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DOI:

[10.1016/j.appet.2014.10.021](https://doi.org/10.1016/j.appet.2014.10.021)

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*Document Version*

Peer reviewed version

*Citation for published version (Harvard):*

Higgs, S 2015, 'Social norms and their influence on eating behaviours', *Appetite*, vol. 86, pp. 38-44.  
<https://doi.org/10.1016/j.appet.2014.10.021>

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# Social norms and their influence on eating behaviours

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**Article type:** Review

**Keywords:** Social norms; social influence; food intake; food choice; modeling

## Abstract

Social norms are implicit codes of conduct that provide a guide to appropriate action. There is ample evidence that social norms about eating have a powerful effect on both food choice and amounts consumed. This review explores the reasons why people follow social eating norms and the factors that moderate norm following. It is proposed that eating norms are followed because they provide information about safe foods and facilitate food sharing. Norms are a powerful influence on behaviour because following (or not following) norms is associated with social judgements. Norm following is more likely when there is uncertainty about what constitutes correct behaviour and when there is greater shared identity with the norm referent group. Social norms may affect food choice and intake by altering self-perceptions and/or by altering the sensory/hedonic evaluation of foods. The same neural systems that mediate the rewarding effects of food itself are likely to reinforce the following of eating norms.

25 **Highlights:**

26 • Social norms about eating have a powerful effect on both food choice and intake

27 • Norm following is an adaptive behaviour

28 • Norms provide information about safe foods and facilitate food sharing.

29 • Social judgements associated with following foods norms give them power

30

31

32

33 Eating often occurs in a social context and the food choices of others and the amounts that those  
34 around us eat have a powerful effect on our own consumption decisions. We model the eating choices  
35 of our dining partners and consume amounts similar to what they eat (Herman et al. 2003). Sometimes  
36 the presence of other diners may augment consumption compared with eating alone (de Castro and  
37 Brewer 1992) and other times eating may be inhibited, even in the face of deprivation-induced hunger  
38 (Goldman et al. 1991).

39

40 One mechanism that may underlie the effects of social context on eating is the operation of social  
41 norms. Social norms are implicit codes of conduct that provide a guide to appropriate action. There is  
42 evidence that we use information about the eating behaviour of others as a guide as to what is  
43 appropriate behaviour in a given context (Herman et al. 2003). Dietary behaviours have also been  
44 reported to be related to perceptions of normative behaviour within peer groups (Ball et al. 2010;  
45 Lally et al. 2011; Louis et al. 2012; ) and food intake can be predicted by the eating behaviour of  
46 socially connected peers (Feunekes et al., 1998; de la Haye, Robins, Mohr, & Wilson, 2010;  
47 Pachucki, Jacques, & Christakis, 2011).

48

49 Studies on the effects on food intake/choice of providing normative information about the eating  
50 habits of others have been reviewed elsewhere recently (Robinson et al. 2013; 2014). Studies on  
51 social facilitation of eating, modelling and impression management are reviewed elsewhere in this  
52 special issue. The aim of this paper is to add to this literature by exploring why people follow eating  
53 norms and how these norms influence eating. Consideration will also be given to the factors that  
54 determine when people follow norms and when other factors override the influence of norms.

55

### 56 **What are social eating norms and where do they come from?**

57 Social eating norms are perceived standards for what constitutes appropriate consumption, whether  
58 that be amounts of foods or specific food choices, for members of a social group. The social group  
59 might be defined at the level of nationality, peer group, family or friendship grouping. Social norms

60 may be communicated directly via cultural practices and rules, actual behaviour in a given situation,  
61 or indirectly via environmental cues such as portion size norms. For example, a social norm might be  
62 avoidance of eating insects, which is communicated by the group cuisine rules and reinforced by  
63 observation of disgust responses to (the prospect of) eating insects (Looy et al. 2013). Descriptive  
64 norms refer to the perceptions of the prevalence or extent of a behaviour (what other people do) and  
65 injunctive norms refer to perceptions about what behaviour is expected (what other people endorse)  
66 (Cialdini et al. 1990).

### 67 **Why do people follow social eating norms?**

68 Two possible reasons why people follow eating norms are that 1) following a norm enhances  
69 affiliation with a social group and being liked; and 2) following a norm results in eating that is correct  
70 (Deutsch and Gerard, 1955). Many studies have been conducted to investigate the role of these  
71 motives in norm following in the context of eating.

