time securing jobs, and have less earning potential once they are employed.

Weight is distributed normally in any given population – therefore we must ask whether stigma is associated with individuals who fall at the other end of the continuum. In another excellent review, Polivy, Garner and Garfinkel (1986), wrote about the causes and consequences of the current preference for thinness in our culture. Just as overweight is associated with all

sorts of negative traits, thinness is associated with all sorts of positive characteristics including cleanliness, honesty, self-confidence and an outgoing personality.

Why do people hold negative stereotypes of overweight people and positive stereotypes of thin people? As was mentioned earlier, the issue of personal responsibility seems to play a crucial role in the attitudes that people form toward overweight people. According to DeJong and Kleck (1986), “the overweight not only do not have an acceptable physical appearance, but are also perceived as characterologically flawed for not being able to resist the temptations of food” (p. 66). What fat people are faced with, then, is a double-edged sword – not only are they visibly overweight, but others also *assume* that they became overweight by eating too much.

Clearly, thin people are “visibly thin” just like overweight people are visibly fat. And, we also assume that thin people are just as responsible for their thinness as fat people are for their fatness. As pointed out above, though, it is assumed that people become fat due to a lack of self-control (e.g., eating too much). It is also assumed that thin people are thin because they have a great deal of self-control – both in terms of their eating and in terms of their exercise habits. Viewed in this way, it becomes apparent that the issue of self-control may be more relevant to our understanding of these stereotypes than the issue of personal responsibility. Simply put, overweight people are seen as lacking control, while thin people are seen as being able to exert a great deal of control. For unknown reasons, the latter has come to be viewed very positively in our culture.

Another body of literature suggests that eating behavior (namely, the *amount* that people eat) is also used as a source of information for drawing characterological conclusions. It is unfortunate that there have been no studies that have manipulated both the weight of a target

subject (overweight, normal weight, underweight) and the amount eaten by the target (small meal, large meal), since in the “real world,” people probably draw impressions of others based on their weight *and* on the amount that they eat. It would be interesting to know what types of judgments would be made when a target eats in a way that is not congruent with his/her body weight (e.g., an obese person eating a small meal). Rather, the literature in this area generally keeps the weight of the target constant and simply manipulates the amount that he/she eats.

Chaiken and Pliner (1987) gave male and female subjects a food preference questionnaire that had supposedly been completed by subjects (targets) in an earlier study. Male and female targets, all of normal height and weight, were depicted – only the size of the meals (breakfast and lunch) that they reported eating was manipulated. After reading the food preference questionnaire, subjects were asked to make ratings of the target individual. Female targets who reported eating small meals were perceived as more feminine, less masculine, more expressive, more concerned with their appearance, and better looking than were those who had reported eating large meals. Furthermore, females who reported eating larger meals were rated as being fatter than those who had reported eating smaller meals despite the fact that weight was held constant across targets. In contrast, the meal-size manipulation did not affect subjects’ perceptions of the male targets.

Bock and Kanarek (1995) performed a similar study in which subjects were asked to make judgments of a normal-weight male or female who was described as having eaten a small, medium, or large breakfast and lunch. In their study, all targets were rated as significantly more masculine and significantly less feminine as meal size increased and were rated as significantly more concerned with their physical appearance as meal size decreased. Only female targets were

rated as less attractive as meal size increased – perceptions of male target's appearance were not affected by the meal size manipulation.

Basow and Kobrynowicz (1993) asked males and females to watch videotapes of a normal-weight female eating different meals, manipulating both the size of the meal and the type of food consumed. The woman in the videotape ate either a small or a large salad (considered to be feminine meals) or a small or a large sandwich (considered to be masculine meals). Participants watched one of the four tapes and were then asked to rate the target subject on a number of dimensions. Two-way ANOVAs were run with sex of the subject and meal video (small or large "feminine" meal; small or large "masculine" meal) as the two independent variables. A main effect of meal video was found for the rating of social appeal. When the target ate the small salad, she was rated as significantly more socially appealing than when she ate the large sandwich. A main effect of meal video was also found for the rating of "concern for physical appearance." Post-hoc tests failed to reveal differences between any two meal types, but the authors pointed out that the eater of the large salad was perceived as being most concerned with her physical appearance while the eater of the large sandwich was perceived as being the least concerned. These main effects were not qualified by interactions with the sex of the subjects – both male and female subjects held these views. The authors concluded that "‘eating lightly’ for a woman does appear to be socially advantageous [and can] help explain why women may manipulate their eating behavior in the presence of others" (p. 342-3).

In summary, both weight and eating seem to have social meaning in our culture. Particularly for woman, thinness and minimal eating are associated with positive traits, while overweight and "heavier" eating are associated with negative traits. It appears that women have

internalized the knowledge that being overweight can lead to all sorts of negative outcomes in areas ranging from career to making friends. It is not surprising, then, to find that women use this knowledge to guide their eating – using minimal eating as self-presentational tactic.

Eating as a self-presentational tactic: The work of Pliner and colleagues

Pliner and her colleagues have carefully explored the ways that women use their eating to communicate images of themselves to others. The basic hypotheses underlying their studies are that women should eat less in the presence of a male companion (particularly if he is attractive) than in the presence of a female companion, while the intake of men should not be particularly affected by the sex of their companion. Mori, Chaiken & Pliner (1987) based these hypotheses on the premise that while “eating lightly conveys information about women’s femininity” (p. 694), the intake of males is not assumed to communicate information about their masculinity.

Mori, Chaiken and Pliner (1987, Study One) asked male and female subjects to participate in a “get-acquainted task.” Subjects were paired with either an undesirable or desirable male or female confederate. During the get-acquainted task, subject and confederate were each given a bowl of candy and peanuts to snack on. Intake by the confederate was held constant and intake by the subject was calculated once the task was complete.

The data revealed two significant interactions. There was a subject sex by confederate sex interaction, such that all subjects ate less in the presence of opposite sex companions as compared to when they were with same sex companions. Post-hoc tests revealed that this effect was reliable only for the male subjects. A subject sex by confederate desirability interaction was also found. While women ate significantly less in the presence of a desirable partner (as compared to an undesirable partner), men ate nonsignificantly more. The authors wrote that “in

a situation in which food intake could be used to influence others' perceptions of femininity, female subjects showed a significant tendency to restrict their eating in the condition in which such concerns were assumed paramount (i.e., with the desirable male partner)" (p. 696).

Pliner and Chaiken (1990) ran another study to explore further the effects found in Mori, Chaiken and Pliner's first study. Male and female subjects were paired with a socially desirable male or female confederate under the guise of a get-acquainted task. Subjects and confederates were offered crackers during the task; confederates were instructed to eat 15 crackers and the intake of the subject was the dependent variable. Initially, a subject sex by confederate sex interaction was found, with all subjects eating less in the presence of an opposite sex companion than in the presence of a same sex companion. No simple effects were found and therefore, the desirability ratings that subjects made of their companions were included as an additional independent variable in the analysis. Between-cell contrasts based on this analysis of variance showed that females ate less in the presence of a desirable male than they did in any other condition. The food intake of males did not differ according to the sex or perceived desirability of the companion with whom they were paired.

Presumably, impression management should be most important when one's image is at risk. To explore this issue, Mori, Chaiken and Pliner (1987, Study Two) ran another study in which the femininity of female subjects was threatened. Female subjects were informed that they had either very feminine or very masculine interests. Furthermore, they were informed that the individual with whom they would be participating in a get-acquainted task was either aware or unaware of this information. Following this threat to or enhancement of femininity, all

subjects participated in a get-acquainted task with a male confederate – during which they were offered a snack of candy and peanuts, as in Study One.

The data revealed a threat condition by awareness interaction. When subjects had received threatening information and were led to believe that their male companion was aware of it, they ate less than did subjects whose femininity had been reinforced. When participants were led to believe that their companion was not aware of the feedback, the opposite effect was observed. Those who had received threatening feedback ate more than did those who had received positive feedback. The authors concluded that “women may restrict their food intake in order to enhance their feminine identities. Such restricted eating may occur either to protect one’s feminine identity in response to a threatening event or to take credit for an identity affirming positive event” (p. 701).

Having found these interesting effects in the laboratory, Pliner and Chaiken (1990, Study Two) then developed a questionnaire to further explore the issue of eating and social motives. In Part One of the questionnaire, subjects were asked to imagine that they were having lunch with a likable person that they had just met. Some subjects were told that this person was of the same sex as them, some were told that the person was of the opposite sex and for the control group, the sex of the companion was unspecified. Subjects were presented with ten social motives (e.g., making a good impression, appearing feminine, etc.) and were asked to indicate how important it would be for them to accomplish each motive (e.g., “How important would it be for you to make a good impression?”). In Part Two of the questionnaire, participants were asked how much they would eat (from “extremely small amount” to “extremely large amount”) if each of these motives

was indeed important to them (e.g., “Assuming that you want to make a good impression, how much would you eat?”).

Before analyzing the data, the ten social motives were factor analyzed. Three factors emerged: a femininity/masculinity factor, a social desirability factor (that included making a good impression, appearing attractive, being polite, becoming involved in/appearing interested in conversation with the companion) and a “miscellaneous” factor (that included appearing healthy/fit, being similar to one’s companion, competing with/feeling superior to one’s companion).

Data were analyzed using two by two ANOVAs, with partner sex and subject sex as the independent variables. On the masculinity/femininity factor, an interaction emerged such that females rated appearing feminine as more important when eating with males than when eating with females, while for male subjects, the importance of appearing masculine did not differ as a function of the sex of their partner. All subjects (both males and females) reported that it was more important to appear socially desirable when eating with an opposite sex partner and that it was more important to compete with a partner of the same sex.

In order to analyze Part Two of the questionnaire, Pliner and Chaiken (1990) computed difference scores by subtracting estimates of intake given by control subjects (who were asked to make estimates based on a partner of unspecified sex) from estimates of intake given by experimental subjects (who were asked to imagine eating with either a male or a female partner). As the authors explained, “scores represent differences in estimates produced by knowledge of the sex of eating partner” (p. 248).

As with Part One of the questionnaire, two way ANOVAs were run with subject sex and partner sex as the independent variables; here, estimates of intake were the dependent variables. All subjects reported that they would eat less than baseline in order to appear feminine and more than baseline in order to appear masculine – but the magnitude of this difference was found to be greater for women. In terms of social desirability, both male and female subjects reported that they would eat less than baseline to accomplish this goal, regardless of the sex of their companions. For the motive of appearing similar to one's companion, subjects reported that they would eat more than baseline to appear similar to a male companion and less than baseline to appear similar to a female companion. Finally, all subjects reported that they would eat more than baseline in order to feel superior to, or compete with, their partner – with one notable exception. Females reported that they would eat less than baseline in order to feel superior to, or compete with, a female companion.

Pliner and Chaiken's (1990) study leads us to two important conclusions – both relevant to the studies that will be presented here. First, it is clear that a variety of social motives can govern eating. And, secondly, their data suggest that (at least when directly asked) people are cognizant of the fact that they can adjust their eating in order to accomplish their self-presentational goals.

Should the weight of our companions affect our self-presentational concerns?

The work of Pliner and her colleagues clearly suggests that women use their eating as a self-presentational tactic. They eat less when they are in the presence of desirable men (as compared to undesirable men or any women) and social inhibition of eating is clearly seen when

their femininity is publicly threatened. Women seemed to have internalized a belief that minimal eating enhances their femininity.

Sex is not the only “companion characteristic” that seems to influence the degree to which people experience self-presentational concerns around food and eating. Some researchers have explored whether the weight of our companions affects the way that we eat. Maycovich (1978) observed obese and normal weight individuals eating at a smorgasbord restaurant. Presumably, the nature of our companions should influence the degree to which we are concerned with impression management (e.g., eating in the presence of a thin individual may lead an overweight individual to feel self-conscious about her weight) and this concern should be manifested in our eating behavior. As diners left the restaurant, they were asked to report whether they were “regular” or “occasional” patrons of the restaurant. Maycovich (1978) reported that “regular” patrons who were overweight or obese were more likely to come to the restaurant alone or with other overweight or obese people than with normal weight people. These overweight “regulars” ate more food, at a faster rate, than did normal weight “regulars.” The overweight/obese “occasional” diners showed markedly different behavior. These “occasionals” tended to visit the restaurant with normal weight diners (rather than with other obese/overweight diners) and also ate less and more slowly than their normal weight companions. The eating behavior of normal weight individuals did not vary according to the weight of their companions or their status as “regular” or “occasional” patrons to the restaurant. It seems evident that the impression management concerns of obese diners were heightened by the presence of normal weight companions, leading to minimal eating, and dampened by the presence of obese companions, leading to heavy eating.

De Luca and Spigelman (1979) paired female subjects with either obese or normal weight confederates. Subject and confederate were seated side by side and were each offered a bowl of candy to snack on as they completed some questionnaires. The confederate was instructed to eat ten candies and the amount eaten by the subject was the dependent measure. Results showed that obese individuals ate significantly more candy when paired with an obese confederate than when they were paired with a normal weight confederate. Normal weight individuals ate slightly more with a normal weight confederate than with an obese confederate. De Luca and Spigelman (1979) conclude that “the obese person may feel self-conscious about eating in the presence of a slim person if the latter is perceived as disapproving towards her and consequently, inhibits her eating behavior. However, in the presence of another obese person, such feelings of self-consciousness may be reduced to the extent where the obese person is able to relax her inhibitions” (p. 128).

The role of self-awareness in eating

The remaining studies that fall under the heading of “impression management” take a slightly different perspective, although individual difference variables are still a focus of attention. The studies described above examine the effect of various companion types on food intake (presumably mediated by impression management concerns). There are three studies that focus on how awareness of eating, or more specifically, on awareness of oneself as an “eater” affects the amount of food consumed. Some allusion was made to this issue earlier in this review. In some of the social facilitation studies (e.g., Clendenen et al., 1994; Edelman et al., 1986), authors commented on how attention is directed only to food and eating in solitary eating

situations. This increased awareness of food and eating may make people more cognizant of their dietary ideals, be they simply not to become overly sated or to stick to a diet.

Knowledge of the eating literature, however, suggests that eating alone is not a foolproof way to control intake. Indeed, binge eating – both in dieters and eating disordered individuals – tends to occur primarily when people are alone (Polivy & Herman, 1993). Factors within social eating situations can also influence the degree of attention directed toward food and eating. These factors can be clearly tied to impression management concerns.

Pliner and Iuppa (1978) explored the importance of attention in solitary eating situations. They asked obese and normal weight female participants to consume lunch in front of a mirror that had either been covered (no mirror condition) or left uncovered (mirror condition). All subjects, regardless of weight, ate less in the mirror condition than in the no mirror condition. The effect was slightly weaker for normal weight subjects than for obese subjects. Pliner and Iuppa (1978) interpreted their results in the context of Duval and Wicklund's (1972) theory of objective self-awareness, suggesting that "attention could have made subjects aware of the discrepancies between their actual weights and their ideal weights, producing behavior intended to reduce the discrepancies – i.e. reduction in amount consumed" (p. 23). The mirror can be seen as a means of increasing the importance of "self-presentation to self." In effect, the mirror forced participants to be their own audience and their heightened impression management concerns (driven by a desire to impress themselves) forced them to live up to the behavioral ideal of minimal eating that seems to be appropriate for females in our culture.

Polivy, Herman, Hackett and Kuleshnyk (1986) also explored the importance of attention on eating behavior, placing their focus on potential differences between dieters and nondieters.

In their first study, subjects were given a large milkshake preload and were then asked to taste and rate some candies. Subjects were randomly assigned to a self-attention condition (in which they were instructed to allow the candy wrappers to pile up in front of them, but to throw them in the trash before the experimenter returned), a public attention condition (in which they were simply told to let the candy wrappers pile up on the table in front of them) and a control condition (in which subjects were told to throw each wrapper in the trash as the candy was unwrapped). Some subjects in the control condition were not preloaded.

Restrained subjects ate significantly more in the preloaded/control condition than in the other three conditions. Both self-attention and public attention served to counteract the disinhibited eating that one would expect from dieters following a large preload, bringing intake down to the level of the nonpreloaded control group. For non-dieters, self-attention alone was not sufficient to inhibit eating. The preload itself serves to inhibit eating in nondieters and it was only the stronger manipulation of public attention (with its inherent self-attention) that served to further inhibit the eating of nondieters.

In Study Two, half of the subjects were given a cake preload (while the other half were not preloaded) and all subjects were asked to taste and rate three flavors of cookies. In this study, participants in the self-attention condition were told to keep track of how many cookies of each flavor they had eaten, since they would have to report to the experimenter which flavor they had consumed the most of. In the public attention condition, participants were told that they would have to report to the experimenter how many cookies of each flavor they had eaten. In the control condition, participants were given no instructions.

The results from this study were complex. As compared to the control condition, any type of attention suppressed eating in all subjects (regardless of level of dietary restraint) – but whether or not subjects had consumed a preload had a powerful influence. Both public attention and self-attention reduced the intake of preloaded dieters and of nonpreloaded nondieters (as compared to the control condition). The authors concluded that “self-attention and public attention both seem to counteract the disinhibitory effects of a high-calorie preload and bring dieters’ eating back to ‘restrained levels.’ Paying attention to one’s behavior may forestall some mindless quality inherent in disinhibited eating or bingeing” (p. 6-7). Of equal interest, however, is the fact that attention inhibited eating in the unrestrained subjects as well. Presumably, the eating behavior of unrestrained subjects can also be mindless. Given sufficient distractions, they too may surpass their stop-eat boundary. While dieters have set up for themselves a diet boundary (Herman & Polivy, 1984) as a means of controlling their eating, the intake of nondieters is not unregulated – rather, it is influenced by hunger and satiety. It is reasonable to assume that increased attention to eating makes nondieters more aware of their internal physical state and leads them to stop eating before they are uncomfortably full. This study also suggests that nondieters have some concern for what others think of their eating behavior, even though common sense would suggest that this concern would be unique to dieters.

This brings us to the question of how people react when their eating is actually observed. In Polivy et al.’s (1986) study, participants thought that the experimenter would *know* how much they had eaten (in the public attention condition), but given that the experimenter could not actually *see* them eating, the pressure to make a particular impression may have been lessened.

