



Research report

Awareness of social influence on food intake. An analysis of two experimental studies ☆

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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 not 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

participants had eaten' (5 point Likert scale with labels strongly agree, agree, unsure, disagree, strongly disagree). Next, they were asked to write down why they were or why they were not influenced by the eating behaviour of the other participants. Participants were then weighed and measured to calculate BMI, before being fully debriefed and thanked for their time. Cookie intake was calculated by measuring the weight of cookies before and after participants had completed the task.

The focus of the present research is on the self-reported data collected at the end of the study (but not previously analysed) concerning participants' self-reports of whether the behaviour of other participants had influenced their food intake in the study. Eighty healthy weight female participants took part in the study (Mean age = 18.8 years (SD = 1.1); Mean BMI = 21.0 (SD = 1.5)). As noted, in Study 1 the bogus information sheet indicated that the previous study participants had either been healthy weight or overweight (2×2 design, between subjects), in order to examine whether weight status of the previous participants moderated whether intake norms were followed. However, as this additional factor had no influence on food intake and it did not moderate/interact with food intake norm condition (see Robinson et al., 2014b); participants followed norms set by both healthy weight and overweight previous participants to the same degree) it was not included as a factor in the present analysis strategy, although all participants from the study were still included in the present analyses.

Study 2: procedure

Eighty female participants took part in the study (Mean age = 28.8 years (SD = 9.8); Mean BMI = 24.5 (SD = 5.0)). The procedure was the same as that described as in Study 1, with the following differences: (a) prior to being provided with the bogus information sheet (high intake norm condition or low intake norm condition) participants were asked to write about a time when they had to make a personal choice that they felt either uncertain (uncertain condition) or certain (certain condition) about (2×2 design, between subjects) and (b) the weight status information about previous participants was not included on the bogus information sheet. When asked to write about a time they had to make a personal choice, participants were asked to write down what the dilemma was, why they were certain/uncertain, how they felt, what emotions they experienced and whether they were happy with the outcome. After completing this short writing exercise, as in Study 1 participants completed a series of mood ratings (10 cm VAS, anchors: 'not at all' to 'extremely'), which also included ratings of how unsure, unclear and indecisive they felt ($\alpha = 0.87$). This experimental manipulation of feelings of certainty versus uncertainty factor was originally included in the experiment in an attempt to test whether participants would be more likely to follow food intake norms when feeling uncertain. However, the manipulation was not effective; participants in the certain and uncertain conditions reported similar feelings of being unsure, unclear and indecisive ($ps > 0.45$). This additional factor also had no influence on food intake, nor did it interact with food intake norm condition ($ps > 0.50$). Given that this additional factor had no influence on food intake, it was not included as a factor in the present analysis strategy, although all participants from this study were still included in the present analyses.

Statistical analysis strategy

In order to examine (a) how common reporting of social influence was, and (b) whether reporters of social influence were actually more likely to alter their eating behaviour in response to that influence, we collapsed data across the two studies for our main

analyses (also see¹ for a statistical justification of this). We opted to do this because the same paradigm was used in both studies and because it allowed us a larger data set ($n = 160$) to comprehensively examine (a) and (b), with sufficient statistical power. Participants were categorised as reporting social influence if they selected 'agree' or 'strongly agree' to the Likert scaled question concerning whether they believed they had been influenced. We opted to categorise participants rather than to treat this as a continuous variable as we believed that participants would clearly fall into one of two distinct categories (reporters vs. non-reporters). Participants were categorised as not reporting social influence if they selected 'disagree' or 'strongly disagree'. Participants selecting 'unsure' were categorised as neither reporting nor denying social influence. To examine whether the participants reporting social influence on their eating were actually more likely to have been influenced, 2×2 ANOVA was used, with intake norm condition (high intake norm or low intake norm) and reporting of social influence (reporters or non-reporters) as independent factors. The dependent variable was grams of cookie eaten. If a significant interaction between intake norm condition and reporting of social influence was observed, Bonferroni corrected independent samples t-tests were conducted to examine the effect of intake norm conditions in reporters and non-reporters separately. We opted not to include participants who were 'unsure' if they were influenced in our main analysis strategy as there were very few of them ($n = 16$). However, the exact same pattern of results was observed if participants who were unsure if they were influenced were incorporated into the analysis².

Results

Reporting of social influence

Of the 160 participants, thirty-four percent of participants ($n = 54$) reported being influenced by the eating behaviour of other participants (strongly agree or agree), 10% of participants reported being unsure ($n = 16$) if they were influenced (unsure) and 56% ($n = 90$) denied being influenced (strongly disagree or disagree). See Table 1 for a breakdown of responses across the two studies. Thus, a significant proportion of participants reported being socially influenced.

