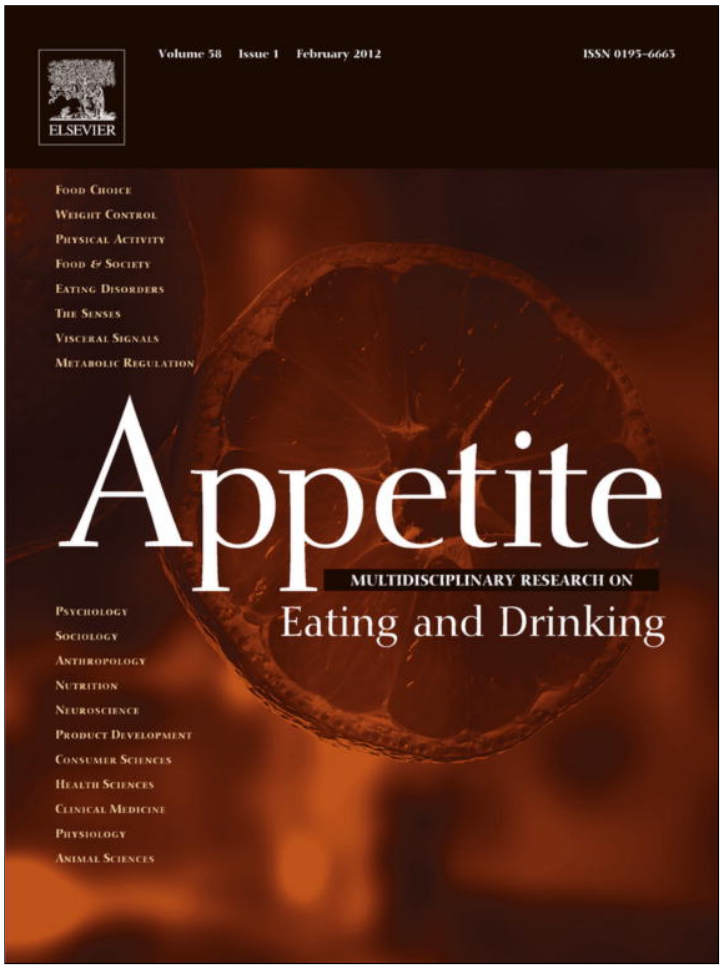

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Research report

Friends don't let friends eat cookies: Effects of restrictive eating norms on consumption among friends ☆

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ABSTRACT

Social norms are thought to be a strong influence over eating, but this hypothesis has only been experimentally tested with groups of strangers, and correlational studies using actual friends lack important controls. We manipulate an eating norm in the laboratory and explore its influence within established friendships. In two studies we randomly assigned groups of three friends to a restrictive norm condition, in which two of the friends were secretly instructed to restrict their intake of appetizing foods, or a control condition, in which the friends were not instructed to restrict their eating. The third friend's consumption was measured while eating with the other two friends and while eating alone. In both studies, participants consumed less food when eating with friends who had been given restricting instructions compared to those who had not been given those instructions. In Study 2, participants who ate with restricting friends also continued to restrict their eating when alone. Experimentally manipulating social norms within established friendships is possible, and these norms can influence consumption in those social groups and carry over into non-social eating situations. These findings may suggest mechanisms through which eating behaviors may spread through social networks, as well as an environmental factor that may be amenable to change.

Introduction

Although common sense might suggest that hunger and satiety are the prevailing motivators of food intake, a body of research has found that individuals often eat for social reasons, leaving hunger and satiety to play relatively minor roles (Herman & Polivy, 2005; Herman, Roth, & Polivy, 2003). Research analyzing large social networks suggests that social factors play a significant role in the spread of obesity; individuals' likelihood of being obese was particularly influenced by the weight of their friends–even more so than by the weight of siblings or a spouse (Christakis & Fowler, 2007). Although that work suggests that social factors influence body weight, the mechanisms through which social factors have these effects are not clear, nor is it clear whether these same factors can lead to restrictive eating as well as overeating.