72 It has been reported that traits linked to the need for affiliation, such as self-esteem and empathy, are  
73 associated with norm following (Robinson et al. 2011). Robinson and colleagues found that  
74 participants were more likely to follow the eating norm set by their eating partner when they scored  
75 high on a measure of empathy and low on a measure of self-esteem. They concluded that social  
76 acceptance concerns play a role in modelling of a food intake norm. Hermans and colleagues found  
77 that the quality of a social interaction affects the degree of modelling observed (Hermans et al. 2009).  
78 They instructed a confederate to act either in a friendly or unsociable manner and reported that less  
79 modelling occurred when the confederate acted in a friendly manner than when the confederate acted  
80 in an unsociable manner. One interpretation of the results of this study is that under conditions where  
81 there is little need to ingratiate oneself, because a social partner is already accepting, it is less likely  
82 that a social norm inferred from his or her behaviour will be followed. This hypothesis was tested  
83 explicitly in a study that employed an experimental manipulation to alter feelings of social acceptance  
84 before a social eating opportunity. Priming feelings of social acceptance reduced the extent to which  
85 the participant modeled the food intake of a confederate (Robinson et al. 2011). The results of these

86 studies are consistent with the idea that norms are followed as a means of affiliating with others and  
87 gaining acceptance.

88

89 Several studies have examined how people adjust their eating behaviour to manage their public image  
90 and create a certain impression on others. In reviewing this literature, Vartanian, Herman and Polivy  
91 concluded that we make use of stereotypes about consumption patterns to convey an image of  
92 ourselves in accord with that stereotype (Vartanian et al. 2007). Eating a small portion conveys a  
93 feminine and otherwise positive image, which may be used to create a favourable impression on a  
94 fellow diner who values those characteristics (Pliner and Chaiken, 1990). These data are in line with  
95 evidence from the broader social psychology literature that adopting normative behaviour achieves a  
96 goal of affiliating with others that is driven by our strong desire to be liked (Baumeister & Leary,  
97 1995).

98

99 Other studies have examined whether people follow norms conveyed by messages about how other  
100 people have behaved in a specific situation, rather than norms set by another present person's eating  
101 (see Robinson et al. 2014 for a review). These types of norms are usually referred to as informational  
102 norms (Deutsch and Gerard, 1955). In the remote confederate design, participants are exposed to  
103 fictitious accounts of the amount of food consumed by previous participants in that study (Feeney et  
104 al., 2011; Pliner & Mann, 2004; Roth, Herman, Polivy, & Pliner, 2001). If remote confederates eat a  
105 lot, this signals a high intake norm, whereas if they eat only a little then this signals a low intake  
106 norm. A high norm increases food intake relative to a no norm control condition whereas a low intake  
107 norm decreases intake relative to a no norm control condition (Feeney et al., 2011; Pliner & Mann,  
108 2004; Robinson et al. 2011; Roth et al., 2001). Amounts consumed by previous participants in a study  
109 can also be communicated via cues such as empty food wrappers. There is evidence that participant  
110 choices are affected by such cues. People are more likely to choose a "healthy" versus "unhealthy"  
111 food item if they see evidence that previous participants have chosen "healthily" (Prinsen et al. 2012).  
112 Furthermore, text-based descriptive norm messages conveying information about the eating behaviour

113 of others affect subsequent food choices (Robinson et al. 2014; Stok et al. 2012; 2014). In these  
114 instances, following the norm does not serve to promote affiliation or a sense of belonging because  
115 there is no other person present. Hence, it might be concluded that the motive to behave correctly  
116 explains why people follow eating norms. Taking the example of studies using a remote confederate,  
117 the intake of the fictitious participants indicates the “right” way to behave in terms of how much to eat  
118 or what foods to choose, and so that norm is adopted (Cialdini and Trost 1998; Deutsch and Gerard,  
119 1955).

120

121 Clearly, there is evidence that on occasion people might follow an eating norm to satisfy a desire to be  
122 liked but there is also evidence that in the absence of direct social interaction, people still follow  
123 eating norms, perhaps because they desire to behave correctly. Traditionally these motives have been  
124 conceptualised as being independent (Cialdini and Goldstein, 2004). However, a more detailed  
125 consideration of the evidence suggests that affiliation and correctness concerns are not so easy to  
126 disentangle as it might at first seem. Although the use of the remote confederate design may minimise  
127 the extent to which people alter their behaviour to create a good impression, there remains the  
128 possibility that the participants may follow the norm to impress the experimenter, assuming that they  
129 are aware that their food intake/choices are being monitored by the experimenter. In addition,  
130 adhering to the norm may make the individual feel as if s/he is a more socially-responsive individual  
131 and therefore perhaps more likely to be accepted by others. Given that affiliation and correctness  
132 motives seem difficult to dissociate, it may be that rather than considering them as separate and  
133 independent, we should consider the possibility that they are interdependent.

