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Research report

Social modelling of food intake. The role of familiarity of the dining partners and food type ☆

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ABSTRACT

In a social eating context, people tend to model the food intake of their dining companions. In general, people tend to eat more when their dining companion eats more and less when their eating companion eats less. In the present paper we investigate 1) whether familiarity of dining partners affects modelling and 2) whether modelling is affected by whether familiar partners consume the same versus different foods. In both studies, female dyads completed a task together whilst having access to high energy dense snack foods. Modelling was observed regardless of the familiarity of the dining partners and food types consumed. These findings confirm that social modelling of food intake is a robust phenomenon that occurs even among familiar dining partners and when partners are consuming different types of snack food.
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Introduction

Human eating is a highly complex behaviour that is the outcome of the integration of many different inputs, including sensory, somatic, affective, contextual and socio-cultural information (Higgs, 2005). Social factors have attracted significant interest recently and this is not surprising because food and eating are intertwined with our social lives (Robinson, Blissett, & Higgs, 2013). It has been reported that individuals model the food intake of their eating companions, such that they tend to eat more when others eat more and less when others eat less (Herman, Roth, & Polivy, 2003). This phenomenon, known as social modelling of food intake, is so powerful that Goldman, Herman, and Polivy (1991) reported that participants ate minimally in the presence of a low-intake model, even when participants had been food-deprived for 24 hours.

The effects of modelling on food intake are well documented but the mechanisms underlying these effects remain unclear. Because many meals are eaten in a social context, even from early childhood, understanding the mechanisms underlying social influences on eating may be helpful in the development of new more effective strategies to promote healthy eating behaviours. Herman et al. (2003) proposed a normative model of social influence on eating, which suggested that external cues play a significant role in determining people's eating behaviour. Thus, in a social context, people may use the intake of others as an example of appropriate eating and adjust their own food intake accordingly.

One motivation underlying modelling may be the desire to avoid the appearance of eating excessively (Herman et al., 2003). There are negative stereotypes associated with eating to excess (Vartanian, Herman, & Polivy, 2007), which may be avoided in a social situation if one does not eat more than do others. This desire to avoid looking like one is overconsuming may result in modelling of a companion's intake, especially in situations where there is uncertainty about what constitutes an appropriate amount to eat. The provision of clear normative information about the eating of others has been reported to provide a brake on consumption (Leone, Pliner, & Peter Herman, 2007). Hence, there is evidence that when people are uncertain of how much they should eat, they model their eating companions to ensure that they do not appear to be eating too much.

It has also been proposed that modelling of food intake is driven at least in part by basic processes related to the links between perception and action (Robinson, Tobias, Shaw, Freeman, & Higgs, 2011). This idea is based on the finding that perceiving another person's movements activates one's own motor programmes for the same movements, which promotes imitative actions (Iacoboni et al., 1999). It is possible that as people eat together, their movements become synchronized regardless of other salient goals or intentions (Cook, Bird, Lunser, Huck, & Heyes, 2011) and this explains why dyadic partners model each other's eating. In support of this idea, video analysis of eating partners has confirmed a link between initiation of eating by one partner and a similar action by their eating companion (Hermans et al., 2012). Hermans et al. (2012) found that

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modelling was more likely within 10 s of a model picking up food, which is consistent with the suggestion that modelling effects may be driven in part by mechanisms linking perception with action (Chartrand & van Baaren, 2009; Dijksterhuis & Bargh, 2001).

Another factor that may underlie social modelling of food intake is that it serves to ease social interactions (Hermans, Engels, Larsen, & Herman, 2009; Robinson et al., 2011; Salvy, Jarrin, Paluch, Irfan, & Pliner, 2007). Hermans et al. (2009) found that participants modelled their dining partner's intake but only in the condition where the partner (a confederate of the experimenter) was acting in an unsociable manner, whereas in the situation where participants were exposed to a friendly confederate, no modelling was observed. Robinson et al. (2011) also found that in the presence of a high eating confederate, modelling decreased when participants were primed to feel socially accepted, suggesting that modelling is in part driven by affiliation concerns.

Most studies on modelling have been conducted with participants who do not know each other (e.g. Goldman et al., 1991; Hermans et al., 2009; Hermans, Herman, Larsen, & Engels, 2010a, 2010b; for a review see Cruwys et al. in this issue) and only a small number of studies have examined modelling among both friends and strangers (Salvy, Vartanian, Coelho, Jarrin, & Pliner, 2008; Salvy et al., 2007). Research on children aged 5–11 showed that modelling of food intake was extremely high among strangers, but low and not significant among siblings (Salvy et al., 2008). In contrast, Salvy et al. (2007) did not find a difference in the degree of intake modelling in dyads of adult strangers and friends. Howland, Hunger, and Mann (2012) have reported recently that a low intake norm set by friends resulted in the consumption of fewer cookies, both during a social interaction and immediately after, but the authors did not compare the responses of friends and strangers.