¹ Given the similarities across the two studies we deemed this to be an appropriate analysis strategy. However, to verify this choice statistically we also conducted further analyses in which we re-ran the 2×2 ANOVA on cookie intake but also included Study (levels: Study 1 and Study 2) as an additional factor, resulting in a $2 \times 2 \times 2$ ANOVA. In this analysis all of the main results that are reported in the manuscript were unaffected. The variable Study had no significant main effect on cookie intake ($F(1, 136) = 0.03$, $p = 0.86$, partial eta squared = 0.001), nor did it interact with reporting of social influence ($F(1, 136) = 1.9$, $p = 0.17$, partial eta squared = 0.01) or intake norm condition ($F(1, 136) = 0.02$, $p = 0.89$, partial eta squared = 0.001) and there was no three way interaction ($F(1, 136) = 0.9$, $p = 0.36$, partial eta squared = 0.006). Thus, our decision to collapse data across the two studies was appropriate, because there was no evidence that the patterns of results obtained differed between Study 1 and Study 2.

² With 'unsure' as a level in a 2 (intake norm: high vs. low) $\times 3$ (awareness: reporters, non-reporters, unsure) ANOVA, an almost identical pattern of results is observed. There was a main effect of intake norm ($F(1, 154) = 5.9$, $p = 0.02$, partial eta squared = 0.04), whereby learning that previous participants had eaten a large number of cookies (high intake norm) increased cookie consumption relative to learning that previous participants had eaten a small amount of cookies (low intake norm). The main effect of reporting of social influence was also significant ($F(2, 154) = 4.5$, $p = 0.01$, partial eta squared = 0.06) and so was the interaction between reporting and food intake norm ($F(2, 154) = 5.2$, $p = 0.007$, partial eta squared = 0.06). Examining the effect of norm condition in only the participants reporting that they were unsure if they had been influenced ($n = 16$), there was no significant difference in food intake between the high intake norm condition ($n = 6$, mean grams = 30.2, SD = 15.5) and the low intake norm condition ($n = 10$, mean grams = 29.5, SD = 20.8) ($t(14) = 0.1$, $p = 0.95$, $d = 0.03$).

Table 1
Frequencies of participant reporting of social influence on food intake.

	Participants reporting influence	Participants reporting being unsure	Participants reporting no influence	Total number of participants
Study 1	32 (40%)	8 (10%)	40 (50%)	80
Study 2	22 (27.5%)	8 (10%)	50 (62.5%)	80

Note: Values denote number of participants with percentages in brackets.

Table 2
Food consumption (grams of cookies) of reporters and non-reporters for all studies.

	Reporters of social influence		Non-reporters of social influence	
	High food intake norm	Low food intake norm	High food intake norm	Low food intake norm
Study 1	M = 55.2, SD = 36.0 N = 15 ^a	M = 29.3, SD = 14.5 N = 17 ^a	M = 42.0, SD = 28.6 N = 21	M = 32.3, SD = 20.8 N = 19
Study 2	M = 64.5, SD = 23.7 N = 9 ^b	M = 32.3, SD = 14.5 N = 13 ^b	M = 33.0, SD = 19.0 N = 28	M = 31.8, SD = 18.0 N = 22
Both studies combined	M = 58.7, SD = 31.7 N = 24 ^c	M = 30.6, SD = 14.3 N = 30 ^c	M = 36.8, SD = 23.8 N = 49	M = 32.0, SD = 19.1 N = 41

Note: M and SD denote means and standard deviations for grams of cookies consumed. N denotes number of participants. Same letter superscripts denote significant difference ($p < 0.05$) between conditions for grams of food eaten. Data for participants reporting being 'unsure' whether they were socially influenced are reported under Note 2.

The relationship between reporting social influence and actual social influence

As expected, the amount of food previous participants had eaten (intake norm condition) had a significant effect on participant food intake ($F(1, 140) = 17.86$, $p < 0.001$, partial eta squared = 0.11), whereby learning that previous participants had eaten a large number of cookies (high intake norm) increased cookie consumption relative to learning that previous participants had eaten a small amount of cookies (low intake norm). See Table 2 for grams of cookie consumed. The main effect of reporting of social influence was also significant ($F(1, 140) = 6.9$, $p = 0.01$, partial eta squared = 0.05) and critically so was the interaction between reporting and food intake norm ($F(1, 140) = 8.9$, $p = 0.003$, partial eta squared = 0.06)³. Following up this interaction, the effect of food intake norm was large and statistically significant amongst the reporters of social influence ($t(52) = 4.3$, $p < 0.001$, $d = 1.2$), whereby cookie intake was greater in the high intake norm condition than in the low intake norm condition. In the non-reporters of social influence there was no significant difference between the high intake norm condition and low intake norm condition ($t(88) = 1.0$, $p = 0.30$, $d = 0.2$). See Table 2 for means and SDs. An identical pattern of results was also observed when analysing data from the two studies separately; reporters of social influence in the high intake norm conditions ate significantly more cookies than in the small intake norm conditions in both studies ($ps < 0.05$), whereas there was no difference in intake between the small and large intake norm conditions for non-reporters of social influence in both studies ($ps > 0.05$). See Table 2 for means and SDs for grams of cookie eaten in each study. In other words, reporters of social influence were significantly influenced by the eating behaviour of previous participants, but non-reporters of social influence did not show this effect. Thus, there was evidence that reporters of social influence were accurate in their reports of having been influenced.

