



## Research report

Awareness of social influence on food intake. An analysis of two experimental studies <sup>☆</sup>Eric Robinson <sup>a,b,\*</sup>, Matt Field <sup>a,b</sup><sup>a</sup> Department of Psychological Sciences, University of Liverpool, Liverpool L69 7ZA, UK<sup>b</sup> UK Centre for Tobacco and Alcohol Studies, UK

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## ABSTRACT

There is consistent evidence that the amount of food we consume can be influenced by the eating behaviour of other people. Some previous experimental studies reported that consumers are unaware of this influence on their behaviour. The present research tested whether people may be more aware of social influence on their eating than previously assumed. In two studies, participants (total  $n = 160$ ) were exposed to information about the amount of snack food other people had been eating shortly before being served the same snack food and eating as much as they liked. After this, participants responded to questions regarding whether they thought their food intake had been socially influenced, and reported the reasons why they believed they had or had not been influenced. Of the 160 participants, 34% reported that they had been influenced, 10% were unsure and 56% reported they had not been influenced. Crucially, participants' reports of social influence appeared to be accurate; the food intake of participants reporting social influence was significantly affected by the amount of food other people had been eating, whereas the food intake of participants denying social influence was unaffected. Individuals may be more aware of the effect that social influence has on their eating behaviour than previously assumed. Further work is needed to identify the factors which determine whether people are susceptible to social influence on eating behaviour.

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## Introduction

There is robust evidence that psycho-social and environmental factors, such as the eating behaviour of other people, can strongly influence the amount of food that we eat (Hermans, Larsen, Herman, & Engels, 2010a; Robinson, Thomas, Aveyard, & Higgs, 2014a). These effects have been shown across a variety of paradigms (McFerran, Dahl, Fitzsimons, & Morales, 2010; Prinsen, de Ridder, & de Vet, 2013; Robinson, Tobias, Shaw, Freeman, & Higgs, 2011), as well as for different foods (Feeney, Polivy, Pliner, & Sullivan, 2011; Herman, Roth, & Polivy, 2003; Hermans et al., 2010a) and studies have also shown that individuals will copy the eating behaviour of other people even when they are of a different weight status (Conger, Conger, Costanzo, Wright, & Matter, 1980; McFerran et al., 2010; Robinson, Sharps, Price, & Dallas, 2014b). What is less clear is whether people are aware of these types of influence on their behaviour. Given that nutri-

tion and diet are important determinants of health, it is important to clarify the extent to which individuals are able to identify the environmental factors that shape their eating behaviour. For example, if awareness of these influences can mitigate social influence effects that promote unhealthy eating behaviour, educating people about social influence effects could reduce unhealthy eating behaviour.

A relatively small number of social psychology studies have examined awareness of social influence on behaviour. Nolan, Schultz, Cialdini, Goldstein, and Griskevicius (2008) showed that although social normative beliefs about energy conservation influenced behaviour, most participants in their study did not believe that they would be influenced in this way. In two studies, Vorauer and Miller (1997) showed that individuals often fail to notice that they change their own behaviour in order to present themselves favourably to others. However, this 'social influence blindness effect' was not consistently seen in all participants, because some participants were aware. Some studies have specifically examined awareness of social influence on eating behaviour in experimental settings (Roth, Herman, Polivy, & Pliner, 2001; Spanos, Vartanian, Herman, & Polivy, 2014; Vartanian, Herman, & Wansink, 2008). These studies tended to report that although participants were strongly influenced by the eating behaviour of their co-eaters or information about what other people had been eating, they did not report or recognise this influence impacted on their behaviour (Spanos et al., 2014; Vartanian

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et al., 2008). One explanation of these findings is that social influence on eating could act outside of conscious awareness (Nisbett & Wilson, 1977), whilst another is that individuals are aware but are motivated to report that they are not influenced, possibly in order to maintain or portray a sense of autonomy.

On the basis of these experimental studies it has been concluded that people are unaware of social influence on their eating behaviour (e.g. Vartanian et al., 2008) and this view has been endorsed by others (e.g. Hermans, Larsen, Herman, & Engels, 2012a). However, in some studies participants have shown a degree of awareness. Although not the main interest of their study, Hermans et al. (2012a) reported that 21% of participants reported that they had adjusted their food intake in response to what a dining companion was eating. Moreover, qualitative studies which explore consumers' beliefs and experience of eating behaviour have found that people report that social context and the behaviour of those around them is an important influence on their own eating behaviour (Brug, Debie, van Assema, & Weijts, 1995; Weber Cullen, Baranowski, Rittenberry, & Olvera, 2000). One possible explanation for the mixed findings to date lies in the methods that are typically used to measure awareness of social influence effects. In most studies, after participants had eaten in a social context they were not directly asked if they had been influenced by the behaviour of others. Instead, participants were asked either to spontaneously consider all the possible influences on their recent eating behaviour, or to rate an extensive list of possible influences (Spanos et al., 2014; Vartanian et al., 2008). Arguably, one consequence of both approaches is that encouraging participants to consider a wide range of alternative influences could impede their ability to correctly identify the most appropriate or 'correct' answers; also known as the paradox of choice (Iyengar & Lepper, 2000; Schwartz, 2004). Thus, it is conceivable that asking participants in this way may result in them giving greater weight to less important influences on their eating behaviour, leading them to underestimate social influence effects.