Observational studies examining the social facilitation of eating find that individuals tend to eat more when around other people than when alone, and the more other people around, the more they eat (de Castro & Brewer, 1992). This increased consumption may result from the extended duration of the meal when many other people are present (de Castro, 1990), suggesting one route through which social eating may contribute to weight gain. An advantage of these field studies is that they examine the influence of familiar others on eating in typical social contexts. Without experimental control, however, it is not possible to assess whose behavior is being influenced by whom, nor is it possible to examine additional mechanisms that underlie this influence.

In contrast to the literature on social facilitation effects, some laboratory research on social eating has demonstrated that people actually eat *less* when around others (Mori et al., 1987; Pliner & Chaiken, 1990). In these studies, concerns over conveying a positive impression (i.e., impression management concerns) were particularly salient and may have been the primary influence on consumption (e.g., Roth, Herman, Polivy, & Pliner, 2001), as individuals eating with strangers are motivated to avoid excessive eating and its associated negative stereotypes (Vartanian, Herman, & Polivy, 2007). Other research has demonstrated that social eating leads to modeling of intake such that individuals model the consumption of their eating partner, whether the partner is eating more or eating less (Herman et al., 2005; Rosenthal & McSweeney, 1979). These studies suggest that social eating can both promote and inhibit eating, depending on social motives as well as the consumption of co-eaters.

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Impression management concerns are thought to be a larger factor among strangers than friends (Leary, Nezlek, Downs, Radford-Davenport, et al., 1994), which might explain why lab studies with strangers support impression management interpretations whereas field studies with friends do not. Indeed, the two lab studies that included both friends and strangers found that subjects ate less with strangers than with friends (Clendenen, Herman, & Polivy, 1994; Salvy, Jarrin, Paluch, Irfan, & Pliner, 2007). An advantage of the laboratory approach is the ability to isolate specific social influences on eating behavior; however, with few exceptions (i.e., Clendenen et al., 1994; Salvy et al., 2007), the co-eaters in experimental studies have been strangers, rather than actual friends or partners, which limits the generalizability of claims we can make from these studies.

Social eating can be more parsimoniously described within a normative framework (Herman et al., 2003). When eating with others, individuals are motivated to avoid eating in excess, as individuals who eat excessively are negatively stereotyped (for a review, see Vartanian et al., 2007). To achieve this, individuals turn to the intake of their eating companion(s) as a guide for how much can be eaten without appearing excessive. Among strangers, the default norm may be one of minimal eating (in situations where impression management concerns are salient) or one of matching (in the absence of other guides to consumption). Among friends, the primary influence on eating may be the social norm set by the group (Herman et al., 2003), which theoretically could function to either promote *or* inhibit restrictive eating. A social norm explanation for how familiar others influence eating is also consistent with research on social identity and health behaviors, which has demonstrated that perceptions of group norms and behaviors can guide health decisions (Oyserman, Fryberg, & Yoder, 2007). However, clear experimental support for the effects of norms *within existing friendships* remains absent from the literature. In fact, one study found that individuals were no more likely to match their eating to that of a friend than to a stranger (Salvy et al., 2007), suggesting that norms may *not* be more influential in groups of friends than in groups of strangers. Researchers in that study observed the consumption of friends eating together—groups in which an eating norm presumably already existed.

Eating norms have been experimentally manipulated in previous studies. For example, consumption norms were surreptitiously indicated in one study by allowing participants to see false data on the amount of food consumed by previous participants (Roth et al., 2001). This norm, however, was based on information about the behavior of strangers (just as norms in other lab studies were based on observations of strangers)—and participants' consumption was observed outside the friendship context. To our knowledge, no research has experimentally manipulated eating norms within established friendships to directly test how a consumption norm may influence the eating of one of its members.