Our aim here is to further investigate modelling effects in dyads composed of friends versus strangers to shed more light on the role of dyad relationships in modelling effects and provide more insight about possible underlying mechanisms of social modelling. In Study 1, we compared the degree of modelling of food intake in natural dyads of friends and strangers using a free eating paradigm. If modelling of food intake is used as a strategy to gain social approval, then it might be expected that the degree of modelling would differ between friends and strangers because of the greater importance of ingratiation concerns when eating with a stranger than when eating with someone who knows one well (Jones & Pittman, 1982). On the other hand, if modelling is more motivated by concerns about avoiding eating to excess or is the result of behavioural mimicry, then we might expect to see no difference in modelling as a function of familiarity with an eating partner.

A question that has yet to be investigated is how modelling effects are influenced by the type of food consumed by dyadic partners. In modelling studies, the foods provided have been the same for both partners, but in real eating situations we may consume different foods than our dining companions do and it is unclear whether modelling would occur in this scenario. Although other studies have examined modelling of food choices where a number of foods are available for selection (Hermans et al., 2010a, Robinson & Higgs, 2013), to our knowledge, there has been no examination of modelling of food intake when participants are provided with one food to consume but this is not the same food as that provided to their partners. If we use the intake of another as a specific guide to appropriate intake, then consumption of different foods should undermine modelling because what your partner eats is a less useful guide if she is eating something different. Alternatively, the food type may matter less if modelling is driven by a general rule about not eating excessively, as suggested in the normative model of eating (Herman et al., 2003).

In Study 2, we examined whether eating the same or different snack food influenced the degree of modelling of food intake in natural dyads of friends who had access to snack food whilst completing a problem solving task. To the best of our knowledge, this is the first study that examines whether food type is an important factor that can influence the levels of modelling of food intake. We hypothesized that the degree of modelling might be stronger between co-eaters who had access to the same food than between co-eaters who had access to different food because in this case the partner's eating would provide both a specific and general cue about appropriate consumption.

Study 1

Materials and methods

Participants

One hundred and ten female participants from the University of Birmingham were recruited in exchange for course credit (mean age = 18.8 years, s.d. = 1.0). BMI was within the normal range (mean BMI = 22.1 kg/m^2, s.d. = 3.1). We tested only female participants because our sample was taken from a largely female population (undergraduate psychology students). Participants gave informed consent and the study protocol was approved by the University of Birmingham Research Ethics Committee.

Design

The independent variable in the study was whether the dyad was made up of friends or strangers and the dependent variable was the degree of modelling of food intake. To reduce demand characteristics, the study was advertised as research examining mood and social interaction. Participants signed up for sessions online either with a friend or individually. Participants who signed up individually were paired with another participant by the experimenter to form the stranger dyads.

Snack food

Across both conditions, participants had access to the same snack food (chocolate minstrels) during the testing sessions. A bowl of 100 g of minstrels was provided to each participant within a dyad (approximately 37 pieces of minstrels; 505 kcal per 100 g), so that the bowl was close to being full.

Measures

The relationship between the eating partners was assessed through the use of a social interaction questionnaire [two questions; "How well do you know your partner in the study?"(6-point Likert scale, possible answers: I have never seen her before, I recognize her but we have never spoken, We have spoken a few times, We sit together in lectures but do not socialize outside the lectures, We are friends, We live together), "How comfortable did you feel around your partner?" (8 cm long horizontal scale, anchors; "Not at all" and "Extremely")].

Procedure

Sessions took place between 2 pm and 6 pm on weekdays. When the participants arrived at the reception of the lab facilities, they were greeted by the experimenter and were taken to a room where they were seated at opposite ends of a small table before being asked to complete demographic questionnaires and a mood/appetite questionnaire, the aim of which was to corroborate the cover story and provide a baseline measure of appetite. Mood and appetite items (calm, anxious, excited, upset, tired, hungry, thirsty, stressed) were rated using a 10 cm visual analogue line rating scale (VAS) with "Not at all" and "Extremely" as end anchors and the question "How . . . do you feel right now?" (centred above the line scale). The experimenter then returned and instructed participants that for the next part of the experiment they were each required to answer a set of

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