³ We also examined whether reporting of social influence interacted with food intake norm condition when reporting of social influence was treated as a continuous variable. To do this we used linear regression analysis. We dummy coded intake norm condition, mean centred the variable 'reporting of social influence' and computed the interaction term between the two. Entering all three variables into a forced entry linear regression model (dependent variable = grams of food consumed) produced the exact same pattern of significant results as reported in our main analyses. All three variables significantly predicted grams of food consumed (all $ps < 0.05$).

Manipulation checks and demand awareness

In Study 1, 71/80 participants reported noticing the number of cookies the remote confederates had eaten. In Study 2 73/80 participants reported noticing the amount of food the remote confederates had eaten. Thus, of the 160 participants, 144 reported noticing the amount of food that previous participants had eaten. In Study 1 only 1/80 participants came close to guessing the true aims of the study (whether information about previous participants influenced food intake). In Study 2 only 6/80 participants came close to guessing the true aims of the study. Thus, of the 160 participants, only seven participants came close to guessing the aims of the study.

Sensitivity analyses

In order to account for the small number of participants who reported having not seen the remote confederate intake information or who came close to guessing the true aims of the studies, we re-ran the aforementioned analyses with these participants removed. Removing this small minority of participants did not alter any of the aforementioned results. Intake norm condition had a significant effect on participant food intake ($F(1, 118) = 15.1$, $p < 0.001$, partial eta squared = 0.11). The main effect of reporting of social influence was marginally significant ($F(1, 118) = 3.8$, $p = 0.05$, partial eta squared = 0.03) and most importantly the interaction between reporting and food intake norm remained significant ($F(1, 118) = 4.6$, $p = 0.035$, partial eta squared = 0.04). The effect of intake norm was statistically significant amongst the reporters of social influence ($t(45) = 4.0$, $p < 0.001$, $d = 0.87$), whereby cookie intake was greater in the high intake norm condition than in the low intake norm condition. In the non-reporters of social influence there was no significant difference between the high intake norm condition and low intake norm condition ($t(73) = 1.4$, $p = 0.35$, $d = 0.32$).

Written explanations of social influence

In the instances in which participants had reported why they had been influenced by the other participants, thematic analysis (Braun & Clarke, 2006) was used to examine recurrent themes across participant responses. Three main themes were identified and these were cross-checked by an independent research assistant blinded

to the aims of the study. Many participants did not provide an actual explanation and instead just reiterated that they had been influenced (e.g. 'influenced because they had eaten a lot'), suggesting that although they were aware they had been influenced, they were unable to explain why. Some participants provided responses that suggested they had internalised the behaviour of the other participants and used it as a guide they felt was appropriate to follow or that the remote confederate's behaviour had allowed them to eat more freely (e.g. 'because they had eaten a lot it felt more acceptable to eat as many as I wanted'). Finally, in some instances aspects of responses suggested that influence occurred because participants were concerned about how others would view them (e.g. 'I wouldn't want to be seen as being greedy'), which presumably referred to the experimenter. In the instances in which participants reported not having being influenced they tended to report that consumption had been influenced by their hunger levels or liking of the food rather than by what others had eaten.

Discussion

We investigated the effect of awareness of social influence on eating behaviour. The food intake data in these studies (which has previously been reported for Study 1; Robinson et al., 2014b) are consistent with the findings that people eat more food when they believe others have been eating a lot, as opposed to when they believe other people have been eating very little. However, the novel contribution of the present work is that unlike previous suggestions that social influence on food intake goes undetected (Spanos et al., 2014; Vartanian et al., 2008), a significant proportion of participants (34%) reported that they were influenced by the eating behaviour of other people. Furthermore, the participants who reported having been influenced were actually accurate in their reporting of social influence: Significant social influence effects on food intake were observed amongst participants who reported having been influenced, whilst the food intake of non-reporters was not influenced. When asked to describe why they believed they had been influenced, some of these explanations suggested informational social influence ('the other people did this, so I believed it was the right way to behave') and normative social influence ('I didn't want to appear greedy to others'), both of which are known forms of social influence (Deutsch & Gerard, 1955) that play important roles in theoretical accounts of social influence on eating (Herman et al., 2003; Robinson et al., 2014a).

