

Research and Professional Briefs

Social Modeling Effects on Young Women's Breakfast Intake

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ABSTRACT

Numerous studies have shown that the presence of others influences young women's food intake. They eat more when the other eats more, and eat less when the other eats less. However, most of these studies have focused on snack situations. The present study assesses the degree to which young women model the breakfast intake of a same-sex peer in a semi-naturalistic setting. The study took place in a laboratory setting at the Radboud University Nijmegen, the Netherlands, during the period January to April 2009. After completing three cover tasks, normal-weight participants ($n=57$) spent a 20-minute break with a peer who ate a large amount or a small amount of breakfast or no breakfast at all. The participants' total amount of energy consumed (in kilocalories) during the break was measured. An analysis of variance was used to examine whether young women modeled the breakfast intake of same-sex peers. Results indicate a main effect of breakfast condition, $F(2,54)=8.44$; $P<0.01$. Participants exposed to a peer eating nothing ate less than did participants exposed to a peer eating a small amount ($d=0.85$) or large amount of breakfast ($d=1.23$). Intake in the Small-Breakfast condition did not differ substantially from intake in the Large-Breakfast condition. The findings from the present study provide evidence that modeling effects of food intake are weaker in eating contexts in which scripts or routines guide an individual's eating behavior.

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There is little question that human food intake is influenced by social factors. Numerous studies have shown that an individual's food intake may be modified by the presence of another person (1). In general, people tend to eat more when their eating companion eats more and less when their eating companion eats less. It has been suggested that in the absence of clear guidelines, people often use the intake of their eating companion(s) as a source of normative information about how much they may eat in a given context (2). Because eating excessively elicits negative stereotypes such as being deficient in self-control (3), people may use the amount eaten by their eating companion(s) as an indication of the maximum amount that they themselves may safely eat without being negatively evaluated by others or themselves. If one's companion eats a large amount, it is permissible to eat a large amount too, whereas it is safer to suppress one's intake when one's companion is eating nothing or only a small amount.

Although the effects of social modeling on intake have proven to be very powerful, they have been observed primarily in situations in which participants ate snacks, such as chocolate-coated peanuts (4) or cookies (5). A limitation of using snack situations to examine social modeling is that this type of eating context might affect the magnitude of the modeling effect (6). That is, the quantity of food that is acceptable to consume may be especially ambiguous in such situations, rendering the companion's intake all the more important as an indicator of how much one should appropriately consume. This situational ambiguity may increase the tendency to model the other's food intake.

Perhaps social modeling has less influence on food intake in situations in which people already have clear eating routines or scripts. Routines or scripts related to eating reflect what people have learned is an appropriate, expected, or desirable amount to consume in a particular cultural or social context. Breakfast consumption has been shown to be a stable and habitual eating behavior within individuals (7). Accordingly, preexisting breakfast-related scripts or routines may largely determine an individual's breakfast consumption. If social modeling reflects a search for guidelines regarding routines or scripts for appropriate intake, then modeling effects should be weaker in a breakfast context for which these preexisting scripts—what Herman and Polivy (8) have called *personal norms*—already exist.

The main aim of the present study was to examine whether social modeling affects young women's breakfast intake in a semi-naturalistic setting. An experimental-observational paradigm was used in which young women were exposed to a same-sex peer instructed to eat nothing.

ing, a small amount, or a large amount of breakfast during a 20-minute break between two cover tasks. Because breakfast consumption is stable and habitual, making people less likely to search the social environment for guidelines for appropriate intake, it is predicted that modeling effects on breakfast intake would be attenuated.

METHODS

Design and Participants

This study used a between-participants design, with participants randomly assigned to one of three conditions. All three conditions involved the participant being exposed to a same-sex confederate who was instructed to eat nothing (No-Breakfast condition), a small amount (Small-Breakfast condition), or a large amount (Large-Breakfast condition). Each session included two people: one was the actual participant and the other was the confederate who acted as if she was an ordinary participant. A total of 57 young women volunteered for the study. All participants were recruited through an Internet sign-up program of the Behavioural Science Institute of the Radboud University Nijmegen and were included only if they had a body mass index (BMI; calculated as kg/m^2) within the normal-weight range ($18 < \text{BMI} < 25$). The Ethics Committee of the Faculty of Social Sciences of the Radboud University Nijmegen approved the study protocol and all participants provided written informed consent. Participants were awarded course credit (for educational requirements) or a €10 gift cheque for completing the study.

Confederates

Five female students acted as confederates. They had a mean age of 22.60 years (standard deviation [SD]=0.89 years) and a mean BMI of 20.73 (SD=1.12). Confederates were assigned randomly to one of the three experimental conditions each session. The Small-Breakfast confederates were instructed to eat one slice of bread (brown or white) with sandwich filling (sweet or savory) and one cup of tea or coffee (approximately 171 kcal). In the Large-Breakfast condition, the confederates were instructed to eat four slices of bread with sandwich filling and two cups of tea or coffee (approximately 547 kcal). The No-Breakfast confederates did not eat or drink from the available breakfast products. The confederates were instructed not to make any remarks on the smell or taste of the available food during the break (4).