Some studies (including the studies that will be presented in detail here) have examined the degree to which an observer can affect eating behavior.

A Special Case of Attention: What is the effect of an observer on amount eaten?

The literature just reviewed brings us to two conclusions. First, increased attention to the “self as eater” can lead to inhibition of eating. Secondly, when a person *believes* that others may be aware of how much she ate, social inhibition of eating can also occur. By extension, it is reasonable to assume that when others are clearly cognizant of how much a person is eating (and indeed have no other demands on their attention except the way that the “eater” is eating), that person will experience particularly heightened impression management concerns and should eat very minimally.

Conger, Conger, Costanzo, Wright and Matter (1980) did find evidence for minimal eating in the presence of a non-eating observer. They paired male and female subjects (classified as normal weight or overweight) with a male or a female confederate. The confederate was instructed to eat either one cracker (low eat condition), twenty crackers (high eat condition) or no crackers at all (no eat condition). Some subjects ate alone. This study will be reviewed in more detail in the Modeling section of this review, but relevant here is the finding that all subjects ate very minimally in the no eat condition – eating far less than they had in any other condition. Conger et al.’s study can also be interpreted from an attentional/impression management point of view. In this situation, a subject was asked to eat in the presence of a complete stranger who was focusing all of his/her attention on the subject. It is reasonable to assume that subjects’ impression management concerns were very much heightened in this situation – and that in order to make a good impression, they ate minimally.

Herman, Polivy and Silver (1979) also examined the effect of an observer on eating behavior. In their study, unrestrained and restrained eaters were given a small or a large milkshake preload and were then offered ad-lib access to more of the milkshake while either alone or while observed by a non-eating companion. Unrestrained eaters were unaffected by the presence of observer, eating less after the large preload than after the small preload. Restrained eaters, however, were strongly affected by the presence of the observer. When they were left alone, they ate more after the large preload than after the small preload – in other words, they engaged in counterregulatory eating. When observed, however, restrained eaters exhibited appropriate caloric regulation, eating more after the small preload than after the large preload.

This pattern of findings is different from that of Conger et al. In Conger et al.'s study, the non-eating observer led to social inhibition of eating; in Herman et al.'s (1979) study, the observer actually led dieters to eat “sensibly” or appropriately. Despite these different patterns of results, both studies can be interpreted from a normative perspective. In Conger et al.'s study, participants were not preloaded – they were offered crackers to taste and simply had to taste enough in order to complete the taste-rating task. Under these requirements, it was certainly acceptable to eat very minimally in the observer condition – which participants indeed did. In Herman et al.'s study, participants were preloaded and furthermore, were told to drink as much of the ad-lib milkshake as it would take to “achieve comfortable satiation” (p. 89). Therefore, Herman et al.'s subjects had greater pressure to eat and also to determine how much was appropriate to achieve satiation. In other words, subjects (particularly dieters) were motivated to present themselves to the observer as “normal” eaters.

Do we always need to eat minimally in order to make a good impression?

The literature in this area quite consistently demonstrates how people use minimal eating to make a good impression (with the exception of Herman et al., 1979, in which the dieters ate “sensibly” in order to make a good impression). It should be noted that there are times when eating a lot is required if one hopes to make a good impression. The obvious example of this is when we are in the presence of “the cook.” It would be ill-mannered to not eat heartily when a person has slaved over a hot stove to prepare a meal. Whether or not we are hungry, and whether or not we find the food palatable, are secondary concerns to being a good guest.

Another example, particularly relevant to the 90’s, is when a person is motivated to dispel a belief that she has difficulties with food and eating. Calista Flockhart, star of the current television show, *Ally McBeal*, has received abundant media coverage lately due to her astonishingly thin physique. A recent article in the *New York Times* explained that “the hysteria over Ms. Flockhart’s putative anorexia reached such a pitch of meanness a couple of months ago that the actress took to eating large meals in public as self-defense” (Durbin, 1998, p. 39). It is certainly possible that people with eating disorders (or those who have difficulties with eating that are not clinically significant) do try to engage in “normal eating” on occasion in the presence of others in order to dispel suspicion about their eating habits.

Can the norm interpretation be applied to the impression management literature?

Applying a norm interpretation to the impression management literature is slightly simpler than it was for the social facilitation literature. In impression management studies, the amount eaten by the confederate is typically held constant while various aspects of the situation are manipulated (e.g., sex or desirability of the companion). Therefore, any variations in intake

by the subject can be attributed to these situational manipulations and their presumed influence on impression management concerns.

The overarching theme that emerges from the impression management literature is that some people seem to hold a norm for minimal eating. Women know that it is appropriate to eat minimally in the presence of men; obese individuals know that it is appropriate to eat minimally in the presence of normal weight individuals. People have acquired this “minimal eating norm” through socialization, in much the same way as we acquire table manners. It is likely that people are unaware that they hold and adhere to this norm, yet it clearly influences eating behavior.

Modeling: People Tend to Match the Intake of their Companions

The “minimal eating norm” is only one of many norms that can affect the way in which people eat. Another type of norm that consistently emerges from the eating literature is a “matching norm” dictating that it is appropriate to gauge appropriate intake from the intake of those around us. Modeling studies – in which subjects are assigned to eat with a confederate who either eats a lot or just a little bit of food – consistently show that people are powerfully swayed by the intake of their companions.

Are obese individuals and dieters differentially affected by modeling effects?

Nisbett and Storms first explored the issue of modeling effects on eating in 1974. As was the case with the early social facilitation studies, early studies of modeling were directed at discovering potential differences between obese and normal weight individuals. Nisbett and Storms introduced their study by writing that “by now, a considerable amount of research has demonstrated that the obese are indeed highly responsive to sensory food cues....in contrast there is little evidence that the obese are more responsive to external cues which are not sensory in

nature” (p. 191). As was the case with the social facilitation studies, the modeling studies have also failed to support the notion that obese people should be differentially responsive to non-sensory external cues – in this case social cues.

In Nisbett and Storms’s study, underweight, normal weight and overweight male students tasted crackers in a social suppression condition in which a confederate ate only one cracker or a social facilitation condition in which the confederate ate twenty crackers; other participants tasted the crackers alone. Participants in all three weight groups ate significantly more in the social facilitation condition than they had in the alone condition. Furthermore, overweight and normal weight participants ate significantly less in the social suppression condition than in the alone condition; the differences did not reach significance for underweight subjects who were already eating minimally in the alone condition.

Conger, Conger, Costanzo, Wright and Matter (1980) also explored the effects of modeling on obese and normal weight participants, none of whom were currently dieting. In their study, both male and female subjects were used and were randomly assigned to participate with a male or female confederate. In other words, they were interested not only in the relationship between modeling effects and body weight, but also in the relationship between modeling effects and gender composition of groups.

Participants were either left alone to eat or were paired with a confederate who ate a lot (20 crackers) or a little (one cracker). A fourth group was paired with a confederate who did not eat at all. The results of Conger et al.’s (1980) study were very complex owing to the number of variables included in their study. Of particular relevance here is the finding that participants ate more when they were paired with the model who ate a lot as compared to when they were paired

with the model who ate only a little bit. Conger et al.'s study was unique in that some participants were asked to eat in the presence of a non-eating confederate. Results showed that participants ate significantly more when the model ate than when he/she refrained from eating. The authors conclude from this finding that "simple social presence" is "inhibitory" (p. 267) and they point out that this effect applies to both overweight and normal weight subjects.

Conger et al. also reported some other interesting findings – more relevant to the issue of impression management than to the issue of modeling. Their data suggest that obese females ate significantly less than did normal weight females when the model was present. They suggest that "the presence of others in the social context cues eating restraint in overweight women to a larger extent than for overweight men or both normal weight groups" (p. 269). Furthermore, they also reported that participants ate more when the model was of the same sex as compared to when the model was of the opposite sex.

Rosenthal and McSweeney (1979) also paired male and female subjects with either a same or an opposite sex normal-weight confederate. Confederates were instructed to eat either a lot or a little; some subjects were assigned to be in a control group and ate alone. Although the authors report the percentage of their subjects who were normal weight and the percentage that were obese, weight was not included as a variable in the analyses. Another methodological flaw of this study is the fact that nine male and eight female confederates were used, thus introducing an unacceptable degree of variability between subjects.

An analysis of variance with subject sex, confederate sex and modeling condition was performed. A two-way interaction was found between modeling condition and model's sex. Post-hoc tests revealed that all subjects who were paired with a high consumption male ate more

than did subjects paired with a high consumption female or a low consumption confederate of either sex. The authors erroneously conclude (given that weight was not actually an independent variable in their study) that “normal weight and overweight individuals showed this behavior [eating more with the high consumption male than in any other cell] to the same degree” (p. 212). They interpreted this finding as suggesting that “this may reflect the higher status of males in our society” (p. 213). It is unfortunate that the experimenters did not ask subjects to report how much they thought that the confederate had eaten. It is possible that the modeling effect was carried by the *perception* that the high consumption male had eaten significantly more than the high consumption female on the basis of implicitly held sex-typed norms for consumption.

The studies reviewed thus far suggest that obese and normal weight individuals are not differentially responsive to social models. As was the case with social facilitation research, interest in modeling effects gradually shifted to the question of whether dieters and nondieters were differentially responsive to social cues. In a study by Polivy, Herman, Younger and Erskine (1979), preloaded dieters and nondieters were asked to eat with a confederate who ate a lot or a confederate who ate just a little. Furthermore, for half the subjects, the confederate identified herself as a dieter; for the other half of the subjects, the confederate made no comment as to her dieting status. Based on Herman, Polivy and Silver’s (1979) finding that dieters were more responsive to social cues than were nondieters, the authors predicted that the restrained eaters in Polivy et al. (1979) would be particularly susceptible to the model. Furthermore, drawing on social psychological research, it was predicted that modeling effects would be enhanced if the subject felt similar to the model. In other words, it was expected that modeling

effects would be particularly strong when dieters were paired with a confederate who identified herself as a dieter.

The results of this study were fascinating, although not in line with predictions. In fact, three main effects were found. Across all conditions, restrained subjects ate less than did unrestrained subjects. In line with previous modeling studies, all subjects, regardless of level of restraint, ate more in the presence of the large-eating confederate than in the presence of the small-eating confederate. And, perhaps most interesting, all subjects, again regardless of level of restraint, ate significantly less in the presence of the “dieting” confederate than in the presence of the “nondietering” confederate. This effect was independent of how much the confederate actually ate. The authors concluded that “the presence of a dieter (or the mention of dieting) alerts subjects to the implicit norm of minimal consumption” (p. 111). Because the mention of dieting affecting both restrained and unrestrained eaters, the authors concluded that “restraining one’s consumption is a behavioral option open to virtually all (female) subjects in our culture” (p. 111).

Only one other published study explored potential dieter/nondieter differences in susceptibility to a model. Unfortunately, the study is fraught with methodological errors, mostly in terms of the assignment of subjects to groups. Rosenthal and Marx (1979) observed the eating behavior of women who had been enrolled in a behavioral weight reduction program. Based on the amount of weight that the women had lost in the program, participants were classified into a “successful” dieter group and an “unsuccessful” dieting group. Dietary restraint, however, was never actually measured. An untreated control group was comprised of normal weight students who were never asked to complete any measures to assess dieting status.

Putting aside these flaws for the moment, let us consider the actual study. Subjects were assigned to taste some foods in the presence of an “appropriate model” who ate minimally at a slow rate or an “inappropriate model” who ate a lot at a fast rate. Some subjects ate alone. Two main effects were found. Participants who were paired with the “inappropriate model” ate more than did participants who were paired with the “appropriate model” or participants who ate alone. Furthermore, the untreated control group ate more than did either of the dieting groups. The authors inappropriately conclude that “modeling of inappropriate eating behavior was found for dieters as well as nondieters” (p. 220). Although it is clear that all subjects in the study were influenced by the model, the role played by dietary restraint remains unclear given that we cannot be certain of the restraint status of any participants in the study.

Two studies demonstrate the power of social influence

Perhaps the most impressive study demonstrating social influences on amount eaten was reported by Goldman, Herman and Polivy (1991). In their first study (Study One), nondieters were assigned to be in a “low deprivation,” “moderate deprivation” or “high deprivation” group. In the low deprivation group, participants were asked to fast for four hours and were then given a small preload known to make people feel neutral (not hungry and not full). The moderate deprivation group fasted for 12 hours prior to the study and the high deprivation group fasted for a full 24 hours prior to the study. Subjects were paired with an inhibition confederate who ate very minimally or an augmentation confederate who ate a lot. The results were surprising – although the authors had predicted that high levels of deprivation would limit modeling effects, they actually found a main effect of modeling condition with no interaction with deprivation

condition. Regardless of level of deprivation, participants ate significantly less with the inhibition model than with the augmentation model.

In their second study (Study Two), nondieting females were again paired with an inhibition or an augmentation confederate. A third group of subjects ate alone. Subjects were assigned to either a low or a high deprivation condition; the moderate deprivation condition used in Study One was eliminated. In this study, two strong main effects were found with all subjects eating more with the augmentation confederate than with the inhibition confederate and with deprived subjects eating more than did neutral subjects, but only in the presence of the confederate; deprivation actually had no effect on the intake of subjects who ate alone. The most interesting finding was that the modeling effect was actually stronger in the deprivation condition than in the neutral condition. Goldman et al. concluded that “social influence...is an extremely powerful factor in the control of eating. Compared to the power of modeling, deprivation-induced hunger appeared to exert weak and fitful effects” (p 138).

An unpublished study (Herman, Polivy, Kauffman & Roth, 1999) adds further weight to the power of social influence. In this study, subjects conformed to an augmentation norm even after having consumed a very large preload. The fact that people will adhere to an inhibition norm when they are very hungry (as in Goldman et al., 1991) and will adhere to an augmentation norm even when they are very full (as in Herman et al., 1999) is perhaps our best evidence for the idea that social factors may play one of the most important roles in determining how much people eat.

Can the normative interpretation be applied to the modeling literature?

Obviously, a normative interpretation applies very clearly to the modeling literature.

Leary (1995) identifies two reasons why people may conform to the behavior of those around them. First, we may follow the lead of others simply because we do not know how to behave in a given situation. From a young age, we have been taught to look to the behavior of others as a guide in situations where the proper way to behave is unclear (e.g., knowing which fork to use at a formal dinner). Visser (1991) proposes that such “conformity” is actually crucial to human survival. She writes that “being human, and depending as we do on knowing our way round our complex and perilous social world, it is entirely necessary to us that we should also react instinctively to very small signs given by other people in social contexts. No one in the group might even be conscious that such a sign has been given” (p. 18-19). It is likely that people are particularly attuned to subtle social cues in laboratory-based eating studies. While we are all accustomed to going out to a restaurant to eat, “eating studies” are novel to most subjects. It would be interesting to know if the modeling effects that are observed in laboratory studies are in fact greater than the modeling that takes place in everyday interactions.

People also conform to the behavior of those around them as a means of self-presentation. Leary (1995) explains that “people often go along with the crowd because they’re afraid of how others will regard them if they don’t” (p. 30). People have learned that in order to be liked and accepted by others, it would be best to behave as does the crowd. Although we live in a culture that supposedly values individuality, we also know that “infractions make news” (Goffman, as quoted by Visser, 1991, p. 75) and people clearly go to great pains to avoid such infractions.

Three Studies Exploring the Influence of Norms on Social Eating Behavior

The review of the literature on social influences on eating clearly demonstrates that the presence of others can have variable effects on the amount that people eat. The three lines of research examining social influences on eating – social facilitation studies, impression management studies and modeling studies – seem to have developed in virtual isolation from each other, with only feeble attempts to reconcile (or even recognize) their divergences and contradictions. We propose here that all three of these literatures can be understood in terms of people's attempts to detect and use norms to govern behavior, especially in situations in which the appropriate behavior is unclear. It is important to note from the beginning that the appropriate amount to eat is more often than not unclear. Even at a regular, routine meal, it is not usually obvious how much one ought to eat. Most of the time, we cannot rely on our internal, physiological guidelines for much assistance. Hunger is often not a significant factor when we begin to eat (particularly in social situations), and even if it is, it quickly subsides after a few mouthfuls so that how much more we should eat is not at all obvious. Portion size (as defined by the person serving the meal) is occasionally used as a guideline; insofar as we rely on portion size as a guide, though, we are simply adopting someone else's notion of how much we should eat. Further, whether or not we acquiesce to the dictates of portion size depends in turn on other ("meta-") norms. Sometimes (depending on the culture or the occasion) it is appropriate to clear one's plate; sometimes such behavior would be viewed as gluttonous and uncouth, regardless of the portion size. When we serve ourselves, what is appropriate becomes even murkier.

In the absence of internal guidelines—either physiological signals or some sort of mental rules about what is appropriate (as are often observed in dieters)—one is forced to govern the quantity of one's eating by reference to whatever norms of appropriateness may be extracted from the situation. When we eat in the actual or implied presence of others, social norms of appropriate eating become salient. This effect is most obvious in the modeling literature, in which people clearly use other people's intake as a basis for determining how much to eat. Hunger or satiety notwithstanding, experimental participants tend to match the intake of the experimental confederate. In addition to assuring the participant that he or she is behaving appropriately, adhering to these social norms may serve to ingratiate oneself with the confederate. Baumeister (1982) points out that a major motive underlying self-presentation is the attainment of social goals, most often eliciting liking or admiration from others. It is clear in the modeling literature that this motive is salient; participants assume that if they behave appropriately (e.g., by at least roughly modeling the behavior of others), they will be liked, admired, and accepted.

In the impression management studies (in particular those studies carried out in the laboratory), the amount eaten by the confederates is held constant, yet eating is found to vary as a function of various situational factors, most notably the nature of the companion. We would suggest that the norm for food intake established by the companion is overpowered by some other norm. For instance, Chaiken, Pliner and their colleagues suggest that females in our culture learn that femininity and other virtues are associated with restricted intake; accordingly, the female eater who is uncertain how to behave, and who wishes to behave properly, is likely to eat restrictively. We may also be influenced by norms for eating a lot, as in the case of eating in

the presence of the cook, as described earlier. Herman, Polivy and Silver (1979) suggested that dieters, despite their often “uncontrolled” behavior following a preload, might react to being observed by adhering to a norm of “sensible” intake. In their study, preloaded dieters showed “irrational” counter-regulation when eating alone but “sensible” regulation when observed. It appears that people have a knowledge base of norms for appropriate eating that they can draw on depending on their eating companions and/or the eating situation.