The present results suggest that in some contexts people may be more aware of external influences on their food intake than previously assumed (Spanos et al., 2014; Vartanian et al., 2008). This observation has implications for suggestions that interventions would benefit from educating people about external and social influences on eating behaviour, because the people who are susceptible to such influences may already be aware of their impact. In support of this, recent studies have found that providing consumers with education about how external factors can influence eating behaviour does not tend to mitigate the influence of such external factors on their eating behaviour (Bevelander, Engels, Anschutz, & Wansink, 2013a; Cavanagh, Vartanian, Herman, & Polivy, 2013). However, it is important to understand why a higher level of reporting of social influences on eating was reported in the present studies compared to other studies (Roth et al., 2001; Spanos et al., 2014; Vartanian et al., 2008). As discussed, one explanation may be the methods used to capture awareness of social influences: in the present studies participants were specifically asked to consider social influences, but not all other possible influences. By contrast, other studies have tended to ask participants 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), which may cause participants to be less able to recognise social influence.

The observation from the present studies that people may be consciously aware of social influence on their food intake could inform our understanding of the mechanisms that underlie social influence effects on food intake. Our findings suggest that social influence on eating behaviour may be more of a conscious decision making process than previously assumed, in the sense that participants consciously observed the amount of food that others had eaten and decided to change their behaviour accordingly, and subsequently acknowledged this. This notion is in line with other findings that after having learnt that other people are eating healthily, individuals change their intentions so that they too will eat a healthier diet (Lally, Bartle, & Wardle, 2011). It is also consistent with theoretical suggestions that descriptive norms (i.e. food intake norms) inform behaviour indirectly through planning and intentions (Rivis & Sheeran, 2003). However, given that the present studies used a very specific paradigm and were both conducted under laboratory conditions, these suggestions are speculative and may not apply to other scenarios in which social influence occurs. For example, people may synchronise their eating behaviour when eating together (Bevelander, Lichtwarck-Aschoff, Anschutz, Hermans, & Engels, 2013b; Hermans et al., 2012b) and it could be argued that if this type of social influence does occur it may be non-conscious and automatic.

To date we have an incomplete understanding of whether some people are more or less likely to follow food intake norms than others (Herman et al., 2003; Robinson, Benwell, & Higgs, 2013). Moreover, to our knowledge no studies have been able to identify individual differences that moderate whether participants follow food intake norms that have been set in a remote-confederate design study. The present findings indicate that there may be a specific subgroup of people who follow food intake norms. If this is the case, a better understanding of such individual differences may now have applied relevance to approaches which aim to use social norms to promote healthier eating (Robinson et al., 2014c; Stok, de Ridder, de Vet, & de Wit, 2012).

Contribution and limitations

The present work had some limitations. Social influence effects were examined using a remote confederate design (as was the case in study 2 of Vartanian et al., 2008). Similar research examining reporting of social influence when eating with a live companion would be informative, as it may be the case that the presence of an actual person may serve to heighten or diminish awareness of social influence. Likewise, determining if people are aware of social influence in more naturalistic settings would also be valuable, because the present studies were conducted in a laboratory setting. Although Vartanian et al. (2008) used laboratory methods but found little evidence of awareness, it could be the case that under some laboratory conditions participants are more conscious and aware of their behaviour and this could increase the likelihood that they notice external influences on their behaviour. We also relied on a female sample of participants. We chose to do this because the reliability of social influence effects on the food intake of males is less clearly established (Hermans, Herman, Larsen, & Engels, 2010b; Salvy, Jarrin, Paluch, Irfan, & Pliner, 2007). Because of this we are unable to draw conclusions on whether the present findings would extend to males. A final consideration is that the methodologies used in the present studies (i.e. asking participants about social influence after eating) means we are not able to conclude whether the participants were aware of social influence whilst they ate, or whether they became aware of the social influence after they had finished eating (something which could have arisen as a result of us asking them about social influence). Given that asking participants about social influence effects on eating whilst they eat could affect behaviour, future

investigations could examine whether people believe that they are likely to be socially influenced when eating. For example, we have recently shown that females report that they would be likely to eat less if they were to participate in a study in which their food intake was being monitored, and an experimental study confirmed this (Robinson, Kersbergen, Brunstrom, & Field, 2014d).

Conclusions

In some contexts individuals may be more aware of social influences on their behaviour than has previously been assumed. Further work is now needed to identify the factors which determine whether or not people are susceptible to social influences on their eating behaviour.

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