In two studies we experimentally manipulated a restrictive eating norm in a group of established friends and measured whether that norm caused individuals to eat less while eating with those friends and while eating alone. In both studies, we brought groups of three friends into the lab for a discussion task, during which they were provided snacks. An eating norm was manipulated by secretly instructing two of the friends to restrict their eating or by giving no instruction. In Study 1 we created this norm by instructing the two friends to eat only vegetables instead of unhealthy foods (in the control condition we gave no instruction), and in Study 2 we created this norm by requiring the two friends to eat no tempting chocolate chip cookies (in the control condition we required them to eat at least two cookies). We then observed the eating behavior of the third friend (naïve to the manipulation instructions, whom we refer to as the participant) while in the group and in a subsequent eating session while alone. In Study 2, we also looked at the relationship between consumption and trait self-control to help illuminate whether individuals were effortfully adhering to a restrictive eating norm, or were eating freely.

These studies improve on existing studies methodologically and conceptually. We used a methodology that afforded greater experimental control than observational studies, yet we maintained a greater degree of ecological validity than typical lab studies by using existing friendships instead of strangers. This allowed us to retain the strengths of both methodologies. Conceptually, this study allowed us to examine the causal effect of social norms on eating within the context of actual friendships, essentially bypassing the influence of pre-existing norms. Additionally we were able to examine whether these eating norms could function to *reduce* consumption. This research allowed us to test the primary theoretical explanation for how friendships influence eating behavior and a potential mechanism through which friendships influence weight.

Our main hypothesis was that participants' food intake would be influenced by the experimentally manipulated group norm. Research has found that norms have the potential to last beyond a social situation (Roth et al., 2001); however, this past research was conducted using strangers instead of friends. We sought further support for norm carryover, hypothesizing that our experimentally manipulated norms would persist outside the presence of the friends. Additionally, the restrictive norm in Study 2 was explicitly designed to require self-control for adherence, as it involved refraining from eating a highly tempting food. Therefore, our third hypothesis was that consumption in Study 2 would be related to trait self-control among participants whose friends set a restrictive norm, but not among participants whose friends ate freely.

Study 1

Method

Participants

Forty-four groups of three friends (132 individuals total) replied to an advertisement for a study on friendship dynamics for which each group member would receive eight dollars or two extra credit course points for participating. Groups in which all members were between the ages of 18 and 29 were eligible, and no other inclusion criteria were set. No mention of snacks or food was made on any of the recruitment materials. Participants' ages ranged from 18 to 29 years ($M = 20.03$, $SD = 2.12$), and 73% of participants were female, 71% were white, and 29% were Asian. Participants reported knowing the friends in their group for an average of 18.9 months ($SD = 26.8$). According to chi-squared tests, participants in the two groups did not differ by participants' gender, $\chi^2(\mathrm{df} = 1) = .62$, $p = .43$; or ethnicity, $\chi^2(\mathrm{df} = 1) = .26$, $p = .61$. Participants in the two conditions did not differ from each other on the time of day of participation, body size, rating of group cohesion or length of time they knew the other group members, according to independent sample t-tests (all t-values <1.30; all p-values > .18).

Research design

Before arriving at the lab, groups were randomly assigned to a restrictive norm condition or a control condition, and within each group, one member was randomly assigned to be the participant (this individual is referred to as the *participant*). The other two members of the group (referred to as the *friends*) would be surreptitiously informed of the manipulation, effectively acting as confederates in the study. One group assigned to the restrictive norm condition was omitted for failure to follow the manipulation instructions (i.e., the informed friends ate the restricted foods), another group was omitted from this condition because the informed

Table 1
Mean (SD) pieces of food consumed in the two conditions of Study.[1]

	Consumed while with friends				Consumed alone			
	Total	Vegetables	Meats	Sweets	Total	Vegetables	Meats	Sweets
Restrictive norm	4.92 (3.91)	1.58 (1.96)	2.50 (2.61)	.85 (1.49)	2.42 (3.61)	.85 (1.57)	1.00 (1.60)	.58 (1.14)
Control	6.73 (4.48)	2.93 (3.32)	1.93 (1.71)	1.87 (2.42)	2.67 (4.27)	.93 (1.91)	.67 (1.11)	1.07 (2.28)

friends ate so much that they did not leave sufficient food for the participant to eat, and one group was omitted from the control condition because the amount of food eaten by the participant was nearly four standard deviations above the mean. This resulted in 26 groups in the restrictive norm condition, and 15 in the control condition.