The social facilitation literature does not lend itself so readily to a normative interpretation. Why should the norm for how much to eat increase when one finds oneself in a group? The dynamics of eating in groups are largely unexplored at this point, but it seems at least possible that the group engages in mutual modeling; that is, each eater looks to the others to see how much intake is appropriate. But why should this mutual modeling lead to increased intake? One possibility is that at any given moment those who are eating are more noticeable or salient than are those who are not eating, simply because doing something makes more of an impression on others than does doing nothing; this perceptual bias may have the effect of potentiating imitative eating. In the same vein, the hungriest individual, or the individual who has the highest initial intake rate, may “drive” the eating of the rest of the group beyond what it might otherwise be.

The present studies were designed to demonstrate the value of a normative interpretation of eating. In Study One, participants ate in the presence of either a co-acting companion or a noneating observer, allowing us to explore the effects of two different intake norms—the norm provided by others’ intake and the norm required to impress a noneating observer. In Study Two, we manipulated the perception of others’ intake directly. Furthermore, some participants

in Study Two were faced with a self-presentational dilemma, a conflict between the norm of impressing a noneating observer and the norm of matching others' intake. Study Three emerged from Study Two and was, in part, a replication of the former study. In this final study, the issue of "self-presentation to self" was also explored by setting up a self-presentation dilemma in the form of a conflict between behaving in line with one's ideals and the norm of matching others' intake. It was expected that a normative interpretation would provide the most coherent explanation for the eating displayed under these various social conditions.

STUDY ONE

The major purpose of Study One was to introduce our normative framework to integrate the literature on social facilitation, modeling and impression management. Female participants were assigned to one of three conditions. In the Alone condition, participants ate alone, with little or no opportunity to use social norms to guide behavior. There were also two social conditions. In the Observed condition, each participant was paired with a companion who did not eat at all, but merely observed the participant. In this condition, we expected that intake would be suppressed among the female participants, since females adhere to a restrictive intake norm when they try to impress a stranger, especially one who is actively observing them. In the Co-action condition, each participant was paired with another participant (or "companion"), who ate *ad lib.* along with the subject. Insofar as this companion served as an observer, we would expect to see reduced intake; but insofar as the companion's intake served as a guide to appropriate behavior, we would expect to see the participant match the companion's intake.

Certain individual difference variables are associated with the degree to which people experience concern about the impressions that they make or want to make. In this study, we

were particularly interested in dietary restraint. By definition, dieters are concerned with the way that they look, and it is reasonable to assume that this concern about appearance should apply all the more to the impressions that they make while they are eating; we would expect dieters, when observed, to be especially prone to restricting their intake in the interests of making a good impression. Thus, although we realized that eating in the presence of a stranger could affect *all* the female participants to some degree, we expected our manipulations to have a particularly powerful inhibitory effect on the dieters in this study.

The Alone condition in this study was included to serve as a baseline against which to measure the impact of observation and co-action. In planning this study, we were concerned lest dieters eat minimally in all conditions, which would make it difficult to detect a suppression of intake under conditions of observation. In order to increase baseline (Alone) intake among dieters, all participants were given a milkshake preload before they engaged in *ad lib* eating. Laboratory studies (see Herman & Polivy, 1988, for a review) have repeatedly demonstrated that a milkshake preload disinhibits eating in dieters, while suppressing subsequent eating in nondieters. (We expected the social manipulations to have a weaker inhibitory influence on nondieters than on dieters, so we were less concerned about nondieters starting from a relatively low baseline of intake.)

Method

Participants

A sign-up sheet for a study entitled "Perceptions of the University Environment" was posted in the Psychology department at the University of Toronto. This title was used so that prospective participants would not be aware that the study concerned eating behavior. Students

were contacted by telephone and a one-hour appointment was arranged between the hours of 11:00 a.m. and 5:00 p.m. The experimental condition to be run in each time slot was determined by random assignment. For the Alone condition, only one participant (the subject) was booked for each hour. In the Observed and Co-action conditions, two subjects (the subject and another participant) were booked for each hour. It was not always possible to book two participants for a time slot scheduled for the Observed or Co-action condition. Therefore, sample size varied across conditions, with the Alone condition having a larger sample size than the Observed or Co-action condition.

When two participants were recruited for one time slot, the first participant was designated the "subject" and the second participant was designated the "companion." Although both participants ate in the Co-action condition, only the food intake data provided by the subject were used for the analyses examining mean levels of food intake. Data from the companion were collected, however, and were used in the correlational analyses. In the Observed condition, only the subject ate, while the companion observed.

A total of 131 first- and second-year female students took part in this study. Eighty-one students (31 in the Alone condition, 23 in the Observed condition, and 27 in the Co-action condition) were considered "subjects" whose data were used for mean-level analyses, while 50 (23 in the Observed condition and 27 in the Co-action condition) were considered "companions."

Of the 131 subjects, 126 were recruited via the sign-up sheets described above; they earned one point of course credit for their participation. Five additional subjects were recruited via sign-up sheets posted in the Psychology department, offering \$6 for participation. The mean age of participants was 21 years ($SD=5.3$).

Materials and Procedure

The study took place in a laboratory designed to look like a kitchen with an eating area. Participants were seated at a rectangular table; in the Observed and Co-action conditions, participants were seated across the table from one another. Once participants were seated, they were provided with information about the study, all designed as a cover story to mask the real purpose of the project. They were told that participation involved completing a number of questionnaires regarding their perceptions of the university environment. They were then told that the research group running the study conducted research on human attitudes in general, including peoples' attitudes about food and eating. Therefore, the group was often approached by companies interested in marketing new foods, in the hopes of getting feedback from undergraduates. Participants were then asked if they would be willing to taste-test some new cookies after they had finished completing their questionnaires. If participants agreed, they were asked to read and sign a consent form. Two individuals were unable to participate on account of dietary restrictions; they were walked through the study, given credit, and dismissed. If one individual assigned to the Observed or Co-action condition could not participate, the remaining individual was run in the Alone condition; this occurred only once over the course of the study.

At this point, participants in the Alone and Co-action conditions were provided with a three-page bogus university environment questionnaire to complete (the Observed condition, being slightly different, will be described below). On the first page, participants were presented with various demographic questions as well as a series of rating scales asking them to mark on a ten-centimetre line the best description of how they were feeling on that day. Important to this study was a hunger rating scale on which participants rated how hungry they felt on a ten-

centimetre line anchored at one pole with "not at all hungry" and at the other pole with "very hungry." This rating scale was included to ensure that participants were not differentially hungry across experimental groups at the beginning of the study.

Once they had completed the remaining two pages of the University Environment questionnaires, participants were served a 15-oz. vanilla milkshake made from one cup (8 oz.) of 2% milk and three scoops (7 oz.) of ice-cream. Participants were told that the cookie company wanted all participants to drink the milkshake before tasting the cookies, since level of hunger and taste sensation in the mouth affect taste perception. Thus, the milkshake served as a way to standardize these two variables across all participants.

At this point, participants were served the cookies. Gourmet cookie dough was purchased in three flavors—chocolate chip, oatmeal raisin and double chocolate chip. Cookies were shaped using a melon baller to ensure standard sizes (each cookie weighed, on average, 7.7 grams), were baked in advance, and frozen. Each participant received three plates of cookies (one for each flavor), with each plate heaped with 25 cookies. Cookies were heated immediately prior to serving to make them especially palatable. Random assignment was used to determine the order in which the cookies would be presented to each participant; complete counterbalancing was used, yielding six possible orders. A sign labeling each plate as flavor "A," "B," or "C" was placed in front of each plate. Participants were also provided with a glass of cold water and a taste-rating sheet for each cookie flavor.

The experimenter then presented the instructions for completing the taste-rating task. Participants were instructed to begin by taking a sip of water to clear their palates and then to begin by tasting cookie A. They were told to taste as many of cookie A as they needed in order

to make accurate taste ratings. Then they were to take a sip of water and move on to cookie B. Again, they were instructed to taste as many of cookie B as they needed in order to make accurate taste ratings. Then they were to take another sip of water and move on to cookie C. Participants were told that after rating cookie C they should feel free to go back and taste as many additional cookies as they wanted, as long as they did not change their initial taste ratings.

Participants in the Co-action condition were asked not to talk during the taste-rating task, since the cookie company wanted to obtain independent taste ratings from all participants. Furthermore, they were asked not to taste cookies from their companion's plates, since they may have been given "slightly different formulations."

The experimenter left the room for ten minutes during the taste-rating phase of the study. When she returned, she cleared away the cookies and presented all participants with a packet of post-experimental questionnaires.

Participants assigned to the Observed condition were given further instructions after the initial description of the study and after signing the consent form. They were told that the cookie company was interested in obtaining independent taste ratings from each participant. Therefore, one participant (the observer) would begin by completing the university environment questionnaires, while the other (the subject) would begin by tasting the cookies. Before beginning, both the subject and the observer completed the first page of the University Environment questionnaire in which the hunger rating scale was embedded. Then the observer was asked to complete the second page of the university environment questionnaire while the subject drank the milkshake (note that the companion did not drink a milkshake). The subject was then served her cookies. Instructions for the taste-rating task were given to both

participants, since the observer would ostensibly be tasting the cookies shortly. The observer was given the final page of the university environment questionnaire to complete while the subject tasted the cookies; she was told that her questionnaire might take only a short time to complete (it contained only ten items) and was told that when she was done, she could “sit back and relax and enjoy a few minutes of peace and quiet.” This was arranged so that the observer would have nothing to do during most of the ten minutes other than observe the subject while she ate. Participants were told not to talk during this phase of the study, since they were completing different tasks, and the observer was told not to taste any of the subject’s cookies, since she would be receiving a slightly different formulation. The experimenter left the room for ten minutes during the taste-rating phase. When she returned, she explained to the observer that her assistant was supposed to have brought a different batch of cookies for her to taste, but that she had not arrived. Therefore, the observer did not have to complete the taste test, but was offered cookies from the available batch to take home with her. All participants were then asked to complete a packet of post-experimental questionnaires.

Two sections of the post-experimental questionnaire packet were relevant to the current study. In order to assess the effectiveness of the manipulations, we asked all participants to indicate how self-conscious they felt during the taste-test. In the Co-action and Observed conditions, subjects were also asked to indicate to what extent their companion was watching them during the taste-test. These ratings were made using a 10-cm. visual analogue scale anchored by “not at all self-conscious” to “very self-conscious” and “not at all watching” to “watching closely.”

In order to explore the role that modeling played in determining intake, participants were asked a number of questions about their own intake, as well as the intake of their companions (in the Co-action condition). Subjects were asked to estimate how many cookies they had eaten, as well as how many cookies their companion had eaten if they had been assigned to the Co-action condition. Although actual intake (as measured by the experimenter) was the main dependent variable in the study, it also seemed important to assess whether participants perceived that they had modeled the intake of their companions.

The Revised Restraint Scale (Polivy, Herman & Warsh, 1978) was also included in the post-experimental questionnaire packet. This is a 10-item scale that assesses degree of dietary restraint. Scores are used to classify participants as unrestrained eaters (nondieters) or restrained eaters (dieters). In line with previous research that has used this scale, participants who scored 15 or higher on the Restraint Scale were classified as restrained eaters, while those who scored below 15 were classified as unrestrained eaters. With this cut-off, unrestrained eaters outnumbered restrained eaters by more than two to one (see Table 1 for n's).

Once participants had completed the packets, they were debriefed and thanked for their participation. When asked, all subjects reported that they had believed the cover story. They were also asked if they would be willing to be weighed and measured before they left; all participants agreed. Once participants had left, the number of cookies remaining on each plate was counted and subtracted from the original twenty-five cookies, yielding a reliable measure of intake.

Results

Manipulation Checks

Participants in this study were randomly assigned to one of three conditions—Alone, Observed (with a companion who did not eat) and Co-action (with a companion who did eat). It was intended that participants in the Observed condition would report feeling more closely watched than would those in the Co-action condition (participants in the Alone condition were not asked how closely watched they felt). Furthermore, it was expected that individuals assigned to the Observed condition would report feeling more self-conscious than would participants in the other two conditions. Finally, it was predicted that restrained eaters, due to their heightened impression management concerns about food and eating, would be more sensitive to the social manipulations than would the unrestrained eaters. Given that these predictions, as well as most of our predictions about intake, were based on both social condition and restraint category, the data were analyzed using two-way analyses of variance (ANOVA's) with both social condition (Alone, Observed, Co-action) and restraint category (unrestrained, restrained) as the independent variables⁵.

A marginally significant interaction between restraint category and social condition was found on the measure of how closely watched participants felt in the Observed and Co-action conditions, $F_{(1,45)}=3.79$, $p=.058$. Post-hoc t-tests revealed that restrained and unrestrained eaters did not differ significantly on ratings of being watched in either the Observed condition ($M=3.00$, $SD=2.72$ and $M=3.85$, $SD=2.23$ for the restrained and unrestrained eaters, respectively, $t_{(45)}=1.04$, ns) or the Co-action condition ($M=3.25$, $SD=2.32$ for the restrained eaters; $M=1.82$, $SD=.72$ for the unrestrained eaters; $t_{(45)}=1.71$, ns).

Although a main effect of social condition was not found for ratings of how closely watched participants felt, it should be noted that the means were in the expected direction. Participants in the Observed condition ($M=3.44$, $SD=2.45$) felt more closely watched than did participants in the Co-action condition, ($M=2.26$, $SD=1.52$). Contrary to the prediction that the restrained eaters would be more sensitive than the unrestrained eaters to the social condition manipulations, the means suggest that the latter group actually demonstrated greater sensitivity. While restrained eaters felt slightly more closely watched in the Co-action condition than in the Observed condition (means of 3.25 vs. 3.00), unrestrained eaters reported feeling far more closely watched in the Observed condition than in the Co-action condition (means of 3.85 vs. 1.82). In sum, it appears that only the unrestrained eaters were sensitive to the social condition manipulation in terms of how closely watched they felt.

Participants were also asked at the end of the study to report how self-conscious they had felt during the taste-rating task. As above, a two-way ANOVA was conducted with self-consciousness as the dependent variable and with restraint category and social condition (Alone, Co-action *and* Observed) as the independent variables. A main effect of restraint was found, $F_{(1,75)}=10.41$, $p<.01$, with restrained eaters feeling significantly more self-conscious ($M=4.29$, $SD=2.31$) than did unrestrained eaters ($M=2.64$, $SD=2.26$). Contrary to predictions, there was no main effect of social condition.

Intake Data

Before beginning to analyze the data, we examined initial hunger ratings to ensure that groups did not differ on how hungry they felt at the beginning of the study. A two-way ANOVA was performed, with social condition and restraint category as the independent variables and

hunger rating as the dependent variable. No significant effects were found for either restraint category or social condition.

Replication Check

Before examining analyses relating to the main questions posed in this study, brief comments should be made regarding consumption in the Alone condition of the study. Previous research has shown that restrained and unrestrained eaters react differently to a forced preload. When *ad lib.* eating follows a preload, restrained eaters typically engage in disinhibited eating, while unrestrained eaters engage in appropriate caloric compensation. Accordingly, we expected that following the preload, restrained eaters would eat more in the *ad lib.* phase than would unrestrained eaters. This pattern was found in the current study, although the difference between dieters and nondieters did not reach significance. When alone, restrained eaters consumed a mean of 8.50 (SD=4.48) cookies, whereas unrestrained eaters consumed a mean of 6.43 (SD=4.21) cookies, $t_{(29)}=1.25$, $p=.22$.

Comparisons across the three conditions

The main question posed in the current study was whether eating behavior would be affected differently by the presence of a non-eating, observing companion, as compared to the presence of a co-acting companion. Also of interest was the question of whether the presence of these companions would affect dieters and nondieters differently.

An analysis of variance was performed using social condition (Alone, Observed, Co-action) and restraint status (Restrained, Unrestrained) as independent variables, and intake of cookies as the dependent measure. A main effect of social condition was found, $F_{(2,75)}=4.31$, $p<.05$, with participants eating on average 7.10 (SD=4.34) cookies in the Alone condition, 4.87

($SD=1.82$) cookies in the Observed condition, and 5.61 ($SD=2.47$) cookies in the Co-action condition (See Table 1). Post-hoc t-tests revealed that subjects ate significantly fewer cookies in the Observed condition than in the Alone condition, $t_{(75)}=2.54$, $p<.01$, and marginally fewer cookies in the Co-action condition than in the Alone condition, $t_{(75)}=1.77$, $p<.10$. Intake in the Observed and Co-action conditions did not differ significantly. There were no significant effects of dietary restraint.

Participants were also asked to report how many cookies they had eaten. Based on these self-reports, a main effect of social condition was also found, $F_{(2,75)}=3.33$, $p<.05$, which is not surprising given that the correlation between actual intake and self-reported intake was high, $r_{(79)}=.91$, $p<.001$. As with the data based on actual intake, subjects reported that they had eaten significantly less in the Observed condition ($M=4.80$, $SD=2.02$) than in the Alone condition ($M=7.02$, $SD=4.09$; $t_{(75)}=2.46$, $p<.05$) and marginally less in the Co-action condition ($M=5.74$, $SD=2.94$) than in the Alone condition, $t_{(75)}=1.48$, ns. Reported intake in the Co-action and Observed conditions did not differ.

As noted above, the correlation between actual intake and self-reported intake was remarkably high, suggesting that participants were very accurate in their self-reports. An accuracy score was computed for each subject by subtracting self-reported intake from actual intake. The mean accuracy score for the entire sample was $-.06$ ($SD=1.43$). Examination of the accuracy scores from the whole sample revealed that only three participants were more than three cookies “off” in terms of their estimates. An unrestrained eater in the Co-action condition reported that she had eaten four more cookies than she actually had, an unrestrained eater in the Alone condition reported that she had eaten six more cookies than she actually had and a

restrained eater in the Alone condition reported that she had eaten seven fewer cookies than she actually had. With the exception of these three subjects, the sample as a whole seemed to be very cognizant of how much they had eaten.