Setting and Procedure

The experiment took place in the bar laboratory at the campus of the Radboud University Nijmegen during the period January to April 2009. All sessions took place on weekdays from 8:30 AM to 9:30 AM or from 9:45 AM to 10:45 AM. Under the pretext of a study on the influence of consuming breakfast on cognitive performance, participants were asked to individually perform three tasks involving concentration and spatial insight both before and after breakfast consumption. They were told that they were participating with another

person in order to speed up data collection. The three cover tasks took approximately 15 minutes. Data from these cover tasks were not used in this study. To avoid large variations in satiation, participants were asked to refrain from eating 3 hours before the experiment (9). After performing the three tasks, the confederate and the participant had a 20-minute break, which they could spend together. They were told that they could help themselves to the breakfast that was provided for them. After the break, the participant filled in a questionnaire about her breakfast patterns. Next, the experimenter measured the participant's height and weight. Postexperimental interviews indicated that participants were naïve about the real aim of the study and that they were unaware that their breakfast consumption was being measured.

Breakfast

The breakfast used in this study consisted of a variety of foods. Before starting the study, 10 female undergraduate students were asked what kind of foods they would normally drink or eat for breakfast. On the basis of these women's choices, the following breakfast ingredients were selected: plain brown bread (95 kcal per slice) and white bread (85 kcal per slice), coffee (no calories), tea (no calories), milk (110 kcal per 225-mL glass), yogurt (75 kcal per 150-mL bowl), orange juice (94 kcal per 200-mL bottle), cheese (59 kcal per slice), and ham (32 kcal per slice). Participants could choose between a number of individually packaged sandwich fillings consisting of butter (34 kcal; 10.7 g), chocolate sprinkles (65 kcal; 20 g), peanut butter (99 kcal; 15 g), chocolate pasta (85 kcal; 15 g), syrup (40 kcal; 15 g), honey (48 kcal; 20 g), and jam (59 kcal; 25 g). In addition, participants could add sugar (16 kcal; 4 g) or coffee milk (10 kcal per cup) to their coffee or tea.

Measures

Participants were asked how many times a week (weekdays only) they had breakfast, with response categories ranging from 0=0 times per week to 5=5 times per week. In addition, they were asked to indicate at what time they had breakfast and with whom they ate breakfast most of the time. In order to calculate the participants' BMI, the experimenter assessed weight and height following standard procedures (10). Height was measured to the nearest 0.5 cm using a stadiometer (Seca 206, Seca GmbH & Co, Hamburg, Germany) and weight was measured to the nearest 0.1 kg using a digital scale (Seca Bella 840, Seca GmbH & Co). The participants' total quantity of breakfast consumed (ie, amount of energy consumed in kilocalories) was used as the dependent variable. A digital scale (Kern 440, Kern & Sohn, Balingen, Germany) for measuring amounts consumed (in grams) was used. For each type of food that the participant ate, the experimenter determined the total number of grams consumed and converted grams to total amount of energy consumed (in kilocalories). If the participant did not eat all of a particular individually packaged sandwich filling, the experimenter subtracted the leftovers from the net weight of the small package. The total amount of breakfast con-

Table 1. Age, body mass index, and breakfast frequency of normal-weight female participants exposed to a same-sex peer eating a large or small amount of breakfast or no breakfast at all

Variables	No-breakfast condition (n=21)	Small-breakfast condition (n=17)	Large-breakfast condition (n=19)
	←————— <i>mean ± standard deviation</i> ^a —————→		
Age	21.85 ± 5.83	20.81 ± 2.56	20.79 ± 1.62
BMI ^b	22.08 ± 1.97	21.41 ± 1.48	21.65 ± 1.25
Breakfast frequency (weekdays)	4.67 ± 0.80	4.29 ± 1.21	4.21 ± 1.27

^aThere were no significant differences in means between conditions.
^bBMI=body mass index (calculated as kg/m²).

Table 2. Normal-weight participants' total amount of breakfast consumed (in kilocalories) during a 20-min break for each modeling condition

	No-breakfast condition (n=21)	Small-breakfast condition (n=17)	Large-breakfast condition (n=19)
Participants' mean intake in kilocalories	185	294	355
Standard error in kilocalories	29	32	30
95% confidence limits	127, 243	229, 358	294, 416

sumed by the participant and the confederate was measured by adding up the kilocalories for all the products consumed.

Statistical Analysis

Preliminary analyses were performed on baseline variables (breakfast frequency, age, and BMI) to determine whether there were differences between conditions. To answer the main question, an analysis of variance (followed by post hoc analyses) was used to examine the main effect of the modeling conditions. The Bonferroni correction was used to adjust for the inflation of type I error. Statistical significance was set at $P < 0.05$. Data were analyzed using SPSS for Windows (version 15.0, 2006, SPSS Inc, Chicago, IL).

