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Research Report

The role of familiarity on modeling of eating and food consumption in children

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Abstract

This study investigates the effects of peer and sibling influence on the cookie intake of normal-weight children. A total of 44 children (24 girls and 20 boys) aged 5–11 participated in this study. Children played a sorting task while being exposed to a large amount of cookies. Children were tested alone or with an unfamiliar peer or with a sibling. Results indicated that the social condition was related to the participants' energy intake. Children eating with their siblings ate more cookies than did children eating with strangers and also consumed more cookies than did children eating alone. This pattern of results is consistent with previous research in adults indicating that familiarity between co-eaters influence how much one choose to eat. Furthermore, the degree of intake matching was extremely high among strangers, but low and not statistically significant in dyads of siblings. We conclude that matching effect is not ubiquitous and that familiarity affects the level of matching of eating in children.

Keywords: Peer influence; Sibling relationship; Eating; Children

Introduction

Social eating, or eating in the presence of others, leads to a different pattern of intake than does solitary eating. According to a recent normative model put forth by Herman and colleagues, people use the eating behavior of others in order to determine how much they should eat—generally, individuals are motivated to eat as much palatable food as possible without being seen to eat excessively, and they often rely on social cues to help them define "excessive" (Herman, Roth, & Polivy, 2003).

Social factors are among the most potent influences on individuals' food intake, but it is important to note that the direction of these influences can vary depending on the context, leading to either increased intake or decreased intake. Social facilitation research shows that, in adults, the presence of others is associated with increased eating (e.g., de Castro, 1990). Other research shows that people tend to model the intake of their eating companions, eating less when their companions eat less and eating more when their companions eat more (e.g., Goldman, Herman, & Polivy, 1991). Finally, the desire to convey a favorable impression can also influence individuals' food intake (Vartanian, Herman, & Polivy, 2007). Although much of this research shows that impression-management inhibits eating (e.g., Mori, Chaiken, & Pliner, 1987; Pliner & Chaiken, 1990), this is not always necessarily the case. For instance, Vartanian et al. (2007) argued that impression-management efforts are based on common consumption stereotypes. To the extent that eating a large amount of food is related to the impression that one is motivated to convey (e.g., appearing masculine), impression-management concerns could lead to increased intake. Thus, although there are clear social factors that determine intake, the direction of those influences can vary depending on the context.

One particular contextual factor that is related to social influences on food intake is the relationship between the co-eaters, more specifically, the familiarity between co-eaters. For instance, de Castro (1994) reported that there was social facilitation of intake to a greater extent between friends and family compared to with co-workers and other

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unfamiliar individuals (see also Clendenen, Herman, & Polivy, 1994). Only one study to date has examined the impact of familiarity on modeling of food intake: Salvy and colleagues (Salvy, Jarrin, Paluch, Irfan, & Pliner, 2007) found similar levels of matching of food intake among familiar others compared to unfamiliar others.

Although several studies have looked at the influence of parents on children's food consumption (e.g., Faith, Scanlon, Birch, Francis, & Sherry, 2004; Klesges et al., 1983; Koivisto, Fellenius, & Sjoden, 1994; Laessle, Uhl, & Lindel, 2001), few experimental studies have tested the influence of peers on children's food intake. In fact most of the research in children has focused on the effects of others on children's acceptance of unfamiliar foods (Addessi, Galloway, Visalberghi, & Birch, 2005; Birch, 1980; Duncker, 1938; Harper & Sanders, 1975; Hendy, 2002; Hendy & Raudenbush, 2000). However, questions remain about the extent to which social influences also impact children's food consumption (i.e., *how much* they eat). Some recent findings indicate that the presence of others do impact children's eating (Salvy, Coelho, Kieffer, & Epstein, 2007; Salvy, Kieffer, & Epstein, 2007; Salvy, Romero, Paluch, & Epstein, 2007). However, it is unknown whether the relationship between co-eaters impacts children's food intake and/or their matching of food consumption.

With respect to the relationship with co-eaters, a type of familiar other that might be uniquely relevant to a child is his or her sibling. McHale, Kim, and Whiteman (2006) describe two primary forms of sibling influence: modeling, in which one sibling serves as a socializing agent to another sibling, and "de-identification", in which one sibling actively tries to differentiate him or herself from the other sibling. These authors recently identified a third form of sibling influence in which a child does not use his or her sibling as a referent (Whiteman, McHale, & Crouter, 2007). Whiteman et al. (2007) found, for example, that the correlation between siblings' risky behaviors was observed for modeling siblings, but not for de-identification or non-referent siblings. Given the variability in sibling influence, it is unclear whether or not one would expect modeling of food intake between siblings.

The current study was designed to examine the effects of social influence on children's food intake, and to determine whether familiarity (siblings versus strangers) impacts the amount of food consumed as well as the relationship between co-eaters' intake (modeling of eating).