A focus on the co-action condition: Was eating driven by modeling effects?

In the analyses presented thus far, data for the Co-action condition were contributed only by the “subject,” because the intake of the subject and the companion were not considered to be independent. Intake data—both actual and self-report—were collected, however, for both the subject and the companion.

Actual intake was assessed by the experimenter by counting the cookies remaining on both the subjects’ and the companions’ plates at the end of the study. The actual intake of the subject and the actual intake of the companion were not significantly correlated, $r_{(25)}=.30$. This correlation was also examined separately for unrestrained and restrained eaters (based on the small sample size, these analyses should be viewed with caution). For unrestrained eaters, the correlation between actual intake and the companion’s actual intake was relatively strong, $r_{(17)}=.42$, $p=.07$. The correlation was much weaker for restrained eaters, $r_{(6)}=.05$, $p=.90$.

Self-reports of intake from *all* participants in the Co-action condition (subjects and companions) were also examined. (When computing the correlations based on self-reports, we included data from both the subject and the companion, thus increasing the sample size—it was not quite doubled, owing to missing data—and increasing the statistical power for this important analysis.) The correlation between self-reported intake and estimate of the companion's intake was strong and significant, $r_{(35)}=.50$, $p<.01$. As above, this correlation was also performed separately for restrained and unrestrained eaters. The self-report correlation for restrained eaters

was very strong, $r_{(11)}=.83$, $p=.001$, whereas the correlation for unrestrained eaters was far weaker (although still significant), $r_{(22)}=.43$, $p=.05$.

We also examined modeling data on a case-by-case basis. We considered subjects to have “modeled” their companion if they reported having eaten within two cookies of the amount that they thought their companions had eaten. (Of course, we cannot know whether the subject modeled the companion or the companion modeled the subject, or both. All that we can measure with these data is the extent of matching, not the direction of influence.) Of the 37 participants who completed the two questions (self-reported intake and estimate of partner’s intake), 26 (70.3%) reporting having eaten within two cookies of their companion, and 13 of these 26 (35.1% of the total 37 participants) reported that they had eaten exactly the same amount as their partner. There was no appreciable difference between the restrained and the unrestrained eaters with respect to modeling. Of the 37 participants, 24 were unrestrained eaters and 13 were restrained eaters; this is roughly the same proportion as in the sample as a whole. The extent of modeling was virtually the same for unrestrained eaters (17, or 70.8%) and the restrained eaters (9, or 69.2%). The proportion of participants who reported that they ate exactly the same amount as their companions was also quite similar (37.5% for unrestrained subjects and 30.8% for restrained subjects).

Also interesting is whether participants reported having eaten more or less than their companions – if they had not reported having matched their intake exactly. Many participants actually reported having eaten more than their companions (16 out of 37, 43.24%; 10 unrestrained subjects and six restrained subjects). Only 21.62% of the participants (8 out of 37;

six unrestrained subjects and two restrained subjects) reported having eaten less than their companions.

Finally, we thought that it would be interesting to ascertain how accurate participants were about the intake of their companions in the Co-action condition. An accuracy score was calculated by subtracting each subject's estimate of how much her companion had eaten from how much the companion actually had eaten. Again, data from *all* participants in the Co-action condition (subjects and companions, $N=37$) were examined. Overall, participants were very accurate in their reports – the mean accuracy score was $-.80$, $SD=.36$. An ANOVA was run with accuracy score as the dependent measure and restraint status as the independent variable in order to assess whether dietary restraint was related to accuracy. In fact, this analysis did not yield a significant difference between dieters and non-dieters although dieters did appear to be slightly more accurate ($M=-.27$, $SD=1.51$) than nondieters ($M=-1.08$, $SD=2.43$).

Discussion

In designing this study, we had intended for participants to experience particularly heightened impression management concerns in the Observed condition (with them feeling slightly less concerned about impression management in the Co-action condition and far less concerned in the Alone condition), and to restrict their intake accordingly. Although the manipulation check data were not especially strong, subjects' intake did suggest that the manipulations had the desired effect. Participants in the Observed condition ate significantly fewer cookies than did participants in the Alone condition.

Various explanations can be advanced as to why subjects ate minimally when observed. One explanation emerges directly from the modeling literature: the observer may have set an

explicit example of “non-eating,” inducing the subjects to eat minimally beyond the requirements of the taste-test procedure. The problem with this explanation is that in the Observed condition, subjects knew that the observers *could not* eat. Only the most obtuse subject would infer that the observer's not eating provided a suitable guide for the subject's behavior in the situation; in effect, the subject and the observer were in quite different situations procedurally, and the subject knew it.

More likely, in our view, is that subjects treated the observer not as a useful example of how to behave but as a critical evaluator of how they (the subjects) might behave. In order to make as positive an impression as possible on this evaluative stranger, the subjects reverted to the norm of minimal eating. This norm provides a safe position to adopt in an uncertain situation, since minimal eating has been shown to enhance a woman's perceived attractiveness and evident concern with eating appropriately (see Bock & Kanarek, 1995; Chaiken & Pliner, 1987).

The fact that dieters and nondieters both showed social inhibition of eating in the presence of the non-eating companion suggests that the norm of minimal eating that is associated with dieting is superseded by the norm of minimal eating that is associated with femininity. That is, even the *nondietering* females adopted the minimal eating strategy when confronted with an evaluative observer. (A more conclusive test of this proposition would require testing male subjects as well.)

There was a slight social inhibition of eating in the Co-action condition in this study. The most salient effect in this condition was the intake matching that occurred, but it is worth noting

again that overall, the mean level of intake was marginally lower ($p < .10$) than was the level in the Alone condition.

When the companion provides an explicit example of how much to eat, as in the Co-action condition, modeling or matching was the principal tactic that subjects used to determine their own intake. Overall, the correlation between one's own intake and that of the companion was not very strong ($r = .30$), but the correlation between one's own estimated intake and the estimated intake of the companion was much stronger ($r = .50$). Differences between restrained and unrestrained eaters in the pattern of these correlations were evident. For unrestrained eaters, the actual intake correlation and the estimated intake correlation were very similar (r 's = .42 and .43, respectively); for restrained eaters, the actual intake correlation was negligible ($r = .05$) but the estimated intake correlation was immense ($r = .83$). Unrestrained eaters engage in moderate modeling, and recognize that they are doing so, whereas restrained eaters, although they are not actually matching their companions, certainly believe that they are doing so. This is not the place to debate the relative meanings of actual versus estimated modeling, but this stark dieter-nondieter difference indicates that this distinction should be pursued.

What was clear from this study is that norms seem to have helped subjects to know how much was appropriate to eat in this novel situation. In the Observed condition, being observed by a non-eating observer made female subjects adhere to the socially-prescribed norm of minimal eating. The Co-action condition was more complex; the "matching" norm appeared to trump the "feminine" norm. Exactly how matching occurs remains unclear; we do not know how the two subjects "negotiated" the amount that they would eat. Does one participant take the lead and the other follow, and if so, how is leadership determined? Or is there a process of

reciprocation that governs the "negotiation." Nondieters are accurate in their assessment of the extent to which they match their eating companions, and dieters grossly overestimate the extent of matching; but in either case, do people believe that they are setting the pace, following the lead of the companion, or engaged in a give-and-take? Given the complexity of studying the reciprocal process involved in "naturalistic" social eating, in Study Two we turned to the examination of more clearly imposed norms.

STUDY TWO

Study One was a complex study to interpret, given that the norm for appropriate eating may be negotiated reciprocally in social eating situations. In Study Two we examined how participants would react when they were told exactly how much other people decided was an appropriate amount of food to eat. On a simple level - based on the modeling literature - it was reasonable to predict that participants in this study would adhere closely to explicit norms when they are available. Yet, in this study, we added one complication to the modeling paradigm by introducing a conflict between using others' behavior as a guide and achieving one's own impression management goals.

In this study, dieters and non-dieters were assigned to eat alone or to eat in the presence of a non-eating observer (the experimenter). Furthermore, participants were assigned to one of three norm conditions. In the No Norm condition, participants were given no indication of how much prior participants in the study had eaten. In the Inhibition condition, participants were led to believe that prior participants had eaten minimally; in the Augmentation condition, they were led to believe that prior participants had eaten a lot.

Instead of pairing participants with a confederate instructed to eat a certain amount, we provided a social norm by incidentally allowing participants to learn how much ostensible prior participants in the study had eaten. This was accomplished by giving participants access to a written record of ostensible prior participants' intake. The advantage of this technique is that it permitted us to introduce a social norm without simultaneously introducing another person into the eating situation. It provided a social norm manipulation while eliminating the possibility that this other person would act as an observer; thus, it was possible to manipulate social norms even while the experimental participant was alone. To an extent, this technique risked weakening the social norm manipulation. For one thing, it eliminated social acceptance as a motive underlying adherence to the norm; the participant did not gain any social advantage (e.g., ingratiating herself with the confederate) by behaving normatively. (Of course, the participant could still use the social norm to reduce her uncertainty regarding how to behave; it was this use of the norm that we considered to be most important.) A second potential problem with this manipulation was that the norm was in some sense only weakly available to the participant; instead of having an active "co-actor" setting a salient example, the participant merely saw a written indication of what prior participants had done. It might be the case that this evidence would be too remote or abstract to provide a compelling guide for behavior. On the other hand, instead of seeing how one salient co-actor dealt with the ambiguous situation, the participants in this study saw how ten prior participants had behaved, and indeed, saw that all these prior participants had behaved rather consistently in eating a lot or a little. Moreover, participants were aware immediately of the prior participants' total intake, rather than having to extrapolate from their intake early in the eating situation to what they would eventually consume. We hoped that the example set by a

large number of prior participants, all acting the same way, would be strong enough to offset the fact that these participants were not physically present.

Participants did not receive a preload in this study. Therefore, in the Alone condition, in the absence of an explicit social norm, dieters were expected to eat sparingly and nondieters were expected to eat somewhat more.

Within the Alone condition, we hypothesized that there would be a self-presentational conflict, involving not conventional impression management but rather “self-presentation to self.” Dieters, particularly when their diets have not been threatened, are invested in maintaining dietary restraint. This goal could be accomplished easily enough in the Inhibition norm condition, since this norm is clearly congruent with the dietary goal. In the Augmentation norm condition, however, dieters were faced with a choice. They could ignore the social norm and maintain their diets, in effect giving precedence to their personal norm of minimal eating; alternatively, they could eat a larger amount, in accordance with the social norm, but at the cost of abandoning their personal norm of restraint.

We expected that non-dieters would loosely adhere to the social norms when they ate alone, with these norms serving as a guide for appropriate behavior in this novel environment. They were expected to eat minimally in the Inhibition condition, slightly more in the No Norm condition, and quite a lot in the Augmentation condition. Dieters were expected to eat minimally in both the No Norm and the Inhibition norm conditions. In the Augmentation condition, it was possible that they would maintain their minimal eating or that they would use the social norm as a guide and eat considerably more than in the other norm conditions.

What should we expect in the Observed conditions? All participants—not just dieters—were faced with a self-presentational dilemma in the Observed/Augmentation condition. We know from Study One that young women tend to adhere to a norm of minimal eating when in the presence of a non-eating observer. Yet, participants were also led to believe that prior participants in the study had eaten a great deal in this particular situation. Would the presence of an observer cause these female eaters to eat minimally regardless of the social norm condition? Or might the presence of the observer make the eater even more likely to adhere to the social norm? After all, the observer presumably regarded eating a lot as normal in this situation; the female participants risked appearing "abnormal" if they deviated from the pattern set by the prior, "normal" participants. The conflict, then, was between trying to make a good ("feminine") impression by eating minimally versus trying to make a good ("normal") impression by eating a lot.

We also had a secondary interest in this study in whether people are influenced not only by how much others are eating, but also by others' food preferences. Although repeated exposures to others' preferences seem to exert an influence on one's own food choice (e.g., Birch, 1980; Duncker, 1938; Hobden & Pliner, 1995; Marinho, 1942), it is unclear whether one's choices can be influenced by a single exposure to others' preferences. Stalling and Miller (1981) found that participants consumed a greater number of doughnuts that had supposedly been preferred by other participants in the study, although all three of the doughnut samples were identical. Herman, Olmsted and Polivy (1983) found that overweight diners (but not slim or normal weight diners) were strongly affected by social influence, with 55% of overweight subjects ordering the particular dessert recommended by the waitress. Finally, Polivy, Herman,

Younger and Erskine (1979) found that participants' intake was not at all influenced by a confederate's comments on some samples of nuts (saying that one type of nut was delicious while the other was stale). These studies suggest that it may not be as easy to influence people's taste preferences as it is to influence their intake levels of a given food. We decided to investigate this issue further however, by leading subjects to believe that prior participants in the study had preferred one type of cookie over the other two.

Method

Participants

One hundred and fifty-two students from first and second-year psychology courses signed up for the study. Records were checked from the previous year to ensure that the second-year students had not participated in Study One when they were first-year students. All participants were recruited via sign-up sheets located in the Psychology department inviting all female subjects to participate in a study of "Perceptions of the University Environment." Participants earned one course credit for their participation. The mean age of participants was 23 years ($SD=4.03$).

Fourteen participants (9.2%) refused to taste-test the cookies. Three of these participants had food allergies that precluded participation, one did not eat sugar, one did not eat eggs, one followed "strict dietary practices," four were kosher, one was fasting for Ramadan, and three provided no reason for refusing. Personality measures were completed by eleven of these participants; two participants who were run at the beginning of the study were not asked to complete them, and one, upon seeing the questionnaires, refused to answer any of the questions.

Out of these eleven participants, ten were unrestrained eaters and one (the individual who followed strict dietary practices) was a restrained eater.

Four participants who completed the study were excluded from the final data analyses. One participant was pregnant and one was diabetic; at the end of the study, both said that their conditions had been the major determinant in how much they ate. Another subject had left several questions blank, making it impossible to calculate her dietary restraint score. One participant ate thirty cookies during the study, ten more than the next “largest” eater in the sample. It came to the experimenter’s attention (the “crime” was committed by the roommate of a friend of a student who worked in our laboratory!) that this participant had had a Tupperware container in her bag and had taken the cookies with her, rather than eating them during the study. Thus, the final sample consisted of 134 participants.

Materials and Procedure

As noted above, participants signed up for a study entitled “Perceptions of the University Environment.” Students were contacted by telephone to arrange a one-hour appointment between the hours of 11:00 a.m. and 5:00 p.m. (4 subjects were run at 5:45 p.m.). The condition that would be run in each time slot was determined by random assignment. All subjects were run individually.

The study took place in the same laboratory described in Study One. When each participant arrived, a consent form and a pen had already been placed on the table. In the Augmentation and the Inhibition conditions, the norm manipulation was also in place. Taped to the table was a piece of paper on which ten bogus participants had recorded how many cookies of each flavor they had eaten during the study. Furthermore, these bogus participants had circled

their favorite flavor of cookie. On each sheet, seven of the ten subjects had selected the same flavor of cookie as their favorite. Thus, six norm sheets were developed; in both the Inhibition and the Augmentation condition, each flavor was presented as the favorite. Recall that subjects were randomly assigned to the norm condition in the study (No Norm, Augmentation or Inhibition); the “favorite flavor” manipulation was randomly determined as well.

In the Inhibition condition, bogus participants had ostensibly eaten 3, 4, or 5 cookies ($M=4$), and in the Augmentation condition, bogus participants had eaten 13, 14, or 15 cookies ($M=14$). These numbers were determined on the basis of pilot testing. The first fifteen participants who were run through the study were assigned to the No Norm/Alone condition. By examining the bottom and the top of the distribution of intake by this group, we were able to establish the Inhibition and Augmentation norms.

Once the participant was seated at the table with the consent form and the norm sheet (in the Inhibition and Augmentation conditions), the experimenter outlined the details of the study. Participants were told that the experiment concerned people’s perceptions of the university environment, and that they would be asked to complete some questionnaires on that topic, as well as some questionnaires about themselves. They were then asked if they would be willing to participate in an additional task—namely, tasting some cookies. Participants were told that some other students in the experimenter’s lab were planning a study on taste perception and needed some pilot subjects to taste-test some foods. They were then asked if they would be willing to taste-test some cookies and fill in a series of taste-rating forms about them. Participants who agreed to complete the taste rating task were screened for food allergies or other dietary

restrictions (if these had not already been mentioned) and were then asked to read and sign the consent form.

At this point, participants were asked to complete the university environment questionnaire. This questionnaire served simply as a cover story and was of no interest to the experimenters. As in Study One, however, this questionnaire gave us an opportunity to collect hunger ratings to ensure that participants were not differentially hungry across experimental groups at the beginning of the study.

Upon completion of the university environment questionnaire, participants completed the taste-rating task. The task was carried out in the same manner as described in Study One, using the same brand (and flavors) of cookies.

Additional instructions were provided, however, in the Inhibition and Augmentation norm conditions. After providing participants with the instructions for the taste-rating task, the experimenter appeared suddenly to “notice” the norm sheet. The experimenter told subjects: “As for that sheet, I should have put it away. We just needed the first ten subjects to fill in how many cookies they had eaten and it looks like we have ten there already. So, just ignore that sheet and concentrate on making the taste ratings.” Given that the sheet had been there since the start of the experiment (and remained on the table throughout the taste-rating task), we expected that participants would get a good look at it. Before starting the stop-watch to time the ten-minute taste-rating task, the experimenter told the subjects that she hoped that they enjoyed the cookies and further reinforced the norm manipulations by telling subjects in the Augmentation condition that “people have been eating lots,” and telling subjects in the Inhibition condition that “people haven’t been eating that many.”

At this point, the experimenter left the room in the Alone condition. In the Observed condition, she sat down opposite the participant at the table. The experimenter held a book or an article on her lap, glancing down at it occasionally, but focusing primarily on the participant. No conversation took place during the taste-rating task.