RESULTS AND DISCUSSION

There were no significant differences between groups in age, BMI, or breakfast frequency (see Table 1, all P values were > 0.10). All participants consumed breakfast at least once a week, and 70% of the participants ($n=40$) indicated that they had breakfast every weekday. The vast majority of participants (80%) consumed breakfast between 7 AM and 9 AM.

As a manipulation check, participants were asked to estimate the other's food intake (in slices of bread) during the break. Participants estimated the intake of the confederate as larger in the Large-Breakfast condition (mean=3.11, SD=0.88) than in the Small-Break-

fast condition (mean=1.12, SD=0.33), $t(34) = -8.80$; $P < 0.001$, confirming that the intake manipulation was successful. None of the participants in the No-Breakfast condition reported that the confederate ate anything.

An analysis of variance showed a significant difference among participants in the three intake conditions, $F(2, 54) = 8.44$; $P < 0.01$. Bonferroni post hoc tests showed that intake in the No-Breakfast condition was lower than in the Small-Breakfast condition ($P < 0.05$, $d = 0.85$) or than in the Large-Breakfast condition ($P < 0.01$, $d = 1.23$) (see Table 2). Intake in the Small-Breakfast condition did not differ significantly from intake in the Large-Breakfast condition. Results of this study suggest that young women do not eat more breakfast when their eating companion eats a lot rather than a little, but that they do eat less when the other eats nothing.

The absence of the standard small-large modeling effect found in the current study is inconsistent with previous research on modeling of food intake. Earlier studies examining modeling of food intake have focused on the intake of snack foods, such as cookies, baked cheese crackers, cocktail nuts, sandwich quarters, or chocolate-coated peanuts (4,11-17). These studies have all found the same pattern: people eat more when their eating companion eats more and less when their eating companion eats less. All attempts to demonstrate individual differences in the extent of modeling have failed. The modeling effect was found both for men (11,13,14) and women (4,11,15-17), restrained and unrestrained

eaters (15), obese and normal weight (11,14), hungry or satiated individuals (12), and extraverts or introverts (18), indicating that modeling effects of snack intake are rather robust. This study is the first to demonstrate that young women do not necessarily eat more when their eating companion eats more. A possible explanation for the absence of the standard small-large modeling effect is that the present study focused on a specific meal context (breakfast) instead of snack foods. With snacks, the quantity (or range) that is acceptable to consume may be especially unclear and, therefore, modeling behavior might be elicited. Breakfast intake, however, is known to be a stable and habitual eating behavior (7), consisting of routines or scripts that guide an individual's eating behavior. Once these scripts have been determined to work well, they provide a level of comfort and predictability and are likely to be repeated (19). The young women participating in the current study might have brought with them their idiosyncratic breakfast routines ("personal norms"), which made them less susceptible to the normative information conveyed by the breakfast intake of the other peer.

Participants were clearly affected by the behavior of others in the No-Breakfast condition, and ate much less in this condition. It might be the case that, in this situation, the salience of norms induced by the peer did influence participants' intake. But in snack situations, the most salient norm might be a peer eating a large amount of food, in a more standardized eating situation, the most salient norm might have been the peer eating nothing from the available breakfast. Four participants conformed to the no-eating norm, and the other participants in this condition consumed considerably less than did those exposed to a peer eating a small or large amount of breakfast. It is probably worth noting that in the No-Breakfast condition, the peer was not only modeling zero intake but was also serving as a noneating observer, and noneating observers are notorious for suppressing the intake of those they are observing (20). The no-eating peer might have set a powerful norm, leading to suppressed intake, whereas any eating by the peer might have authorized the participants to eat the same amount as they usually would for breakfast (or somewhat more or less).

This study is not without limitations. First, there is substantial between-person variation in normal breakfast intake, and the current design makes it impossible to determine whether the presence of a same-sex peer eating smaller or larger breakfasts has reduced or increased women's normal breakfast intake. Second, although ecological validity was increased by using a breakfast setting that was as naturalistic as possible, participants were provided with a large variety of palatable breakfast ingredients from which they could select their "normal breakfast." In addition, they did not have breakfast in their normal context. This "experimental" breakfast might have been different from their normal eating routine and it is known that the more food people are provided with, the more they will eat (21).

CONCLUSIONS

The findings from the present study provide evidence for the proposal that modeling effects of food intake are weaker in eating contexts in which scripts or routines are available to guide an individual's eating behavior. However, the influence of these scripts or routines on social modeling of food intake was not directly tested in the present study. Most studies on breakfast consumption among children and adolescents have focused on family correlates, such as parental breakfast eating or parental control on food choice to promote healthy breakfast consumption (22). The current study underscores the potential importance of peers or siblings on breakfast consumption. Implications are that interventions designed to promote healthy breakfast consumption must ensure that young people do not consume their breakfast in the presence of noneating peers or siblings. As long as their eating companions eat at least something, then they are likely to consume their customary breakfast.

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