Method

Participants were 44 non-overweight children (20 boys and 24 girls) aged 5–11 ($M = 6.8$, SD = 1.8). Participants were tested either alone ($n = 18$), with a sibling ($n = 16$; eight sibling dyads) or with an unfamiliar child ($n = 10$; five stranger dyads) in a between-groups design. While recruiting and scheduling participants, the dyads of strangers were matched to the dyads of siblings on age and gender to insure an equal distribution of similar pairs in each condition. However, because of scheduling problems, three "stranger" sessions had to be cancelled (i.e., one participant per dyad did not show up for the session).

Parents were asked that their child refrain from eating for 2 h prior the appointment at the laboratory (to standardize participants' food intake prior to the study). Parents were informed that during the study, their child would indicate preferences for different activities while having access to a large portion of cookies.

Upon arrival to the laboratory, all children heard an assent script and they were asked if they were willing to take part in the study. Parents were also asked to provide written consent. The experimenter then explained the experimental task in detail to the parents and their children. This 20-min task, described as a "sorting task," required each child to indicate which activities he or she likes to do by placing pictures of activities in either a "Yes" bin for those activities that they liked or a "No" bin for the activities they did not enjoy (see Salvy, Romero et al., 2007, for a detailed description of this task). Participants were instructed to sit at opposite sides of a table, facing each other (or sitting alone for those participants in the alone condition). An audio CD delivered task instructions to insure that participants examined the same activity, at the same time, at the same pace and in the same order. The experimenter ensured that participants felt comfortable before starting the task by receiving verbal confirmation of this from the participants, and encouraged participants to report any discomfort that might arise during the study.

Before starting the task, each child was casually offered two pre-weighed bowls of cookies which were copiously filled (200 g ± 50 g of cookies in each bowl). The snacks were commercially available bite-size cookies (Chips Ahoy Mini Chocolate Chip cookies and Mini Oreo Sandwich Cookies; Nabisco, East Hanover, NJ), weighing a mean of 2.9 g (SD = 0.3 g) per cookie and yielding 14 kcal each. Uneaten snacks were discarded after each session. Participants were also provided with 250 ml of fresh water and a 1.5 L pitcher of water to refill their cup as needed. The children were casually informed that these snacks were for them and that they could eat as much as they like while working on the task. The bowls of snack food were placed so that when eating in the presence of others (strangers or siblings), each child could only access his or her own bowls of cookies. The experimenter performed an example of the task and made sure that the participants clearly understood the instructions. After participants completed the 20-min task, the experimenter returned to the laboratory room, and the remaining snack foods were removed to be reweighed to determine the participants' food intake. Finally, participants and their parents were debriefed and given $20 as compensation for their participation.

Analytic plan

Food intake

The first question considered in this study is whether the relationship between co-eaters impact children food

consumption. Analysis of these data requires accounting for dyadic issues as the mutual influence violates the assumption of independence between observations required for analysis of variance. Mixed-effects models provide a useful approach to account for interdependence in dyadic relationships (Gibbons & Hedeker, 1994; Hedeker & Gibbons, 1994). Mixed models assume that the data within clusters are dependent among the observations. This is determined by the covariances among the regression coefficients and can be characterized by a covariance function. The outcomes at the individual level are modeled taking into consideration the dependence of observations within groups and individuals. A mixed-effects model analysis, using SAS Software (SAS, 2002) was used to analyze these data. The social condition (alone vs. siblings vs. strangers), gender and age were entered as fixed effects into the models as predictors of participants' caloric intake of cookies.

Relationship between co-eaters

The second question of interest was whether co-eaters' familiarity would moderate the anticipated matching of intake or the similarity between co-eaters' food intake. The assessment of relationships between two measures via Pearson correlations applies only to situations where members of a dyad are distinguishable (i.e., one unequivocally belongs to the X group and the other unequivocally belongs to the Y group). When the designation of members of a pair is arbitrary (i.e., when there is no way to disentangle variability due to a specific individual), intraclass correlation coefficients (ICCs) provide accurate estimations of the magnitude of the relationships between variables (Griffin & Gonzalez, 1995; Shrout & Fleiss, 1979). Matching of intake was indexed by the ICCs, which were calculated with the SPSS 12.0 "reliability" procedure (SPSS. 2003), using a one-way random model.

Results

Food intake

The social condition was related to the participants' energy intake, $F(2,7) = 5.49$, $p < 0.05$ (Fig. 1). Children eating with their siblings ate more cookies ($M = 297$ g, $SE = 43$ g, $N = 16$) than did children eating with strangers ($M = 123$ g, $SE = 48$ g, $N = 10$), $t(13) = 2.7$, $p < 0.05$, and also consumed more than did children eating alone ($M = 143$ g, $SE = 37$ g, $N = 18$), $t(13) = -3.1$ $p < 0.05$. Strangers did not eat more cookies than participants who ate alone. Gender ($p = 0.7$) and age ($p = 0.1$) were not significant predictors of cookie consumption.