At the end of the ten minutes, the cookies and the norm sheet were cleared away and the participants were given the post-experimental questionnaire packet. Before being presented with any questions specifically pertaining to the manipulations involved in the study, participants were asked to briefly explain what determined the number of cookies that they ate during the taste-rating task.

Following this open-ended question, participants were asked to mark on a ten-centimeter line how aware the experimenter was of how much they had eaten during the taste-test (with “0” being “not at all aware” and “10” being extremely aware). They were also asked to indicate on a ten-centimeter line how self-conscious they felt during the taste-test, with “0” being “not at all self-conscious” and “10” being “extremely self-conscious.” These two questions allowed us to assess the effectiveness of the social condition manipulation (Alone/Observed).

In order to assess the effectiveness of the norm manipulations, participants were also asked to report how many cookies other people in the study had eaten and what these other people's favorite flavor of cookie had been. They were also asked to estimate how much they themselves had eaten and they were asked to report their own favorite flavor of cookie.

As in Study One, dietary restraint was assessed using the Revised Restraint Scale (Polivy, Herman & Warsh, 1978). Participants who scored 15 or higher on the Restraint Scale were classified as restrained eaters, while those who scored below fifteen were classified as

unrestrained eaters. As in Study One, unrestrained eaters outnumbered restrained eaters by a ratio of almost two to one.

Once participants had completed this questionnaire package, they were completely debriefed and were permitted to ask any questions that they may have had about the study. They were then weighed and measured, thanked for their participation, and asked to keep the details of the study confidential. Once participants left, the number of cookies remaining on the plates was counted (as in Study One) in order to yield a reliable measure of intake.

Results

Effectiveness of the Social Condition Manipulation

Participants were randomly assigned to eat either alone or while observed by the experimenter. It was intended that participants in the Observed condition should have felt more self-conscious and should have felt that the experimenter was more aware of their eating than did participants in the Alone condition.

All participants were asked to report how aware they believed the experimenter was of their eating, by making a mark on a ten-centimeter line anchored by “not at all aware” (0) and “extremely aware” (10). This measure was used as the dependent measure in an analysis of variance (ANOVA) with social condition (Alone, Observed), norm condition (No norm, Inhibition norm, Augmentation norm) and restraint category (unrestrained, restrained) as the independent variables. This analysis revealed main effects for both social condition and restraint status; there were no significant interactions. Participants in the Observed condition believed that the experimenter was more aware of their eating ($M=6.37$, $SD=2.81$) than did participants in the alone condition ($M=4.53$, $SD=3.35$), $F_{(1,122)}=12.49$, $p<.001$. Furthermore, restrained eaters

felt as if the experimenter was more aware of their eating ($M=6.16$, $SD=3.46$) than did unrestrained eaters ($M=5.02$, $SD=2.99$), $F_{(1,122)}=4.62$, $p<.05$.

The same pattern of results held when participants were asked to indicate how self-conscious they felt during the taste-test. Again, they were asked to indicate their response on a ten-centimeter line anchored by “not at all self-conscious” (0) and “extremely self-conscious” (10). Using the three independent variables outlined above (social condition, norm condition and restraint category) and self-consciousness as the dependent variable, a main effect of social condition ($F_{(1,122)}=7.39$, $p<.01$) and a main effect of restraint category ($F_{(1,122)}=5.84$, $p<.05$) were found, again with no significant interactions. Participants in the Observed condition felt significantly more self-conscious ($M=5.21$, $SD=2.76$) than did participants in the Alone condition ($M=3.90$, $SD=2.88$) and restrained eaters felt significantly more self-conscious ($M=5.31$, $SD=2.89$) than did unrestrained eaters ($M=4.10$, $SD=2.79$).

These results indicate that the social condition manipulation was effective. As compared to subjects who ate alone, participants in the Observed condition perceived the experimenter to be more aware of their eating and also felt more self-conscious during the taste test.

Effectiveness of the Norm Manipulation

Participants in the Inhibition condition were led to believe that other people in the study had eaten, on average, four cookies, while participants in the Augmentation condition were led to believe that other people in the study had eaten, on average, 14 cookies. Subjects assigned to the No norm condition were given no indication regarding how many cookies others in the study had eaten.

In the post-experimental questionnaire, participants were asked to report how many cookies they believed that other participants in the study had eaten. An ANOVA was conducted with this estimate as the dependent variable and with social condition, norm condition and restraint category as the independent variables. A highly significant main effect of norm condition was found, $F_{(2, 119)}=46.75$, $p<.001$. Participants reported that others had eaten, on average, 5.82 cookies in the no norm condition ($SD=2.86$), 4.34 cookies in the Inhibition condition ($SD=1.21$) and 10.22 cookies in the Augmentation condition ($SD=3.87$). Post-hoc t-tests revealed that these means were all significantly different (p 's $<.05$) from one another.

Participants in the Inhibition and Augmentation norm conditions were also led to believe that others in the study had preferred one flavor of cookie over the other two. Participants were randomly assigned to one of three “favorite flavor” conditions, with the norm sheets indicating that the majority of the previous ten subjects in the study had preferred chocolate chip cookies, oatmeal cookies, or double chocolate chip cookies.

Subjects did attend to this manipulation. In the post-experimental questionnaire, participants were asked to indicate the favorite flavor of other participants in the study. Of the 83 subjects exposed to the alleged flavor preferences (those assigned to the Inhibition and Augmentation norm conditions), 55 (twice the number that would be expected by chance) correctly reported the favorite flavor of the “other” subjects in the study.

Intake Data

Hunger Ratings

Hunger was assessed at the beginning of the study to ensure that participants were not differentially hungry across conditions. A three-way ANOVA was conducted with social

condition (Alone, Observed), norm condition (No norm, Inhibition norm, Augmentation norm) and restraint category (unrestrained eaters, restrained eaters) as the independent variables and hunger rating provided at the beginning of the study as the dependent variable. No significant main effects or interactions were found.

Main Analysis

The main question posed in this study was how intake would be influenced by norms, by the presence of an observer, and by their interaction. Also of interest was whether these two manipulations (norms and observation) would affect dieters and nondieters differently.

Analysis of variance was performed using norm condition (No norm, Inhibition norm, Augmentation norm), observation condition (Alone, Observed) and restraint category (unrestrained eaters, restrained eaters) as the independent variables and number of cookies eaten as the dependent variable (See Table Two). Main effects of observation condition and norm condition were revealed; however, these main effects were qualified by an observation condition by norm condition interaction, $F_{(2,122)}=4.44$, $p<.05$ (See Table Two). Post-hoc t-tests were then performed to decompose this interaction.

Three significant effects were found. When subjects were alone, they ate significantly more in the Augmentation condition ($M=8.46$, $SD=4.96$) than in the Inhibition condition ($M=4.73$, $SD=1.49$; $t_{(122)}=3.85$, $p<.01$) and the No Norm condition ($M=6.21$, $SD=3.61$; $t_{(122)}=2.37$, $p<.01$). Intake in the Inhibition and No Norm conditions did not differ significantly. Furthermore, subjects ate significantly more when exposed to the Augmentation norm when they were alone as compared to when they were observed ($M=4.50$, $SD=2.98$; $t_{(122)}=4.05$, $p<.01$). There were no significant effects of restraint status.

As in Study One, participants were asked to report how many cookies they thought that they had eaten. An ANOVA was run with norm condition, observation condition and restraint category as the independent variables and with self-reported intake as the dependent variable. As with the data based on actual intake, main effects of norm condition ($F_{(2,122)}=4.23, p<.05$) and observation condition ($F_{(1,122)}=4.61, p<.05$) were found. There was however no norm condition by observation condition interaction in this analysis. In terms of the main effect of observation condition, participants reported that they had eaten significantly fewer cookies when they were observed ($M=5.10, SD=3.71$) than when they were alone ($M=6.24, SD=3.71$). In terms of the main effect of norm condition, post-hoc t-tests revealed that participants ate significantly less in the Inhibition Norm condition ($M=4.50, SD=1.49$) than in the No Norm condition ($M=6.04, SD=3.49, t_{(122)}=2.27, p<.05$) and than in the Augmentation Norm condition ($M=6.36, SD=4.12, t_{(122)}=2.61, p<.05$). Intake in the Augmentation Norm condition and the No Norm condition did not differ.

As in Study One, the correlation between self-reported intake and actual intake was strong and significant in Study Two, $r(132)=.94, p<.001$. This would suggest that subjects were highly accurate in their estimates of how much they had eaten. A closer look at the data supported this supposition. The mean accuracy rating (self-reported intake subtracted from actual intake) for all subjects was $-.03 (SD=1.15)$. Looking at subjects on a case-by-case basis revealed that only four of the subjects in the sample were more than three cookies “off” in their estimates of intake. As in Study One, there was no pattern to these inaccuracies – the four subjects all fell in different cells of the study.

We were also interested in whether the favorite flavor manipulation had an effect on intake. This was examined in two ways. First, a series of ANOVAs were run with favorite flavor condition as the independent variable and number of cookies of each flavor eaten as the dependent variables (the other independent variables important to the study were not included due to small n's in a four-way ANOVA). This analysis was run under the assumption that subjects would eat significantly more cookies of the flavor proclaimed to be the favorite by other subjects. No significant effects were found; the favorite flavor manipulation did not affect intake of cookies. Next, we ran an analysis with favorite flavor condition as the independent variable and self-reported favorite flavor as the dependent variable. Again, the effect was not significant, indicating that the manipulation did not affect participants' self-reports of flavor preference. In fact, of the 83 participants exposed to the favorite flavor manipulation, only 32 (a number close to what would be expected by chance) reported the same favorite flavor as had been indicated by prior participants. Although participants attended to the favorite flavor manipulation (as reported above in the Manipulation Check section), it did not affect their actual intake or their own preferences.

Modeling Data

All participants were asked to report how many cookies they had eaten as well as how many cookies they believed the prior participants had eaten. (Participants in the No Norm condition, who had no access to a norm sheet, still made an estimate of prior participants' intake). As mentioned in Study One, people's perceptions of whether or not they modeled the intake of others can be very important to understanding the influence that norms have on eating. Overall, participants did report that their intake was similar to the intake of the prior participants;

the correlation between self-reported intake and estimate of the intake of prior participants was $r_{(129)}=.55$, $p<.01$. As in Study One, this correlation was also examined separately for dieters and nondieters. Both correlations were strong and significant ($r_{(80)}=.60$ for nondieters and $r_{(47)}=.47$ for dieters, both $p's<.01$).

We also examined matching data on a subject-by-subject basis. Participants were considered to have modeled the intake of others if they estimated their own intake as being within two cookies of other participants' intake. In the No Norm condition, 79% of subjects reported having eaten within two cookies of other participants' intake when they were alone and 67% reported having done so when they were observed. In the Inhibition norm condition, 100% of subjects reported having eaten within two cookies of other participants' intake when they were alone and 89% reported having done so when they were observed. In the Augmentation norm condition, 32% reported having eaten within two cookies of other participants' intake when alone and 40% reported having done so when observed.

As in Study One, we also felt that it would be interesting to examine whether participants who had reported not exactly matching the intake of others in the study had reported eating more or less than others. Not surprisingly, when subjects were exposed to the augmentation norm, they tended to report having eaten less than others in the study had (78.95% of subjects in the Alone/Augmentation norm condition and 90% of subjects in the Observed/Augmentation norm condition).

More variability in reporting was evident in the No norm and Inhibition norm conditions – although relatively equal numbers of participants reported having eaten more or less than the

other participants. Furthermore, no patterns based on restraint status were evident (See Table Three).

Finally, we were interested in ascertaining whether participants were accurate in their estimates of how much they believed that other participants in the study had eaten. Subjects in the No Norm condition were excluded from this analysis given that they were not given any information about how many cookies other people in the study had eaten. For subjects in the Inhibition condition, an accuracy score was computed by subtracting their estimate of others' intake from four (the mean number of cookies eaten by the ten bogus subjects listed on the Inhibition norm sheet). For subjects in the Augmentation condition, an accuracy score was computed by subtracting their estimates of others' intake from 14 (the mean number of cookies eaten by the ten bogus subjects listed on the Augmentation norm sheet). Overall, participants were very accurate in their reports of how many cookies other participants in the study had eaten (mean accuracy rating = -1.67, $SD=3.50$). An analysis of variance was run with observation condition, norm condition (excluding the No Norm condition) and restraint category as the independent variables and accuracy score as the dependent variable to assess for any between-cell differences. A significant main effect of norm condition was found, $F(1,72)=40.82$, $p<.001$. Participants' estimates of how many cookies prior participants in the study had eaten were far more accurate in the Inhibition norm condition ($M=.34$, $SD=1.21$) than in the Augmentation norm condition ($M=-3.78$, $SD=3.87$), where subjects tended to underestimate the ostensible intake of others.

Reasons for Eating

Participants were asked to explain what had determined the number of cookies that they had eaten during the taste-test. The major determinants reported were feelings of hunger or satiety (41% of subjects, e.g., “Because I wasn’t hungry, I only ate one of each,” “I suppose I ate more quickly because they were good and I was a little hungry”), the way the cookies tasted (47% of subjects, e.g., “Since Cookie A was very tasty, I ate two of them,” “I only ate half of each cookie, I didn’t like their taste very much”) and the demands of the taste-test (47% of subjects, e.g., “I ate just enough to make accurate answers to the taste-test questions”).

A series of correlations were run to determine whether the reasons given for amount eaten did in fact influence intake. For each flavor of cookie, the number of cookies eaten was correlated with ratings of how much subjects liked that flavor of cookie. This correlation was not significant for the chocolate chip cookies. It was, however, significant for the other two flavors ($r(132)=.218$, $p<.05$ for oatmeal raisin and $r(132)=.185$, $p<.05$ for double chocolate chip). The hunger rating made at the beginning of the study was not significantly correlated with the total number of cookies that subjects ate. In other words, hunger and palatability played a lesser role in determining intake than subjects’ reports would suggest.

Not a single subject mentioned norms or social influence as being a determinant of how much they had eaten. Only 16 subjects (12%) mentioned self-presentational concerns as a determinant of their eating (e.g., “I don’t really like to eat by myself in front of others,” “I didn’t want to eat too many, just because I didn’t want to look like a pig,” “I do keep an eye on what I eat, and especially in the presence of others, I do not like eating.”) Interestingly, of these sixteen subjects, five tasted the cookies while alone. Although we would assume that restrained eaters

would have more self-presentational concerns than unrestrained eaters, seven of the comments about such concerns actually came from the latter group.

Discussion

In this study, attention was turned to the effect of clearly-defined social norms on eating. We were particularly interested in how subjects would behave when a norm provided by prior participants (an augmentation norm) conflicted with the norm of minimal eating in the presence of a non-eating observer. Study One suggested that most females, even non-dieters, adhered to this minimal-eating-when-observed norm, at least when no other norms were active.

When they were alone, participants in Study Two clearly adhered to the explicit social norms provided by prior participants. Regardless of their level of dietary restraint, participants ate more in the Augmentation condition than in the Inhibition condition or the No norm condition (the latter two did not differ). However, when observed, participants no longer adhered to the Augmentation norm, eating significantly less in the Augmentation/Observed condition than they had in the Augmentation/Alone condition. Clearly, the norm for minimal eating in the presence of a non-eating observer overpowered the norm for high intake that was prescribed by the behavior of the previous subjects.

Let us first consider some further implications of the results. For participants who ate alone, the fact that they adhered so closely to the explicit social norms is interesting insofar as there were no direct social implications of their behavior. It appears that people are invested in being (or appearing to be) "normal" even when they are acting in isolation, serving as their own audience. This may be particularly true in the unusual laboratory environment where people have no obvious basis for determining appropriate behavior.

It is important to note here that signals from the gut—hunger and satiety cues—were not particularly useful to our experimental participants. In the Inhibition and No norm conditions, participants tended to match (what they thought was) the intake of prior participants; clearly, they were relying on social cues to dictate their own intake. In the Augmentation condition, most participants did not eat quite as much as the prior participants had. In this instance, it seems more likely that satiety considerations may have put an upper limit on intake. Even here, though, we cannot rule out the possibility that some subjective sense of what is appropriate intake may have contributed to the shortfall in matching in the Augmentation condition.

Considering the behavior of the participants who ate alone leads us to two further conclusions. First, our use of “remote” social norms appears to influence subjects as effectively as do “real life” models. This demonstrates just how powerful social influences on eating are—people will adhere to norms set by unknown others even when they are all alone. Moreover, these findings suggest that being a dieter is not a precondition for self-conscious concern about looking “normal”; in this study, both dieters and nondieters appeared to be motivated to behave like everyone else had. It would be useful in the future to examine other populations in order to see if this motive to appear “normal” is limited to college-age females or obtains in other populations.

The strength of the explicit social norm that was evident in the Alone condition was superseded by the norm of minimal eating in the presence of a non-eating observer. Furthermore, as in Study One, this minimal eating norm seemed to be held by both dieting and non-dieting females. As Polivy et al. (1979) noted 20 years ago, “this [restrictive] norm, it appears, applies to restrained and unrestrained subjects alike...it seems likely that restraining

one's consumption is a behavioral option open to virtually all (female) subjects in our culture" (p. 111). Participants in the present study ignored what 10 of their peers had done in favor of presenting themselves as minimal eaters to the observer. It must be remembered, of course, that this study used a novel method of introducing norms—"remote models." Conceivably, a large-eating confederate might have been more powerful than 10 "remote" models, and exerted more normative control over the participant's behavior in the presence of an observer. This speculation requires further testing, but it is worth noting that the power of the remote models was quite impressive in the Alone condition, so we should not assume that they are any less influential than a single confederate in the flesh.

STUDY THREE

Study Three was, in effect, a replication study. In Study One, it was surprising to see social inhibition of eating by nondieters in the Observed condition. In Study Two, social inhibition of eating was observed again in this group – even in the face of an augmentation norm. These findings were counterintuitive – we do not think of nondieters as people who would be concerned with the way that they look when they eat. In Study Three, subjects were again presented with an augmentation norm and were asked to eat in the presence of an observer. A major purpose of this was to see if the social inhibition effect in nondieters could again be replicated. As this research project continued, it became evident that all young women in our culture may at times engage in social inhibition of eating, rather than only those young women who are particularly concerned with weight and eating.