Measures

Group cohesion (adapted from Chin, Salisbury, Pearson, & Stollak, 1999) was measured using a 6-item questionnaire tapping both a sense of belonging within the friend group as well as a sense of wellbeing derived from being a member of the group. Sample items include, "I feel that I belong to this group of friends," "This group of friends is one of the best anywhere," and "I am happy to be part of this friend group." The scale exhibited strong internal consistency ($\alpha = .95$).

Experimenters estimated the body size of each participant using the Figure Rating Scale (Furnham & Alibhai, 1983), a set of 12 drawings of human figures that range from 1 (extremely thin) to 12 (extremely obese).

Procedure

Once the study was briefly explained and consent was obtained, the group members were sent to different lab rooms to complete a background survey comprised of individual difference and demographic items. During this time the norm manipulation (our independent variable) was implemented. In the *restrictive norm* condition, the experimenter individually approached each friend and informed them that they would have the opportunity to eat a variety of healthy and less healthy snacks when they returned to the group (including raw vegetables, meats, cheeses and sweets) but to please restrict their eating to only the vegetables and not touch the other snacks offered. They were also instructed to take at least two vegetables to put on their plate. Even though friends were permitted to eat as many vegetables as they wanted, limiting their intake to only vegetables and avoiding the other snacks presented a restricted eating situation. Neither friend was aware that another member of the group was also being given these instructions, and the actual participants were unaware that their friends had been given instructions of any kind. In the *control* condition, no such eating or serving instructions were given to the friends.

Groups were then reunited, seated around a small round table, and asked to discuss a campus issue together for five minutes. A tray of bite-sized snacks including a variety of raw vegetables (carrots, broccoli, and cauliflower), meats and cheeses (cubed cheddar cheese, slices of summer sausage, and small slices of ham and cheese wraps) and desserts (coffee cake, brownies, and cookie bars) was put on the table and the group was told to help themselves. The number of snacks consumed while with the group and while alone were our dependent variables. All snacks were prepared in advance and were served cold. There were a total of 54 pieces of food on the tray. The snacks were speared with color-coded toothpicks (e.g., blue for veggies) and eaters had different colored plates on which to place their used toothpicks while eating. Researchers could then determine how many pieces of each type of food were consumed by each participant by counting discarded toothpicks on their respective plates after the discussion session.

After the discussion task, group members were separated to their original rooms to complete a short series of follow-up questionnaires, leaving the participant alone in the room with the remaining snacks. This allowed for a period of eating without the presence of the friends but after the norm had been established. Food consumed was again assessed with the color-coded toothpick system. Following the experimental protocol, participants were fully debriefed, thanked, and compensated for their participation. No participant displayed relevant suspicion about the procedures, their friends' behaviors, or the possibility that their eating was being monitored.

Results and discussion

Because friends in both conditions were free to eat as many vegetables as they wanted, consumption analyses control for the vegetable intake of the two friends. Means and standard deviations for each food by condition are provided in Table 1. Participants who ate with friends in the restrictive norm condition ate fewer pieces of food overall than participants who ate with friends in the control condition ($F(1, 37) = 6.86$, $p < .05$). These participants specifically consumed fewer vegetables and sweets than their counterparts in the control condition ($F(1, 37) = 5.99$, $p < .05$ for vegetables, and $F(1, 37) = 4.47$, $p < .05$ for sweets), and there was no difference in consumption of meats/cheeses between the groups. However, when participants in the restrictive norm condition were left alone with the food, their eating no longer reflected the norm their friends had set, and they did not eat less food overall than participants whose friends had eaten freely, nor were there any differences in specific types of food consumed (all p's >.12).

