



## Research report

## Food intake norms increase and decrease snack food intake in a remote confederate study

Eric Robinson<sup>a,b,\*</sup>, Helen Benwell<sup>a</sup>, Suzanne Higgs<sup>a</sup><sup>a</sup> School of Psychology, University of Birmingham, Birmingham B15 2TT, UK<sup>b</sup> Institute of Psychology, Health & Society, University of Liverpool, Liverpool L69 7ZA, UK

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## ABSTRACT

Social factors have been reported to influence food intake. In the remote confederate paradigm, naive participants are led to believe that previous study participants have consumed a small or large amount of food. To date, there has been no demonstration using this paradigm that information about how much previous participants eat (food intake norms) both increase and decrease food intake in the same study. In the present experiment, we tested 64 undergraduate psychology students using a remote confederate design. We investigated the effect of both a high intake and low intake norm on food intake under the same conditions. We also tested whether a variable shown previously to predict food intake matching amongst eating partners (trait empathy) predicted the influence of food intake norms on intake. Compared with a no norm control condition, leading participants to believe that the intake norm was to eat a lot of cookies increased cookie intake and leading participants to believe the intake norm was to eat few cookies reduced intake. Trait empathy did not moderate the influence of food intake norms on consumption. These findings add to evidence that perceived intake norms exert strong bi-directional effects on food intake.

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## Introduction

Social factors have been reported to influence human eating behaviour (Herman, Roth, & Polivy, 2003; Robinson & Higgs, *in press*). For example, the number of people present during an eating occasion and the extent to which an eater is eager to make a good impression influence amounts consumed (de Castro & Brewer, 1992; De Castro, Brewer, Elmore, & Orozco, 1990; Pliner & Chaiken, 1990). Recently, it has also been suggested that social factors may contribute to the spread of eating patterns and weight gain through social networks (Christakis & Fowler, 2007; Pachucki, Jacques, & Christakis, 2011).

In the laboratory, social influences on food intake are often studied using a live model, who is an associate of the experimenter, acting as a participant. A snack or meal is consumed in the presence of the model and the amount of food consumed by the model is varied according to experimental condition (see Herman et al., 2003 for a description of such studies). The participants are unaware they are eating with a confederate. A well replicated finding using this paradigm is that if the live model eats very little then the participants eat less than when they eat alone (Feeney, Polivy, Pliner, & Sullivan, 2011; Goldman, Herman, & Polivy, 1991).

A different approach to using live models is to use remote models. In this type of study, participants are exposed to fictional accounts of the amount of food consumed by previous participants in that study (Feeney et al., 2011; Pliner & Mann, 2004; Roth, Herman, Polivy, & Pilner, 2001). This is known as a remote confederate paradigm. The amount that other participants have been eating can be conceptualised as a type of food intake norm. If the remote confederate eats a lot, this signals a high intake norm, whereas if they eat a little this signals a low intake norm. Two studies using the remote confederate paradigm have shown that a high intake norm increases food intake relative to a no norm control (Pliner & Mann, 2004; Roth et al., 2001). A third study also showed that a low intake norm can decrease food intake relative to a no norm control (Feeney et al., 2011, but see also Leone, Pliner, & Herman, 2007 for a study that examined modal distributions of participant food intake, rather than total amount consumed by condition). Pliner and Mann (2004) and Roth et al. (2001) also included low intake norm conditions in their studies, but found no significant decrease in food intake. Roth et al. (2001) found a trend for intake to be decreased, but this was not statistically significant. One explanation provided in both studies was that the low intake norm was too similar to the amount of food being eaten by the no norm control participants to produce any effect. Feeney et al. (2011) only included a low intake norm condition, so were unable to simultaneously examine the influence of high and low intake norms on consumption behaviour.

\* Corresponding author.

E-mail address: [eric.robinson@liverpool.ac.uk](mailto:eric.robinson@liverpool.ac.uk) (E. Robinson).

Thus, there has been no report to date that both high and low intake norms influence intake using this paradigm.

Some studies have examined the moderating effect of individual differences on social eating (Brunner, 2011; Herman, Koenig-Nobert, Peterson, & Polivy, 2005; Hermans et al., in press). Exline, Zell, Bratslavsky, Hamilton, and Swenson (2012) reported that the extent to which individuals want to be liked by other people may underlie food intake matching. Trait empathy has been shown to predict the extent to which individuals adjust their food intake to match the intake of an eating partner. Only individuals with high trait empathy showed evidence of intake matching (Robinson, Tobias, Shaw, Freeman, & Higgs, 2011). This may be because empathic individuals possess a natural tendency to imagine how others interpret their behaviour, and so eat a similar amount to their eating partner to present themselves favourably (Chartrand & Bargh, 1999; Robinson et al., 2011).