An additional issue was also of interest in Study Three. It was fascinating to see the degree to which people adhered to norms in Study Two when they ate alone. Most fascinating

were the dieters who had been assigned to the Alone/Augmentation norm condition. This group had really no reason to adhere to the norm given that no one was checking to see if they had adhered to it and given that by adhering it, they would also be sabotaging their efforts at “self-presentation to self.” Recall that self-presentations are motivated not only by a desire to impress others, but also by a desire to live up to our own standards for ideal behavior.

As it turned out, the dieters assigned to this condition did adhere to the augmentation norm, eating, on average, ten cookies. Evidently, dieters are apt to cheat on their diets at the slightest prodding – in this case simply being told that ten other people felt that it was perfectly appropriate to eat that much. This raises the question of how often dieters actually stick to their diets when they are alone. Research shows that dieters tend to weigh more than nondieters (e.g., McCabe, McFarlane, Olmsted & Polivy, 1999) – although it is unclear whether dieters weighed more to begin with (leading them to diet) or whether dieting (and its accompanying bouts of disinhibited eating) actually led them to gain weight. It is also clear that dieters have lower and more variable self-esteem (e.g., Heatherton & Polivy, 1991; Polivy, Heatherton & Herman, 1988) than do nondieters. If dieters are rarely living up to their self-defined ideal of minimal eating - at least when they are eating alone and not subject to social pressures to eat minimally - it should not come as a surprise that they do not feel particularly good about themselves.

It is clear that self-awareness plays an important role in the regulation of eating – but its role is complex. Some researchers have suggested that self-awareness is the reason for the minimal eating that is sometimes observed when people eat alone (as compared to when they eat with others). Both Edelman et al. (1986) and Clendenen et al. (1994) commented on how attention is directed almost completely to food and eating when we eat alone. Following from

this line of reasoning, it seems clear that when we are alone (and free from distractions), we are also more in touch with our standards for appropriate behavior. For nondieters, this may simply mean a greater awareness of their physiological state, allowing them to stop eating before they are uncomfortably full. For dieters, this may mean a greater ability to attend to their cognitively determined “diet boundary,” causing them to stop eating before they have broken their diets.

There have been studies demonstrating that self-attention inhibits eating. In Pliner and Iuppa’s (1978) study, both obese and normal weight subjects ate a smaller lunch in front of a mirror than they had when asked to eat in front of a mirror that had been covered. Polivy, Herman, Hackett and Kuleshnyk (1986) also showed that self-attention inhibited eating for preloaded dieters (Study One and Study Two) and for nonpreloaded nondieters (Study Two). Although the current studies have focused only on the inhibitory effects of an observer, these studies suggest that serving as one’s own “observer” can also lead to inhibition of eating.

An interesting paradox arises when we consider the setting in which both clinical and non-clinical binge eating typically take place – in private (see Polivy & Herman, 1993). The fact that bingeing occurs in isolation seems to contradict the aforementioned inhibitory effects of self-attention. The work of Heatherton and Baumeister (1991) helps to resolve this issue. Being alone most certainly triggers self-awareness. It is when this self-awareness is aversive that people seem particularly susceptible to binge eating. Heatherton and Baumeister (1991) suggest that it provides psychological relief to shift attention away from aversive thoughts of the self and focus instead on the sensory properties of food. Polivy and Herman (1993) write that “the binge results from the loss of higher cognitions, including those that ordinarily maintain inhibited eating in the service of abstract goals such as weight loss or not losing control of one’s eating”

(p. 180). It is clear, then, that being alone can be helpful or harmful to dieters. The mediating factor seems to be the quality of self-awareness that the dieter experiences when she is alone – if she is feeling fine about herself, it is likely that she will stick to her diet; if self-awareness becomes aversive, it is more likely that she will engage in binge eating.

In the current study, participants were randomly assigned to one of four experimental conditions. Some subjects served as controls, eating alone with no information as to how other participants in the study had behaved (Alone/No Norm condition). The other three experimental groups were all exposed to the same Augmentation Norm manipulation that was used in Study Two. The Alone/Augmentation Norm group participated in a taste-rating task while alone; the Mirror/Augmentation Norm group tasted cookies while seated in front of a mirror; and the Observed/Augmentation Norm group tasted cookies in the presence of a non-eating observer. As in Study Two, subjects in the three conditions who were exposed to the augmentation norm were faced with a self-presentational dilemma – eating minimally or adhering to the norm and eating a lot. Although we were able to predict that the norm for minimal eating would supersede the norm for matching in the Observed condition (based on the findings in Study Two), it was unclear which norm would “win out” in the Mirror condition.

It was predicted that the non-dieters would eat a moderate amount in the Alone/No Norm condition (given that no preload was used in this study) and that they would show a significant increase in intake in the Alone/Augmentation Norm condition. Given the findings of Pliner and Iuppa (1978) and Polivy et al. (1986), it was predicted that the self-attention induced by the mirror would have a slight inhibitory effect on nondieters (as compared to the

Alone/Augmentation Norm condition), but that the greatest inhibition of eating would be seen in the Observed/Augmentation Norm condition.

Dieters were expected to eat minimally in the Alone/No Norm condition given that palatable food does not seem to be a sufficient disinhibitor for them. They were expected to eat the most food in the Alone/Augmentation Norm condition and to eat very minimally in the Observed/Augmentation Norm condition (following from the results of Study Two). In this study, the most interesting question arises from the Mirror/Augmentation Norm cell. The mirror should make all subjects report increased self-awareness. This increased self-awareness can have a number of potential outcomes for dieters. Following from previous studies (Pliner & Iuppa, 1978 and Polivy et al., 1986), the mirror may lead to inhibition of eating (as compared to the Alone/Augmentation Norm condition). In effect, the mirror could force dieters to be their own audience, perhaps even having as strong an inhibitory effect as an observer. It was also possible that dieters could adhere to the augmentation norm in the presence of the mirror. As we know from Study Two, the Augmentation Norm seems to give solitary dieters the license to cheat on their diets. It is possible that being one's own audience does not have the same sort of effect as being observed by someone else. In other words, the motive to engage in "self presentation to self" may not be as strong as the motive to engage in self-presentation to others. Were Baumeister and Heatherton asked to advance hypotheses for this cell, they may also suggest that overeating in the presence of the mirror may be explained by aversive self-awareness. Being made to scrutinize oneself in the mirror may bring to mind the dissatisfaction that dieters often feel about their physical appearance. Furthermore, the norm manipulation may make salient the whole idea of overindulging and cause dieters to reflect on all of the times that

they themselves had broken their diets. In other words, the mirror and the augmentation norm could lead dieters into a state of aversive self-awareness, leading them to overindulge.

Method

Participants

Subjects were initially recruited through a sign-up sheet that was posted in the Psychology department at the University of Toronto. The sign-up sheet invited female students to sign up for a study entitled “Facial Expressions.” This title was used so that prospective participants would not be aware that the study actually concerned eating behavior. Subjects signed up for a one-hour appointment between the hours of 11:00 AM and 5:00 PM.

Ninety-eight subjects signed up for the study. It quickly became apparent that unrestrained subjects were outnumbering restrained subjects by a ratio of almost three to one. During the first week of school, Introductory Psychology students had completed a mass testing questionnaire packet that included the Restraint Scale. Therefore, we began to check on their mass testing scores after we had run the first 72 subjects in order to assign subjects to appropriate conditions and to ameliorate our unbalanced cells. Of the remaining 26 students who had already signed up for the study when this decision was made, restraint scores were available for 11 subjects. When restraint scores were known, subjects were assigned to cells where they were needed prior to their arrival at the laboratory.

Once these ninety-eight subjects had been run, we still needed more restrained eaters to fill our cells. Therefore, students who had scored above 15 on the Restraint Scale during the mass testing were contacted and invited to participate in a study on “Facial Expression.” Subjects were not told that they had been selected because of their high scores on the Restraint

Scale. Seventeen subjects were recruited in this way; three ended up being classified as nondieters after they actually participated in the study.

Therefore, a total of 115 students came to participate in the study. Eleven were excluded from the final analysis. Five refused to taste the cookies and were therefore simply walked through the study. Of these five subjects, two had food allergies, one was a vegan, one was Moslem and was fasting for the day and one was diabetic. The six remaining subjects were run through the study, but their data were excluded from the final analysis. One subject reported at the end of the study that she had hypothyroidism and that this affected how much she permitted herself to eat. Two students spoke very little English and clearly did not understand the taste-rating task or the post-experimental questionnaires. One subject tasted only a tiny bite of each cookie – the difference in weight from the original plates of cookies did not even show up on the scale. And finally, one subject was the sister of a student who had worked in our laboratory the year before and another subject had been in a similar study run by the experimenter the year before. Both of these subjects were aware that the focus of the study was on eating behavior. Therefore, data from 104 subjects were included in the final analysis.

The mean age of participants was 20.13 ($SD=5.15$). Two subjects were students in upper-level psychology courses; the remaining 102 subjects were enrolled in Introductory Psychology. All participants received one course credit for their participation.

Materials and Procedures

The study took place in the same laboratory where Studies One and Two took place. The kitchen table was set up so that one end was almost flush with a wall; participants sat at the other

end of the table. Another chair - for the experimenter/observer - was placed on one side of the table perpendicular to where the participant sat.

Before participants arrived, the room was set up according to which condition was to be run during that time slot. The experimental condition to be run in each time slot was determined by random assignment. There were four experimental conditions – Alone/No Norm condition; Alone/Augmentation Norm condition; Mirror/Augmentation Norm condition; and Observed/Augmentation Norm condition.

In the three conditions in which the augmentation norm was used, a “norm sheet” was taped to the table before participants came into the laboratory. This sheet listed how many cookies ten prior participants had supposedly eaten. The mean number of cookies eaten was 14, with a range of 13 to 15 cookies. In the control condition, the norm sheet was not displayed; participants were given no indication of how many cookies other people in the study had eaten.

In the mirror condition, a full-length mirror was attached to the wall in front of the kitchen table with Velcro before participants arrived in the laboratory. Participants were seated across from the mirror, approximately one foot away, and when seated were looking straight at themselves in the mirror. The mirror was not on the wall in the other three conditions.

When participants came into the laboratory, they were seated at the end of the table. The experimenter sat to one side and explained the purposes of the study to them. In both of the conditions in which the participants were left alone to eat (the Alone/no norm condition and the Alone/augmentation norm condition), they were told the following:

As you know from the sign-up sheet, this study concerns facial expressions. We are actually interested in the relationship between food palatability and facial expressions.

You are going to be a pilot subject in the study – we need some people to taste test foods for us that we would like to use in the actual study about food palatability and facial expressions. So, we are hoping that while you are here today, you'd be willing to taste-test some cookies and fill in some taste-rating forms for us.

Instructions for participants in the mirror condition were as follows:

As you know from the sign-up sheet, this study concerns facial expressions. We are actually interested in the relationship between food palatability and facial expressions. What we are hoping that you will do today is taste some cookies while carefully observing your facial expressions in the mirror. As you taste the cookies, we'd like you to fill in some taste-rating forms for us, as well as filling in some forms about the facial expressions that you make when you taste the cookies. At the end of the study, we'll be able to look at the relationship between your facial expressions and how tasty you found the foods.

And, finally, instructions for participants in the observed condition were as follows:

As you know from the sign-up sheet, this study concerns facial expressions. We are actually interested in the relationship between food palatability and facial expressions. What we are hoping that you will do today is taste some cookies and fill in some taste rating forms for us. As you taste the cookies, I'll be observing the facial expressions that you make when you taste the cookies. At the end of the study, we'll be able to look at the relationship between your facial expressions and how tasty you found the foods.

At this point, participants were asked if they would be willing to taste the cookies. They were also asked whether they had any food allergies or other dietary restrictions that would preclude participation. As noted above, five subjects refused to participate in the taste-rating task. These participants were asked to fill in the post-experimental questionnaires and were then walked through the study. Participants who did agree to complete the taste-rating task were

asked to read and sign the consent form and were then asked to mark on a 10-centimeter line how hungry they felt, with zero being “not at all hungry” and ten being “extremely hungry.”

Participants were then presented with the cookies and were given instructions as to how to complete the taste-rating task. The cookies were made and presented in the same way as they had been in Studies One and Two (see Method section of Study One for full details).

Instructions for the taste-rating task were also consistent across all three studies.

Some variations were made to the procedure outlined in Studies One and Two to accommodate the new cover story used in Study Three. In order to complete the taste-rating task, participants in the Alone/No Norm condition, the Alone/Augmentation Norm condition and the Observed/Augmentation Norm condition were given the standard taste-rating packet consisting of a sheet for each flavor, asking participants to rate various qualities of the cookies (saltiness, tastiness, etc.). Participants in the Mirror/Augmentation Norm condition also received the three taste-rating sheets, but following the rating sheet for each flavor was a “face-rating” sheet. These sheets (again, one for each flavor) contained drawings of six facial expressions. Participants were asked to check the box next to the figure that most closely resembled their facial expression when they tasted each flavor of cookie. After the standard taste-rating instructions had been given to participants in the Mirror/Augmentation norm condition, they were told:

As you taste each flavor of cookie, it is really important to carefully study your facial expressions. After you finish tasting each flavor of cookie, you will be asked to mark which of six facial expressions most closely resembles your facial expression when you tasted the cookies.

In the Observed/Augmentation Norm condition, participants were told:

As you taste each flavor of cookie, I will be carefully studying your facial expressions. After you finish tasting each flavor of cookie, I will be marking which of six facial expressions most closely resembles your facial expression when you tasted the cookies.

In the conditions in which the augmentation norm was used, the experimenter then commented on the norm sheets as she had in Study Two. She suddenly looked surprised to see the norm sheet on the table and said “As for that sheet, I should have put it away. We just needed the first ten subjects in this group to fill in how many cookies they had eaten and it looks like we have ten there already. So, just ignore that sheet and concentrate on making the taste (and face) ratings.” Given that the sheet had been there since the start of the experiment (and was there throughout the taste-rating task), it was reasonable to expect that participants got a good look at it. Before the subjects began the taste-test, the norm manipulation was further reinforced. Before starting the stop-watch to time the ten-minute taste-rating task, the experimenter told the participants that she hoped they enjoyed the cookies adding that, “people have been eating lots.”

At this point, the experimenter started the stop-watch and left the room for ten minutes for all participants except those in the observed condition. In the observed condition, she remained in the seat perpendicular to the participant, and made notes on a clipboard regarding the participant’s facial expressions.

Following the ten minute taste test, the cookies were cleared away and participants were asked to complete a post-experimental questionnaire packet. They were first asked to briefly explain what determined the number of cookies that they ate during the taste rating task. They

were also asked to complete a number of questions intended to serve as manipulation checks and also to explore the issue of adherence to norms. Participants were first asked to rate how nervous and how self-conscious they felt during the taste-rating task by making a mark on a ten-centimeter line anchored by “not at all nervous/self-conscious” and “very nervous/self-conscious.” They were also asked to report how many cookies they had eaten during the taste-test and how many cookies they thought that others had eaten during the taste-test. Finally, they were asked to mark on ten centimeter lines how aware they were of their own eating during the taste test and how aware they thought that the experimenter was of their eating during the taste test (both anchored with “not at all aware” and “very aware”).

Dietary restraint was assessed using the Revised Restraint Scale (Polivy, Herman & Warsh, 1978). Participants who scored 15 or higher on the Restraint Scale were classified as restrained eaters, while those who scored below fifteen were classified as unrestrained eaters. As mentioned earlier, unrestrained eaters greatly outnumbered restrained eaters, resulting in unbalanced sample sizes across cells.

Once participants had completed this package, they were completely debriefed and were permitted to ask any questions that they had about the study. They were then weighed and measured, thanked for their participation, and asked to keep the details of the study confidential. Once participants left the laboratory, the remaining cookies on each plate were counted in order to yield a reliable measure of intake.

Results

Manipulation Checks

Participants were asked four questions in order to gauge the efficacy of the manipulations of both experimental condition and norms. It was expected that participants who were observed when they ate would feel more self-conscious and nervous than would participants who ate alone. Furthermore, it was expected that participants who ate in front of the mirror would feel more nervous and self-conscious than would those who ate alone, but less nervous and self-conscious than would those who were observed when they ate.

Ratings on the measures of nervousness and self-consciousness were used as the dependent measures in analyses of variance (ANOVA's). Experimental condition (Alone/No Norm; Alone/Augmentation Norm; Mirror/Augmentation Norm; Observed/Augmentation Norm) and restraint category (Unrestrained/Restrained) were used as the independent variables. On the rating of nervousness, a main effect of experimental condition was found, $F_{(3,96)}=5.47$, $p<.01$. Post-hoc t-tests were performed to find where the differences lay. Subjects in the Observed/Augmentation Norm condition reported feeling significantly more nervous ($M=3.58$, $SD=2.97$) than did subjects in the other three groups (which did not differ), all p 's<.01. Participants in the Alone/No Norm condition reported being the least nervous ($M=1.43$, $SD=1.72$), followed by those in the Mirror/Augmentation Norm condition ($M=1.61$, $SD=1.67$) and the Alone/Augmentation Norm condition ($M=1.64$, $SD=1.73$).

Ratings of self-consciousness revealed a different pattern of results. A cursory examination of the means suggests that the manipulation seemed to have had its desired effect. Participants in the Observed/Augmentation Norm condition reported the highest level of self-

consciousness ($M=4.42$, $SD=2.77$), followed by those in the Mirror/Augmentation Norm condition ($M=3.46$, $SD=2.85$), the Alone/No Norm condition ($M=3.39$, $SD=3.13$) and the Alone/Augmentation Norm condition ($M=2.96$, $SD=3.18$). The analysis of variance, however, failed to reveal a main effect of experimental condition; only a main effect of restraint was found. Overall, restrained eaters were significantly more self-conscious during the taste-rating task ($M=4.37$, $SD=2.97$) than were unrestrained eaters ($M=3.01$, $SD=2.91$), $F_{(1,96)}=5.26$, $p<.05$.