Results from Study 1 suggest that our experimentally established norm influenced the naïve participants' eating behavior in a group setting. Specifically, these participants ate less food overall, which was evident both in reduced consumption of the vegetables and the sweets. However, we did not find evidence that these norm effects carried over to subsequent alone eating. Several limitations to Study 1 may have impeded our ability to test for this norm carry-over. First, participants' consumption when alone may have been influenced by their awareness that only they (and not their friends) had the opportunity to eat more, raising issues of fairness or politeness that restricted their intake. Second, the large amount of snacks available allowed for near unlimited eating in the group eating session, which may have resulted in satiation and contributed to a floor effect when eating alone that prevented the detection of group differences. Third, based on participant feedback, we suspected that the cold store-bought desserts on the tray may not have been sufficiently tempting relative to the vegetables and meats and cheeses (several participants mentioned that fresh vegetables are hard to come by in the dorm and are therefore quite tempting). This raises the question of how challenging norm-adherence was—it may have been too easy to adhere to this restrictive eating norm, also contributing to a floor effect in the second eating session. Study 2 was conducted to address these concerns.

Study 2

Study 2 differed from Study 1 in four ways. First, the snack offered to participants changed from a variety of foods to a single highly tempting food—freshly-baked bite-sized chocolate chip

cookies. The baking of the cookies began a half hour before participants arrived, so the entire lab space smelled of baking chocolate chip cookies upon the participants' arrival, and all cookies were served warm. Second, all participants were given their own plate of 6 bite-sized cookies, minimizing the chance of over-satiation during the group eating session. Third, following the discussion task, each group member's plate was replenished to once again have six cookies and the members were instructed to bring their plate with them to their original lab rooms to complete the follow-up questionnaires, eliminating politeness and fairness concerns. Fourth, whereas in Study 1 we implemented a restrictive norm by having friends eat only one type of food (vegetables) and refrain from eating the other foods (meats, cheeses and desserts), in Study 2 we implemented a restrictive norm by instructing the informed friends to refrain from eating any cookies at all. In the control condition, friends were instructed to eat at least two cookies during the group task in order to insure that a restrictive norm condition would not inadvertently be set in those groups.

In Study 2 we aimed to replicate Study 1 by demonstrating the effects of a restrictive eating norm when among friends, and to again examine norm carry-over. Additionally, we hypothesized that efforts to adhere to the norm would be made evident by a relationship between trait self-control and consumption for participants in the restrictive norm condition, but not in the control condition. This relationship would provide further evidence of the influence of the restrictive eating norm.

Method

Participants

Fifty-one groups of three friends (153 individuals) took part in the study. Participants' ages ranged from 18 to 26 years ($M = 20.04$, $SD = 1.62$), 69% were female, 69% were white, 25% were Asian, 4% were black, and 2% were Hispanic. Participants reported knowing the friends in their group for an average of 15.93 months ($SD = 19.92$). According to chi-squared tests, participants in the two conditions did not differ by gender, $\chi^2(\mathrm{df} = 1) = .26$, $p = .61$; or ethnicity, $\chi^2(\mathrm{df} = 3) = 4.20$, $p = .24$. Participants in the two conditions did not differ from each other on the time of day of participation, body size, rating of group cohesion ($\alpha = .91$), or the length of time they knew the other group members, according to independent sample t-tests (all t-values <1.06; all p-values >.29).

Research design

Groups were randomly assigned to the two conditions—an experimental restrictive norm condition and a control condition. One group in each condition was omitted for failure to follow the manipulation instructions. One additional "restrictive norm" group was omitted due to a data recording error. This resulted in 23 groups in the restrictive norm condition and 25 groups in the control condition. As in Study 1, no participants suspected the true point of the study or realized their eating was being measured.