Given the mixed findings from a relatively small number of studies, the present paper is focused on the reporting of social influences on eating. Given the mixed findings to date, we tentatively hypothesised that some of our participants would show awareness of social influence on eating, and that awareness would moderate the effects of social influence on eating behaviour. To test this we adopted a similar approach as in Vartanian et al. (2008) who re-analysed previously published self-report data from two experimental studies that had investigated social influences on food intake (Herman, Koenig-Nobert, Peterson, & Polivy, 2005; Leone, Pliner, & Herman, 2007). In the studies reported in this paper, participants were initially exposed to information about the amount of food other participants had been eating before they were given the opportunity to eat that food, and finally they were asked to rate the extent to which they believed that their food intake had been influenced by the behaviour of the other participants. If any participants reported awareness of social influence, social influence effects on food intake were compared in those who reported being aware of this social influence versus those who did not. The data for Study 1 were recently published elsewhere (but awareness of social influence effects was not the focus of that study and was not reported in the paper; Robinson et al., 2014b). Study 2 used the same experimental paradigm as Study 1, and no part of those data have been published previously.

## Method

### Overview of both studies

In total, 160 females participated across two studies. Only female participants were recruited to ensure comparability with previous

studies that examined awareness of social influence on food intake (Spanos et al., 2014; Vartanian et al., 2008). In both studies a remote confederate design was used (as in Vartanian et al., 2008) in which participants were randomised to learn that previous participants (via a mock participant information sheet) in the study had been eating a large (8–10 cookies) or a small (1–2 cookies) amount of cookies, hereafter referred to as the 'high intake norm condition' and 'low intake norm condition'. Participant cookie intake was then observed during a mock taste test, which involved rating the cookies on a series of sensory dimensions (e.g. how sweet are the cookies?). The taste test was included as a cover story so that cookie intake could be examined unobtrusively. After eating, participants were asked to guess the aims of the study and record whether they had noticed the amount of cookies previous participants had eaten. In a final questionnaire, participants rated the extent to which they believed they had been socially influenced. Ethical approval was granted for both studies by the University of Liverpool Research Ethics Committee.

### Study 1: procedure

A full description of the study is provided in Robinson et al. (2014b); participants were tested individually between 10 am–12 pm and 2 pm–5 pm on weekdays and were not asked to abstain from eating prior to the study. On arrival, participants were randomly assigned to one of four conditions. Participants were informed they would be sampling cookies and making taste ratings about them. Participants completed a series of mood ratings (e.g. "how alert are you right now?"), responding on 10 cm visual analogue scales with anchors 'not at all' and 'extremely'. The researcher then returned and explained to the participant that in the next part of the experiment they would be tasting and rating some cookies. The researcher then left to bring the cookies, leaving a bogus information sheet which contained information about the previous 'participants' on the table. The researcher asked the participant to fill out the first few columns of the information sheet (questions about gender, age, date), but told her that she could leave the final two blank (weight status and cookie intake), because the researchers had been recording the number of cookies eaten by the first few participants for stocking purposes, but no longer needed to do this. Participants were also told that they would be weighed and measured at the end of the study, so the researcher would fill out the weight status column later. The bogus information sheet indicated that the previous study participant had eaten either a large or small amount of cookies, and had been either a healthy weight or overweight (2 × 2 design, between subjects). The primary purpose of this study was to investigate whether the weight status of the previous participants moderated the effect of intake norms on cookie intake (see Robinson et al., 2014b, for a description of the results).

Participants were then provided with the cookies (Maryland chocolate chip cookies; each approx. 11 g and 57 kcal), and a rating questionnaire. Fourteen cookies were served in a well-stocked bowl. Participants rated a series of sensory dimensions about the cookies, e.g. how crunchy the cookies were (10 cm visual analogue scale, with anchors 'not at all' and 'extremely'). Participants were told they could eat as much as they liked, as the food would be thrown away afterwards, and were left for 10 minutes. When the researcher returned participants completed the same mood ratings as earlier, before completing a final questionnaire about their experience in the study. This included a measure of what they thought the aims of the study were and if they had noticed the information about previous participants. In a final section participants were asked if they believed that they had been socially influenced. Participants rated 'would you say the amount of cookies you chose to eat was influenced by the information you saw about the number of cookies other

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