Participants in the study were also asked to report how aware they were of their own eating during the study and how aware they thought that the experimenter was of their eating. These ratings were also entered into two-way ANOVA's as described above. It was predicted that participants in the Observed and Mirror conditions would be particularly self-aware and that participants in the Observed condition would believe that the experimenter was particularly aware of how much they had eaten.

The ratings of self-awareness revealed an experimental condition by restraint category interaction, $F_{(3,96)}=2.72$, $p=.05$. Post-hoc t-tests showed that restrained and unrestrained subjects differed significantly in only one experimental condition. Restrained eaters were significantly more self-aware than unrestrained eaters in the Alone/Augmentation Norm condition ($M=8.05$, $SD=1.88$ for restrained eaters; $M=5.59$, $SD=3.33$ for the unrestrained eaters, $t_{(96)}=2.35$, $p<.05$). A glance at the overall means across the experimental conditions suggests that reports of self-awareness were not particularly affected by the manipulations.

In terms of the experimenter's level of awareness (as perceived by the subjects), a highly significant main effect of experimental condition was found, $F_{(3,96)}=7.85$, $p<.001$. Post-hoc t-tests revealed that participants in the Observed condition ($M=7.05$, $SD=2.76$) thought that the

experimenter was more aware of their eating than did participants in each of the other experimental conditions ($M=4.08$, $SD=3.10$ in the Alone/Augmentation Norm condition; $M=3.61$, $SD=2.90$ in the Alone/No Norm condition; $M=3.37$, $SD=2.93$ in the Mirror/Augmentation Norm condition, all $p's < .01$). Ratings made by subjects in the remaining three conditions did not differ.

Finally, an analysis was run to ascertain whether the norm manipulation was effective. Participants were asked to estimate how many cookies other people in the study had eaten. It was predicted that participants in the Alone/No Norm condition would report that others had eaten less than would participants in the other three groups who had all been exposed to the Augmentation norm. To run this analysis, all of the participants who had been exposed to the augmentation norm were considered one group and were compared to participants who had not been exposed to any norms. Restraint was entered as the other independent variable. A highly significant main effect of norm group was found, $F_{(1,92)}=29.66$, $p < .001$. While subjects who had been exposed to the Augmentation norm reported that others in the study had eaten, on average, 10.82 cookies ($SD=3.50$), subjects who had not been exposed to any norms reported that others had eaten, on average, 6.56 cookies ($SD=2.08$).

In summary, it does appear that the presence of the observer had its desired effects, with participants assigned to that group reporting feeling significantly more nervous than other subjects, slightly more self-conscious than other subjects and believing that the experimenter was significantly more aware of the amount that they had eaten. The efficacy of the mirror manipulation was unclear. Subjects did not report feeling particularly self-aware or self-conscious in this condition. The norm manipulation, as in Study Two, was highly effective.

Intake Data

Hunger Ratings

In order to ensure that subjects were not differentially hungry across experimental groups at the beginning of the study, a two-way ANOVA was run with experimental group and restraint category as the independent variables and hunger rating as the dependent variable. No significant effects were found.

Main analysis

In order to examine the main question posed in this study, a two-way ANOVA was run with experimental condition and restraint category as the independent variables and actual number of cookies eaten as the dependent variable (as measured by the experimenter at the end of the study). A main effect of experimental condition was found, $F_{(3,96)}=4.25$, $p<.01$ (see Table Four). Post-hoc t-tests were performed to see where the differences lay. Four significant effects were found. Intake in the Alone/No Norm condition was significantly lower ($M=5.90$, $SD=2.2$) than intake in the Alone/Augmentation Norm condition ($M=8.41$, $SD=3.85$, $t_{(96)}=4.12$, $p<.01$) and also significantly lower than intake in the Mirror/Augmentation Norm condition ($M=7.52$, $SD=2.56$, $t_{(96)}=2.05$, $p<.05$). Intake in the Alone/Augmentation Norm condition and the Mirror/Augmentation norm did not differ. Intake in the Observed/Augmentation Norm condition was significantly lower ($M=5.68$, $SD=2.61$) than intake in the Alone/Augmentation Norm condition ($t_{(96)}=3.46$, $p<.01$) and significantly lower than intake in the Mirror/Augmentation Norm condition, ($t_{(96)}=2.31$, $p<.05$). Intake in the Alone/No Norm condition and intake in the Observed/Augmentation Norm condition did not differ.

It should be noted that there was a trend toward an experimental condition by restraint category interaction for this main analysis, $F_{(3,96)}=2.44$, $p=.07$. Examination of the means showed that the intake of restrained eaters barely varied across experimental condition. Therefore, post-hoc t-tests were performed to see whether unrestrained subjects did indeed carry the main effect of experimental condition. T-tests failed to show any significant differences in intake across experimental conditions for restrained eaters. Unrestrained eaters, however, ate significantly less in the Observed/Augmentation Norm condition than in the Mirror/Augmentation Norm condition ($t_{(96)}=2.55$, $p<.05$) and the Alone/Augmentation Norm condition ($t_{(96)}=4.39$, $p<.01$). Furthermore, they ate significantly more in the Alone/Augmentation Norm condition than in the Alone/No Norm condition ($t_{(96)}=3.46$, $p<.01$).

An ANOVA was also run with subjects' self-reported intake as the dependent variable and with experimental condition and restraint category as the independent variables. Not surprisingly, given the high correlation between actual intake and self-reported intake ($r_{(102)}=.85$, $p<.01$), the same pattern of results was obtained as in the prior analysis based on actual intake. A main effect of experimental condition was found, $F_{(3,96)}=4.81$, $p<.01$ with participants reporting that they had eaten quite minimally in the Alone/No Norm condition ($M=5.92$, $SD=2.56$) and in the Observed/Augmentation Norm condition ($M=5.86$, $SD=2.71$) and that they had eaten quite a lot in the Alone/Augmentation condition, ($M=8.00$, $SD=3.52$) and in the Mirror/Augmentation Norm condition ($M=8.48$, $SD=3.10$). There was no trend toward an experimental condition by restraint category interaction in this analysis.

Accuracy scores were again calculated for each subject by subtracting self-reported intake from actual intake. The mean accuracy score for the whole sample was .18 ($SD=1.71$)

and only three subjects were more than three cookies “off” in their estimates of intake. Two of these subjects were in the Alone/Augmentation Norm condition (one was an unrestrained eater and one was a restrained eater) and one was in the Mirror/Augmentation Norm condition. It should not come as a surprise that the three “inaccurate” subjects came from the two cells in which intake was the highest. Presumably, keeping track of intake should become more difficult as intake increases.

Modeling Data

As noted above, participants were asked to report how many cookies they had eaten as well as how many cookies they thought that other participants in the study had eaten. The correlation between self-reported intake and estimate of others’ intake was significant, $r_{(94)}=.575$, $p<.01$. This correlation was strong and significant for both the restrained eaters, $r_{(33)}=.660$, $p<.01$ and the unrestrained eaters, $r_{(59)}=.540$, $p<.01$.

We considered participants to have modeled the intake of other participants in the study if they ate within two cookies of the amount that they thought others had eaten. Of the 96 subjects who completed these two questions, fifty-one percent (49 subjects) reported having eaten within two cookies of other participants’ intake. It is interesting to note that “modeling” was particularly prevalent in the No Norm condition. Of the 25 subjects in the Alone/No Norm condition who responded to both questions, 21 (84%) reported having eaten within two cookies of other participants’ intake, despite the fact that they were provided with no information as to how other people in the study had behaved.

In this study, over half of the subjects in the Alone/No Norm condition reported having eaten less than other participants in the study (12 out of 23 subjects, 52.17%). It is interesting to

note that six of these twelve subjects were dieters; one dieter reported that she had eaten the same amount as others and only one reported that she had eaten more than others. It was not surprising to see that participants who were exposed to the Augmentation norm tended to report that they had eaten less than had other participants in the study.

Finally, as in the other studies, we also explored whether participants were accurate in their assessments of how much the “bogus” participants in the study had eaten. An accuracy rating was computed (only for subjects in the three groups that were exposed to the Augmentation Norm) by subtracting subjects’ estimates of how many cookies other subjects in the study had eaten from 14, the mean number of cookies ostensibly eaten by the ten prior participants listed on the Augmentation norm sheet. The mean accuracy score was -3.18 , $SD=3.50$. It is not surprising that this difference is much greater than it was in Study One and Study Two since only the Augmentation Norm was used in Study Three. As mentioned with respect to Study Two, participants tend to be less accurate when exposed to the Augmentation Norm as compared to when they are exposed to the Inhibition Norm.

An ANOVA was performed to check for group differences in accuracy, with restraint category and experimental condition as the independent variables (as mentioned above, participants in the Alone/No norm condition were excluded from this analysis since they were not provided with any information about how much other people in the study had eaten) and accuracy score as the dependent variable. This analysis yielded no significant effects. In other words, accuracy was not influenced by either level of dietary restraint, nor by the experimental condition to which participants were assigned.

Reasons for Eating

Subjects were presented with an open-ended question in which they were asked to explain what determined the number of cookies that they ate during the taste-rating task. For the most part, subjects attributed their intake to the requirements of the taste-rating task (56.7% of subjects), their taste preferences (52.9% of subjects) and to their level of hunger or satiety (38.5% of subjects).

A series of correlations were computed to ascertain whether these reasons indeed played a role in determining intake. For each flavor of cookie, the number of cookies eaten and the ratings of liking for the flavor were significantly correlated, with all r 's in the .2 range (and all p 's < .01). The total number of cookies eaten and the rating of hunger given at the beginning of the study were also significantly correlated, $r(102) = .224$, $p < .05$.

In other words, hunger and palatability did seem to play a role in determining the number of cookies that subjects ate, but for the most part, subjects failed to report other factors that most certainly also played a role – namely, the presence of the norm sheet and the presence of the observer. Only three subjects (2.9% of the sample) mentioned the augmentation norm as having an influence on their intake. Two subjects reported that they had noticed the norm sheet, but that it hadn't really affected their eating. These subjects wrote, "I saw on the sheet beside me how many other people had eaten, but I couldn't eat as many as they did because I wasn't really hungry" (Observed/Augmentation Norm condition; Restrained eater) and "After, I looked to see how many cookies others had eaten and I didn't exceed that number" (Alone/Augmentation Norm condition; Unrestrained eater). A third subject clearly recognized the influence of the norms. She wrote, "Seeing the tallies of the number of cookies that other people ate made me

wonder why I was eating so little, so I did eat more than I normally would have”

(Alone/Augmentation Norm condition; Restrained eater).

It was also interesting to note that only five subjects (4.8%) cited self-presentational concerns as a factor affecting their intake. All five of these subjects were in the Observed/Augmentation Norm condition; three were restrained eaters and two were unrestrained eaters. Comments included, “When I am nervous about the impression I am going to make on people who can see me eating, I don’t eat as much” and “Although cookies are my favorite snack, I did not eat as many as I would have liked, probably because someone was watching me and I didn’t know what they were thinking.” An additional subject also voiced concern with respect to the facial expression rating task. She wrote, “Since I was being watched, I wanted to make sure I was eating enough to give the observer enough feedback.”

It should be noted that not a single subject mentioned the mirror as a factor affecting her eating.

Discussion

In this study, participants who were exposed to an augmentation norm and left to eat either alone or in the presence of a mirror ate significantly more than they did when they were exposed to an augmentation norm and observed by a non-eating observer and than when they ate alone and were not exposed to any norms at all. In other words, the presence of a non-eating observer suppressed eating to the level of intake exhibited by people who had not been exposed to the augmentation norm at all.

One purpose of this study was to see if the inhibitory effect of the non-eating observer could be replicated again in nondieters. This goal was indeed accomplished. At this point, we

can quite confidently say that minimal eating in the presence of others is (in the words of Polivy et al., 1979) a behavioral option open to all young females in our culture, even nondieters whom we would not expect to feel self-conscious about their eating.

The other purpose of this study was to explore whether restrained eaters could be made to maintain their diets in the face of the augmentation norm by increasing their self-awareness.

Although various hypotheses were advanced as to the kind of effect that a mirror could have on the intake of dieters, the principal hypothesis was that the mirror, in forcing dieters to serve as their own audience, would cause them to eat quite minimally despite the augmentation norm as compared to when they were left alone in the presence of the augmentation norm.

Unfortunately, the mirror did not make participants particularly self-conscious or self-aware.

Therefore, it should come as little surprise that it failed to have an inhibitory effect on intake.

Why was the mirror manipulation ineffective? This is a difficult question to answer, but one suggestion will be advanced with regard to task demands. In this study, participants were told that it was necessary for them to carefully study their facial expressions in the mirror and to report which of six facial expressions most closely approximated their facial expression as they tasted each flavor of cookie. It is possible that participants were so focused on the experimental task of studying their facial expressions that they did not attend to what they actually looked like with respect to their eating behavior. Another possibility is that the task was so easy that participants could actually get away with not looking in the mirror at all. Once participants had seen the six facial expressions, they probably could have guessed what they looked like as they tasted each flavor of cookie and, given that they were alone, could rest assured that no one would check whether they were indeed really studying their expressions or whether they were actually

selecting the expression that best matched their own. Recall also that participants were to complete the taste-rating forms as they tasted the cookies. This task may have diverted their attention away from studying themselves in the mirror. It is possible that the mirror would have a very powerful effect on eating if subjects were asked to eat in front of it with no instructions as to why it was there and with no other task (e.g., the rating forms) to divert their attention from themselves as “eaters.”

The restrained eaters in this study were in fact unresponsive to all of the manipulations – not only to the presence of the mirror. Post-hoc tests revealed that the intake of dieters across experimental conditions did not differ at all (despite a main effect of experimental condition and only a trend toward an experimental condition by restraint status interaction). This finding was particularly perplexing, especially given the fact that dieters were responsive to these same manipulations (the presence of the observer and the augmentation norm) in the other two studies. To what can we ascribe this unusual finding? Although the dieters in this study were more likely to be run toward the end of the study (due to the fact that many were recruited to fill the shortfall in the dieter cells) and although some were recruited by phone for the study, these two differences cannot explain the pattern of results. Sometimes failures to replicate have no explanation and this may be one such time. Perhaps with more subjects, or if the study were to be run again with another groups of subjects, the results would have fallen more clearly in line with our empirically-derived predictions.

The strength of the results of Study Three clearly lies with the nondieters. Based on their data, we have added support for our use of the “remote” norm. When left alone to eat, or when asked to eat in the presence of a mirror, nondieters adhered to the level of intake supposedly set

by ten previous participants in the study. This pattern of results also adds support to the idea that people adhere to a matching norm for food intake. Participants were placed in an unusual situation – the laboratory – and took full advantage of the norm as a way of knowing how much was appropriate to eat in this situation. As in Study Two, behaving “normally” proved to be important to nondieters when they were left alone and when there were no social implications for doing so.

The other strength of this study was the replication of the social inhibition effect in the Observed condition. As in Studies One and Two, we demonstrated that young women adhere to a norm of minimal eating in the presence of a non-eating observer. As in Study Two, the norm for minimal eating superseded the norm for matching in this study. Nondietering young females have clearly internalized the norm of minimal eating and feel that it is more important to adhere to it than to adhere to the more situation-specific norm of eating a lot as set by the other participants in the study.

General Discussion

The present studies demonstrate the power of norms to control eating. In particular, two norms were evident: (a) the norm of eating minimally when observed (Studies One, Two and Three) and (b) the norm of matching the intake of others, be it of one's actual eating companion (Study One) or of ostensible prior participants in the study (Study Two and Three). These norms were clearly effective in governing intake. Indeed, it is impossible to make sense of intake in these studies without reference to these norms. Not only were these norms necessary to make sense of the intake data, but they were sufficient. No other factors contributed meaningfully to our interpretation of the results.

Demonstrating that people adhere to a single norm (e.g., as set by the intake of their companion) is not particularly interesting or surprising. Since Nisbett and Storm's 1974 paper, many researchers have shown that people are easily swayed by the eating behavior of those around them. The studies presented here were interesting because subjects were faced with conflicting norms and had to reach some sort of decision (likely on a non-conscious level) as to how to behave. In Studies Two and Three, the norm for minimal eating in the presence of an observer overpowered the norm to match the intake of other people. In other words, it was more important for the women in these studies to present themselves as minimal eaters than to present themselves as behaving in line with the ten prior participants in the studies. It seems as if these women felt that it was more important to conform to the "greater" social norm of minimal eating for women in our culture than to the situation-specific social norm set by other subjects in the study.

Why do women adhere to a norm of minimal eating and where did it come from?

Perhaps the most striking finding in these studies was the lack of any significant differences between dieters and nondieters. All subjects (with the exception of the perplexing dieters in Study Three) adhered to a norm of minimal eating when they were observed, even when they were led to believe that other people thought that it was perfectly acceptable to eat a lot in that same situation. Where did this norm of minimal eating come from?

The historian Joan Jacobs Brumberg (1989, 1997) has written eloquently on the history of dieting and eating disorders. Dieting, as we currently think of it, emerged in the 1920's. At this time, the female body was being "unveiled" (Brumberg, 1997, p. 98) to reveal a flat-chested and thin silhouette. Furthermore, hemlines were raised and corsets were cast away. For the first time

in history, women's bodies became public and women started having to work to get their bodies to match the cultural ideal. This was played out in both restrictive eating and exercise.

Brumberg points out that while women have continued to diet since the 1920's, the dieting seen in the 1990's has changed both qualitatively and quantitatively. More girls diet today than they did in the 20's and they begin dieting at an earlier age. Furthermore, the criteria for perfection are far more stringent now than they were in the 20's – the beauty ideal has become increasingly thin over time (see Garner, Garfinkel, Schwartz & Thompson, 1980; Wiseman, Gray, Mosimann & Ahrens, 1992). Of perhaps most relevance to the studies presented here, girls who are growing up today are the first generation of children being raised by parents who themselves diet. From a normative perspective, it is clear that even before adolescent girls are exposed to dieting peers, they are exposed to dieting mothers, suggesting that they may learn the norm of minimal eating at a very young age.

Why are people motivated to adhere to this norm for minimal eating? The answer may lie in the fact that very few people can accomplish the thin beauty ideal, while anyone can alter their eating to at least give the impression that they are trying to achieve it. People may have come to equate minimal eating with the same positive attributes that they ascribe to thin physiques.