Relationship between co-eaters

The co-eaters' familiarity influenced matching of intake. Matching of intake was greater among strangers (ICC = 0.93) than among siblings (ICC = 0.11), $Z = -3.3$, $p < .0001$.

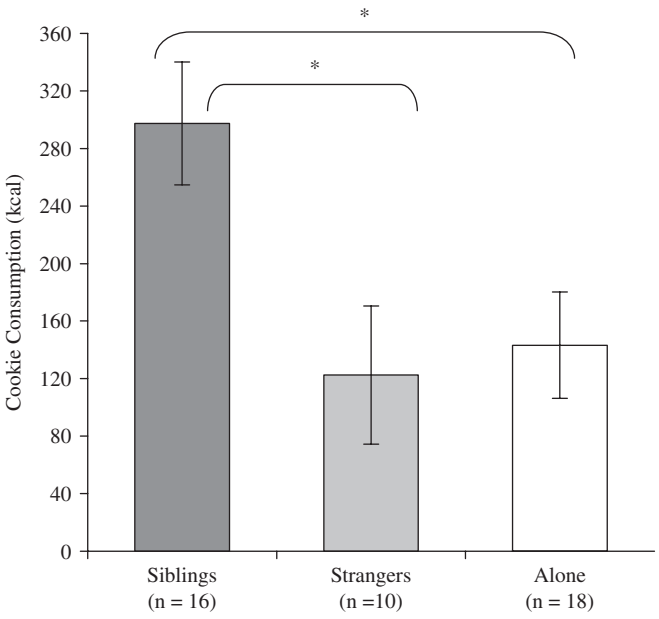

Fig. 1. Children mean cookie consumptions (kcal) and standard errors across conditions.

Discussion

The results of this study suggest that social facilitation of eating in children occurs only when the co-eaters are familiar. Children eating alone and with strangers ate less than did children eating with their siblings. This pattern of results is consistent with previous research in adults (e.g., Clendenen et al., 1994; de Castro, 1994) indicating that familiarity of others moderates social facilitation of eating. The lack of social facilitation among adult strangers has been postulated to occur as a result of impression-management concerns, in which one wants to present oneself to unfamiliar others in a favorable manner. Minimal intake has been postulated to be a means towards conveying a favorable impression (Herman et al., 2003; Vartanian et al., 2007) and the present findings suggest that a similar process might be operating among children. Conceivably, the importance of conveying a good impression may be less with a sibling then with an unfamiliar peer (Leary et al., 1994).

Previous research examining the effects of others on children's eating behavior has focused on the influence of parents on children's food consumption (e.g., Faith et al., 2004; Klesges et al., 1983; Koivisto et al., 1994; Laessle et al., 2001) and on the effects of different models on children's acceptance of new foods (Addessi et al., 2005; Birch, 1980; Duncker, 1938; Harper & Sanders, 1975; Hendy, 2002; Hendy & Raudenbush, 2000). However, these studies did not specifically examine the impact of familiarity on children's food consumption, and it is not clear from these studies how the relationship with co-eaters influences modeling of eating in children.

Our results indicate that children eating with their siblings exhibited less matching behavior than did children eating with another, unfamiliar child. This was somewhat

unexpected, given that past research on adults has found similar levels of matching between familiar and unfamiliar others (Salvy, Jarrin et al., 2007). However, the current finding is consistent with conceptualizations of sibling influence in other domains. Whiteman and colleagues (2007) found that the degree of similarity in sibling behavior varies as a function of the form of influence, with siblings who model one another being more similar than siblings who de-identify or siblings who are non-referents. With respect to sibling influences on food intake, it might be that (a) food intake is a domain in which de-identification or non-referent forms of influence predominate, or (b) that the number of children who de-identify or who are non-referents mask any matching effects that would have been observed among siblings who model one another. Investigating individual differences in the sibling influence-food intake connection would be a valuable direction for future research.

We conclude that the matching effect is not ubiquitous and that familiarity affects the level of matching of eating in children. This said, the explanatory mechanisms responsible for eating conformity in children were not directly tested in the present study. Some situational factors might have influenced the interpretation of these findings. First, the number of dyads was too small to explore how the co-eaters' gender influence the amount of food consumed and the degree of matching. Similarly, this study only involved non-overweight children. Had the groups been composed of lean and overweight children, the pattern of results may have differed. Future research ought to explore children's social motives and consumption stereotypes in children and examine how these factors impact children's food regulation and selection.

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