Measures

Trait Self-Control (Tangney, Baumeister, & Boone, 2004) was measured using a 13-item questionnaire that included items such as, "I am good at resisting temptation" and "I wish I had more self-discipline" (reverse-coded). This questionnaire exhibited good reliability, $\alpha = .76$. Measures of group cohesion (adapted from Chin et al., 1999) and body size (Furnham & Alibhai, 1983) were identical to those in Study 1.

Procedure

Apart from the previously described differences between Study 1 and Study 2, all procedures were identical to those for Study 1.

Results and discussion

As in Study 1, we found that while working on the discussion problem with their friends, participants in the restrictive norm condition ate significantly fewer cookies ($M = 2.43$, $SD = 2.02$) than those in the control condition ($M = 3.68$, $SD = 1.97$; $t(46) = 2.16$, $p = .04$). Unlike in Study 1, but in accord with our hypotheses, we found that the norm retained its influence even in the absence of the friends. While eating alone, participants in the restrictive norm condition consumed significantly fewer cookies ($M = 1.69$, $SD = 1.52$) than participants in the control condition ($M = 2.76$, $SD = 1.92$; $t(46) = 2.11$, $p = .04$).

To support the conclusion that participants in the restrictive norm condition were making active efforts to resist eating the cookies (in accord with the restrictive norm), we conducted a hierarchical regression analysis predicting consumption with trait self-control (centered) and condition (dummy coded) on Step 1 and the interaction between trait self-control by condition on Step 2. This interaction was marginally significant, $\beta = .37$, $p = .06$. Tests of simple slopes confirmed that, in the restrictive norm condition, trait self-control was related to less consumption, $\beta = -.56$, $p < .01$, whereas trait self-control was unrelated to consumption in the control condition, $\beta = -.04$, $p = .84$. Thus, only participants in the restrictive norm condition were using their self-control ability to restrict their eating, indicating efforts to adhere to the norm.

General discussion

These studies had two primary goals: First, to examine the causal influence of restrictive social norms on eating behavior within existing friendships, and second to examine the power of such norms to "carry-over" into non-social contexts. In both studies participants in the restrictive norm condition ate significantly less food than those in the control condition, which is consistent with existing theories that norms are a powerful influence on eating in established friendships. It also demonstrates that friends can influence individuals to eat *less*, not just more. In Study 2 we also demonstrated that these norms can carry over into situations in which one's friends are not present. We further supported our hypotheses by showing that only individuals faced with a restrictive norm seemed to be employing self-control to guide their eating, rather than eating freely.

This research improves upon past work by experimentally manipulating an eating norm within existing relationships. Furthermore, we were able to detect the influence of this new manipulated norm over and above the potential influence of pre-existing norms in these established friendships. This paradigm provides a new tool for experimentally investigating social influences on eating behavior in a more realistic context, an useful method for learning precisely how social ties can influence health behaviors and outcomes. Future research might explore the establishment of norms in situations where there is not already a pre-existing norm, perhaps with a novel behavior.

Because friends may be seen as trusted and credible sources of information central to the self, norms established within friendships are likely to be particularly powerful and to extend beyond the friendship context. Our results from Study 2 support this—participants in the restrictive norm condition continued to eat fewer cookies when alone than did participants in the control condition. The time between eating sessions was brief, however, and it is possible that norms may need repeated exposure to result in more sustained influence. Regardless of how long these effects persist, it appears that the eating of close others can shape our own intake. In contrast to most field research on the influence of friends on eating, we show that these norm effects exist in the direction of reduced consumption; however, in future research it would be

useful to extend this work to experimentally examine high consumption or indulgent norms in addition to restrictive norms. These findings both contribute to the current understanding of social norms and suggest a possible mechanism for how obesity or disordered eating more generally may "spread" through social networks. However, social norms may also support healthy eating behaviors, thus representing a particularly salient and modifiable environmental factor that may contribute to the long-term maintenance of weight.

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