In our culture, self-control is highly valued and praised – and self-control around food and eating garners much respect. In these times of such abundant food, being able to refuse food is an even more powerful way to feel in control and to present oneself to others as being in control⁶. In our culture, people are often commended for eating minimally and this recognition from others may contribute to positive feelings about the self⁷. It is interesting to consider at

what age the shift occurs from being commended for clearing one's plate (as children often are) to being commended for barely eating at all.

Related to this issue is the current belief in our culture that we can exert a great deal of control over our bodies. As noted earlier, women have dieted since the 1920's. A newer phenomenon is exercise (which became popular in the middle to late 1970s, according to Brumberg, 1989) – another activity that people think will change the appearance of their bodies. Brumberg (1989) explains that exercise has “intensified cultural pressures on the individual for control and mastery of the body” (p. 254). The “twin obsessions” (see Brumberg, 1989, p. 255) of dieting and exercise seem to have fueled a belief that we can have more control over our bodies than we actually do. If it is assumed that we have such control over our physical appearance, it is not surprising that overweight people are viewed negatively and are ascribed such traits as laziness (de Jong & Kleck, 1986).

Another issue to consider is the degree to which women compete with one another regarding eating and weight. Rodin, Silberstein and Striegel-Moore (1984) wrote that “the arenas of physical attractiveness and weight may be the chief and most wholeheartedly sanctioned domain in which women are encouraged to contend with each other” (p. 290). If women are competing to be the thinnest of their peers, it would not be surprising to find that they are also competing to be the most minimal eater of their peers. As suggested above, all women are able to succeed at presenting themselves as minimal eaters even though not all women are able to succeed at meeting the cultural ideal for thinness. It is interesting to note that in Pliner and Chaiken (1990), male subjects reported that they would eat more than baseline (with baseline defined as intake in the presence of a person whose sex has not been defined) in order to

compete with or feel superior to either a male or a female companion. Females, however, reported that while they would eat more than baseline in order to compete with or feel superior to a male companion, they would eat less than baseline in order to compete with or feel superior to a female companion.

Pliner and her colleagues have suggested that minimal eating is used as a way to express femininity. What exactly does this mean? Women are expected to be “superwomen” these days – accomplished in the career world, yet still sexy and nurturing at home. Gordon (1989) has remarked that thinness has come to be associated with both power and sexuality. He writes that “thinness is ideally suited to carry the conflicting strands of the contemporary female ideal: achievement, intellectual aspiration, and competence and yet sexual attractiveness, submissiveness and nurturance” (p. 48). Eating probably serves these same purposes. The woman at a business meeting may eat minimally to show that she is in control and powerful; the woman at home with her family may eat minimally to show that she is concerned with her physical appearance and with remaining attractive to her spouse.

Why do people adhere to the matching norm?

In the studies presented here, the “matching norm” was also important, with participants matching the intake of both “real” and “remote” companions. Let us first consider the finding from Study One that women matched the intake of their companions. Matching served as a useful way of explaining the slight social inhibition of eating that was observed in the Co-action condition of Study One (as compared to the Alone condition). The women in these studies seemed motivated to present themselves as “normal.” For young women in our culture, it is normal to eat minimally. In Pliner and Chaiken (1990), both males and females reported that they would eat less than they

normally would in order to “be similar” to a female partner. It is possible that in the Co-action condition in Study One, both women in the dyad adhered to the cultural norm of minimal eating and that this made it seem as if they were adhering to the norm of matching the intake of one’s companion. In other words, both norms could have been influencing the intake of subjects in this cell.

The matching norm was most clearly displayed when women were exposed to norms in the Alone conditions of Studies Two and Three. Why did women adhere to the norms – and particularly the augmentation norm – when no one was there to see if they indeed behaved “normally?” There are at least two possible explanations. People may be so motivated to behave “normally” that they will even try to do so when they are alone. This may be particularly true in the novel environment of the laboratory where subjects really do not know how to behave. Any cues as to what is appropriate behavior are eagerly grasped. Another explanation fits more closely with the comments presented above with respect to the minimal eating norm. Eating is a highly social act and it is likely that people more frequently eat with others than alone. This means – at least for young women – that there is a great deal of pressure to adhere to the minimal eating norm. We have suggested that self-presentational concerns are minimized in the presence of people who we know well. For students in their first year of college, a great deal of eating could be taking place in the presence of “new” friends. Subjects assigned to the Augmentation Norm/Alone conditions in Studies Two and Three could have felt relieved to get some “permission” to let down their guards and eat a lot. Yet, it is important to note that the mean intake of subjects in these cells was not nearly as high as the intake of the bogus subjects (subjects ate, on average, 8.46 cookies in Study Two and 8.41 cookies in Study Three as

compared to the mean of 14 cookies supposedly consumed by the bogus subjects). Even when subjects were “letting go,” the norm for minimal eating still seemed to be exerting its effect – albeit to a lesser degree than when subjects were being observed.

There is no doubt that the norm for matching the intake of others is strong and powerful. It probably plays a role in our eating on an every-day basis. The overarching conclusion of these studies, however, is that young women have been socialized to adhere to a norm of minimal eating in the presence of others. Adhering to this norm may serve all sorts of purposes, -- feeling in control, presenting oneself to others as being in control, competing with others, and appearing feminine are all possibilities. Uncovering the motives underlying this behavioral pattern is clearly the next step in understanding the eating behavior of young females in our culture and could clearly have some benefit in helping this population deal with their conflicting feelings about food and eating.

What are the limitations of these studies?

The studies presented here have brought up all sorts of interesting issues and have helped to clarify our thoughts on the general topic of social influences on eating. They are, however, not without problems. The major limitations concern the “social” situations in which participants were placed as well as the generalizability of the results to other populations.

What do we mean by “social” in social influences on eating?

The literature in the area of social influences on eating covers a range of methodologies. Naturalistic studies, while being high in external validity, are plagued by methodological problems. Perhaps most problematic is the fact that food intake can not be precisely measured. Furthermore, the observer typically knows nothing about the people who are eating – save for

their approximate weight and sex. We know that all sorts of variables – particularly the nature of the companions (friends vs. strangers) – are crucial to how people eat in social situations.

Another problem – most obvious in de Castro's research – is that one person is often selected as the target subject and we never know how much the companions eat or even if they eat at all.

Laboratory studies, while being able to carefully measure intake and control for characteristics of the companions, are also plagued by problems. The major problem is a lack of external validity and this was certainly a problem in the studies presented here. In order to place as much control as possible over the experimental situation, conversation in these studies was not permitted. How often do we eat in the presence of a stranger who simply stares at us? Should this happen, we may wonder if the person who is staring has some sort of pathology. On a day to day basis, we typically eat with people whom we know well and the meal is not only about food and eating. Rather, we engage in conversation. These two factors - degree of acquaintance and degree of attention placed on food and eating - undoubtedly affect the way that we eat.

Future studies must explore this issue. If the experimenter/observer had chatted with the subjects during the taste-test, would social inhibition of eating still have been observed? If the subject had been asked to bring a close friend to the study who would then serve as the observer, would we have seen social inhibition of eating? Obviously, we cannot answer these questions without running the appropriate studies. We simply can not assume that young females will invariably show social inhibition of eating. The next step will be to show what variables underlie it, both in terms of personality factors and characteristics of the companions.

Can we draw conclusions based on the sample?

Another limitation of the studies that were presented here lie in the fact that the results can *not* be generalized to a broader population. The sample used here were college-aged females. Let us first consider the issue of age. The late teens and early twenties are a difficult time when women are particularly concerned with the impressions that they make on others. This is perhaps particularly true during the freshman year in college. People often come to college knowing no one and therefore having the chance to re-create themselves and be whoever they want to be. In other words, it is a time for people can try out all sorts of self-presentations – and to integrate those that are successful into the self-concept. As people get older, the self-concept is more clearly defined and it is unusual to try to re-create the self or to put on any false fronts. This is true for young children as well who have not yet figured out that they can put on acts. Chances are that had we run these same studies using very young children or adults, we may not have found social inhibition of eating. Obviously, this is an empirical issue and simple to study in the laboratory. It would be very interesting to know the developmental path for concerns around social eating behavior.

Sex is another major issue. In these studies, women ate minimally in the presence of a non-eating observer; would men have done the same? It is certainly possible that men could also have exhibited social inhibition of eating in response to this manipulation. It is interesting to ask though, whether social inhibition of eating in any given situation could be driven by different motives. We have suggested that females have been socialized to believe that it is appropriate to eat minimally and that when all attention is directed at them, it becomes particularly important to adhere to this norm. Males and females could also have been socialized to believe that it is rude

to eat in the presence of a person who is not eating. Alternatively, and again applying to both males and females, people could act inhibited simply because they were being scrutinized. It is possible that people may feel inhibited about doing a whole range of activities if another person is staring at them.

Of course, it would also be interesting to see if men would ever show social inhibition of eating in a more “normal” situation than that used in the studies that were presented here. Men are often ignored in the research on both normal and abnormal eating and in order to understand human eating behavior, it will be important to include men in our future work.

Future research

With so many interesting topics to explore, a whole career could be spent on the study of social influences on eating. The studies presented here examined a very narrow situation with a single sample type. Clearly, researchers have a long way to go before they can accurately predict how people will eat in any given social situation.

As was pointed out above, a limitation of these studies was that they helped us to gain insight into a single population – young, college-age females. Future studies must examine both males and females of all ages. A particularly interesting pursuit would be to examine the developmental pathway of social eating behavior. At what age do people become self-conscious about their eating? Do both boys and girls acquire this self-consciousness or is it limited to young girls only? At what age do people begin to model the intake of others? Are we particularly susceptible to modeling effects at certain stages of development? All of these questions can easily be answered in laboratory-based studies similar to those presented here.

A more severe limitation of these studies concerns the actual eating situation in which we placed our subjects. As pointed out above, it is unusual to eat in the presence of a stranger whose sole task is to scrutinize the eating. Future research should explore which factors lead to social inhibition of eating and which factors lead to social facilitation of eating. It is our impression that degree of acquaintance with one's companions and the degree of attention placed on the person as "eater" will both play a crucial role in determining whether people eat more or less in groups as compared to how they eat when they are alone.

Future studies should also continue to explore the hypothesis that modeling underlies both social inhibition and social facilitation of eating. In Study One, we were able to demonstrate that this is the case. It would be best to replicate such a finding. In the future, intake for all subjects in the laboratory should be measured – not just the intake of a designated target subject. Furthermore, it would be interesting to do some naturalistic studies, again collecting data from all people who are present at the meal.

Finally, it would be interesting in the future to uncover the other types of norms that govern eating behavior. In these studies, only two types of norms were explored – a norm for minimal eating and a norm for matching. In fact, it was proposed that the norm for minimal eating may have actually taken effect before the norm for matching in the Co-action condition of Study One. There must be other norms that also govern eating. We have discussed the norm for eating a lot – in the presence of the cook, for instance – and it would be interesting to show in the laboratory that people actually will adhere to such a norm in order to make a good impression.

The most important contribution of these studies actually lies on a theoretical level. The literature in this field has been disjointed and individual researchers have seemed to pay little

heed to the work of other researchers who were exploring the same questions. On a theoretical level and, to a lesser degree, on an empirical level, this project has provided some necessary integration. It is clear that norms play a major role not only in social eating behavior, but – perhaps more impressively – in solitary eating behavior. It is the task of future researchers to more clearly define these norms, understand who adheres to them and when, and explore the motives that underlie such behavior.

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Footnotes

1. In this paper, the people with whom we eat will be referred to as “companions.” It is interesting to note that the Latin word “companion” actually means “a person with whom we share bread” (see Visser, 1991, p. 3).
2. Social psychologists typically associate the term “social facilitation” with Zajonc’s classic 1965 paper that integrated divergent bodies of literature demonstrating that the presence of others sometimes facilitates performance and sometimes impairs performance. Zajonc suggested that the presence of others increases arousal in the person who is being observed and that this heightened arousal increases the probability that the he or she will emit a dominant response. Zajonc argued that for simple tasks, the dominant response is typically the “correct” response, while for difficult or novel tasks, the dominant response is typically the “incorrect” response. Thus, performance on simple tasks is facilitated by the presence of others, while performance on difficult tasks is impaired by the presence of others. Although a rich tradition of research followed Zajonc’s 1965 paper, it is not clearly applicable to the study of social facilitation of eating. It is unclear whether eating is a “easy” or “difficult” task and such a simple formulation as proposed by Zajonc does not allow for the exploration of personality and situational variables that seem so essential to an understanding of social influences on eating.
3. It is interesting to note that social facilitation of eating (in other words, eating more in group settings than in solitary settings) has been observed in various species including rats (Harlow, 1932; Hoyenga & Aeschleman, 1969); monkeys (Harlow & Yudin, 1933; Stamm, 1961); dogs (James, 1960, 1961; James & Cannon, 1955); various kinds of fowl (Tolman, 1965, 1969); opossums (Platt & James, 1966); and armadillos (Platt, Yaksh & Darby, 1967). Researchers have also found evidence of social facilitation of drinking in chickens and ducks (Rajecki, Kidd, & Ivins, 1976; Rajecki, Wilder, Kidd & Jaeger, 1976; Clayton, 1976).
4. Kleges et al. (1984) reported that the absolute size of the group that the person was in did not affect caloric consumption.
5. The exception to this involves the analysis of how closely watched subjects felt. As noted, only participants in the Co-action and Observed conditions were asked to indicate how closely watched they felt. Thus, this manipulation check was actually a two by two ANOVA with social condition (Co-action/Observed) and restraint category (unrestrained/restrained) as the independent variables and how closely watched subjects felt as the dependent variable.
6. An apt way to refer to the current state of abundant food vs. rampant dieting comes from Harvey Levenstein who calls his book on the social history of food in America, “Paradox of Plenty.”
7. Despite the fact that we have no evidence in the scientific literature of people being “commended” for eating minimally (although we do have studies that suggest that people view females who eat minimally as more positive than females who eat larger portions), “popular

press" reports do support this contention. Two prime examples are Judith Rodin's (1992) book, "Body Traps," and Mary Pipher's (1994) book on adolescence, "Reviving Ophelia: Saving the Selves of Adolescent Girls." A recent *People* magazine also spoke directly to this issue (April 12, 1999). In this article, a sorority president was discussing the alarming eating behavior of her sorority sisters. She was quoted as saying, "It was like a competition to see who could eat the least. At dinner they would say, 'All I had today was an apple,' or 'I haven't had anything.' It was surreal" (p. 52). It should also be noted that positive reinforcement from others regarding minimal eating and weight loss have been identified as important points of initiation in the development of eating disorders (e.g., see Bruch, 1978). Unfortunately, the positive effects of dieting on self-esteem do seem to decrease over time, as suggested by both the dieting and the eating disorder literature.

Table One
Mean Intake of Cookies in Study One

Social condition	Restraint	Mean	SD	N
Alone	Unrestrained	6.43	4.21	21
	Restrained	8.50	4.48	10
	Total	7.10 ^a	4.34	31
Observed	Unrestrained	4.58	1.51	12
	Restrained	5.18	2.14	11
	Total	4.87 ^a	1.82	23
Co-action	Unrestrained	5.45	2.43	19
	Restrained	6.00	2.67	8
	Total	5.61	2.47	27

^a Means are significantly different, $p < .01$.

Table Two
Mean Intake of Cookies in Study Two

Social Condition	Norm Condition	Restraint	Mean	SD	N
Alone	No Norm	Unrestrained	6.20	3.61	15
		Restrained	6.22	3.83	9
		Total	6.21 ^a	3.61	24
	Inhibition Norm	Unrestrained	4.93	1.64	14
		Restrained	4.38	1.19	8
		Total	4.73 ^a	1.49	22
	Augmentation Norm	Unrestrained	7.48	3.90	12
		Restrained	9.78	6.10	9
		Total	8.46 ^{a,b}	4.96	21
Observed	No Norm	Unrestrained	5.76	3.23	19
		Restrained	5.13	1.25	8
		Total	5.57	2.78	27
	Inhibition Norm	Unrestrained	5.05	2.17	10
		Restrained	4.19	1.41	9
		Total	4.64	1.85	19
	Augmentation Norm	Unrestrained	4.15	2.30	13
		Restrained	5.06	3.97	8
		Total	4.50 ^b	2.98	21

^{a,b} Means are significantly different, all p 's < .01.

Table Three

Perception by subjects of whether they matched the intake of others, ate more than others, or ate less than others in Study Two

Condition	Subjects thought they ate the same as others in the study	Subjects thought they ate more than others in the study	Subjects thought they ate less than others in the study
Alone/No Norm	UR=4 R=2	UR=2 R=5	UR=9 R=2
Observed/No Norm	UR=3 R=1	UR=6 R=3	UR=10 R=4
Alone/Inhibition Norm	UR=2 R=5	UR=7 R=2	UR=5 R=1
Observed/Inhibition Norm	UR=2 R=1	UR=4 R=4	UR=4 R=4
Alone/Augmentation Norm	UR=1 R=1	UR=1 R=1	UR=11 R=4
Observed/Augmentation Norm	UR=0 R=1	UR=0 R=1	UR=13 R=5

Table Four
Mean Intake of Cookies in Study Three

Experimental Condition	Restraint Category	Mean	SD	N
Alone/No Norm	Unrestrained	5.94	2.38	16
	Restrained	5.85	2.00	10
	TOTAL	5.90 ^{a,b}	2.20	26
Alone/Augmentation Norm	Unrestrained	9.41	4.03	16
	Restrained	6.95	3.21	11
	TOTAL	8.41 ^{a,c}	3.85	27
Mirror/Augmentation Norm	Unrestrained	7.53	2.88	16
	Restrained	7.50	2.07	10
	TOTAL	7.52 ^{b,d}	2.56	26
Observed/Augmentation Norm	Unrestrained	4.93	2.66	15
	Restrained	6.80	2.20	10
	TOTAL	5.68 ^{c,d}	2.61	25

Means with the same superscripts are significantly different; ^{a,c}p's<.01; ^{b,d}p's<.05.