The role of individual differences in moderating the effects of a remote confederate on food intake has received less attention. There are some similarities between the live model and remote model designs and so one might expect similar moderating influences. However, there are also differences between the two paradigms. The use of a live model can produce more than one type of social influence on food intake. Live models could provide information about how to behave in that context, which is known as informational social influence (Herman et al., 2003). In addition, the influence of live models may stem from participants adapting their eating to ingratiate themselves with the model (Hermans, Engels, Larsen, & Herman, 2009; Robinson et al., 2011) and make a good impression (Caudill & Kong, 2001; Pliner & Chaiken, 1990). One might assume that the latter types of social influence (we refer to these as self-presentation concerns) would be much reduced in the remote confederate design since there is no live model to impress. Hence, it is of interest to examine whether factors that have been shown to moderate the effect of a live model on intake similarly moderate the effect of a remote model.

Our overall aim was test whether both increases and decreases in intake are elicited by a remote model and whether individual differences in empathy play a moderating role. We led participants to believe that they would be taking part in a food tasting task involving eating cookies. Depending on condition, participants were led to believe that previous participants had consumed either a small amount of cookies (low intake norm) or a large amount (high intake norm) or they received no information (no norm). To increase the likelihood that participants in the no norm condition would eat an intermediate amount between the portrayed high and low intake norms we based intake norms on the results of a pilot study. It was hypothesised that relative to the no norm control condition, exposure to the high intake norm would result in an increase in food intake and exposure to the low intake norm would result in a decrease in food intake. We also tested whether a measure of trait empathy predicted norm effects on intake. We have previously found that trait empathy scores moderate the effect of a live model on eating in dyads (Robinson et al., 2011) and so we were interested in whether this would also be true for eating in the remote confederate design, as it might tell us something about the similarity between the two study types.

## Method

### Participants

Sixty six female undergraduate psychology students participated. Mean age = 19.2 years (SD = 0.9). BMI was within healthy range; mean = 23.3 (SD = 3.8). To disguise the aims of the study it was advertised as research examining hunger and taste perception. Participation was in return for course credit. Advertisement was

through an online portal in which participants signed up to time slots in advance of study participation. Participants were instructed to abstain from eating 2 h prior to the study to ensure they were not satiated on arrival. Participants gave informed signed consent. The study protocol was approved by the University of Birmingham Research Ethics Committee and was conducted according to the ethical standards laid down in the Declaration of Helsinki 1964.

### Design and food intake norm information

A between-subjects design was used with three conditions: control (no norm); high intake norm; low intake norm. Participants were randomly assigned to one of the three conditions. In the two experimental conditions participants were exposed to a fictitious previous participant information sheet. In both conditions the sheet contained information about 4 participants. All were female psychology students aged 18–20 yrs old. A pilot study indicated that in the absence of norm information, female psychology undergraduates would consume approximately 4 cookies. We selected high and low norm values that we reasoned would be believable and that would differ substantially from the expected intake in the no norm condition. In the high intake norm condition, the 4 previous participants had eaten 8, 9, 9 and 10 cookies. In the low intake norm condition, the 4 previous participants had eaten 1, 1, 2 and 2. In the control condition there was no information sheet presented.

### Measures

#### Empathy

The interpersonal reactivity index (IRI, Davis, 1983) was used to measure trait empathy. The scale has good internal reliability and consists of 4 subscales; 'perspective taking' ( $\alpha = 0.71$ – $0.75$ ), 'emotional distress' ( $\alpha = 0.75$ – $0.77$ ), 'empathic concern' (Cronbach's  $\alpha = 0.68$ – $0.73$ ) and 'fantasy' (Cronbach's  $\alpha = 0.78$ – $0.79$ ), which tap into the global concept of empathy (Davis, 1983). The IRI has previously been shown to be strongly correlated with other measures of trait empathy (Davis, 1983). Each subscale consists of 7 questions and uses a five-point Likert scale response format ('describes me well' to 'does not describe me well'). A high score denotes high levels of empathy and a low score indicates low levels of empathy.

#### Personality measure

To disguise the aims of the study participants completed a personality questionnaire. The questionnaire consisted of 21 characteristics (e.g. I am sociable) and participants used a five-point Likert scale ('strongly disagree' to 'strongly agree') to record how well the characteristic described them.

#### Appetite ratings

Participants completed appetite ratings to corroborate the cover story. Three questions were included; 'how hungry do you feel right now?', 'how full do you feel right now?' and 'what is your current desire to eat?'. Participants made responses on 100 mm line scales by placing an *x* on the line. Anchors were 'not at all hungry' & 'extremely hungry', 'not at all full' & 'extremely full' and 'no desire' & 'extremely strong desire'. We used responses to 'how hungry do you feel right now?' to compare conditions for baseline hunger. We also compared conditions on the other two measures separately.

#### Cookie rating measures

Participants rated how sweet, crunchy and nutty the cookie was (separate 100 mm line scale, anchors: 'not at all' and 'extremely').

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