134

### 135 **Norm following as an adaptive behaviour**

136 A new model of social eating norms is suggested here that emphasises the interdependence of both  
137 affiliation and informational motives in explaining the power of social norms. The suggestion is that  
138 norm following is most usefully conceptualised as an adaptive behaviour that makes it more likely  
139 that we will consume safe foods and might promote food sharing. According to this explanation,

140 behaving correctly by following the group norm enhances evolutionary fitness. It is further proposed  
141 that the force of norms, the reason why they have such a powerful influence on us, lies in the  
142 emotional consequences of either following them (social approval) or not following them (social  
143 disapproval). More specifically, it is proposed that the adaptive function of social influence is  
144 supported by co-opting affiliation motives: I follow your lead on how to behave and this is reinforced  
145 by feelings of a sense of group belonging or the avoidance of social disapproval. Conceptualised in  
146 this way, affiliation concerns underpin the force of adaptive social eating norms. The model rests on  
147 three specific arguments that will be examined in turn.

148 *Norm following is adaptive in ensuring the selection of safe foods*

149 The selection of safe and nutritious foods is critical for survival but presents a challenge to humans  
150 who are omnivores born with few innate flavour preferences (Rozin, 1976). We have to acquire  
151 knowledge about which foods are edible and non-toxic and one way that we learn about the foods that  
152 are good to eat is by associating food flavours with consequences and adjusting our behaviour  
153 accordingly: we learn to like foods that provide energy and avoid items that make us sick (see  
154 Brunstrom, 2007 for a review). However, we are also able to take advantage of the learning of others  
155 by following their lead. Following a social norm shortcuts the need for learning on a trial-and-error  
156 individual basis and so reduces the costs associated with this learning, such as the time taken to learn  
157 and the likelihood of error (Boyd et al. 2011). This may be especially important when it comes to  
158 learning about foodstuffs because of the potentially lethal consequences of consuming the wrong  
159 substances. In support of this notion is the fact that young children are more likely to try a novel food  
160 if they see a familiar adult eating the same food (Addessi et al. 2005) and will avoid drinks that are  
161 paired with an expression of dislike on the face of someone else (Baeyens et al. 1996). Indeed, there  
162 are numerous examples of young children using social information to guide their eating (for a review  
163 see Shutts et al. 2012). Such social learning accumulates across generations in the forms of cultural  
164 practices around food (Rozin, 1996). Hence, following social eating norms increases evolutionary  
165 fitness because eating what others eat is a good guide to food safety and nutrition.

166 *Norm following is adaptive in promoting cooperation and food sharing*



167 Another reason why we tend to eat what others eat might be that it is a behaviour that evolved to  
168 support cooperation between members of a group. Indeed, it has been argued that the human  
169 disposition to cooperate developed in the context of cooperation around foraging for food (Tomasello,  
170 2008). Evidence for this tendency to cooperate can be seen in experimental game playing studies in  
171 which people demonstrate a sense of fairness in dividing resources relatively equally between  
172 anonymous game playing partners, even when there is no chance for punishing unfair distribution  
173 (Dawes and Thaler, 1988). In the context of food foraging, hunter-gatherer societies engage in  
174 cooperative food gathering and sharing to the extent that some food resources are shared among a  
175 group regardless of who actually made the kill (Hill, 2002). Such cooperative behaviour would be  
176 supported by a social norm that one should not eat more than other members of a group, as has been  
177 reported on in experimental studies of social eating (Herman et al. 2003). Therefore, norm following  
178 may have had an additional evolutionary benefit in promoting food sharing and cooperative  
179 behaviour.

180 *Social norms have force because they are associated with social judgement*

181 The end point of eating what others do could be achieved by directly copying what they do or by  
182 observing the behaviour of others and then changing one's own behaviour on the basis of those  
183 observations (observational learning). In fact there is evidence that this kind of copying occurs  
184 around food. For example, studies of eating and drinking in humans show that consumption behaviour  
185 may be imitated directly by a person taking a sip or reaching for food directly after an observed  
186 person performs the same behaviour (Hermans et al., 2012; Larsen et al., 2010; Koordeman et  
187 al., 2011). This behaviour may be underpinned by basic neural processes that link perception with  
188 action, the so called "mirror neuron system" (Rizzolatti and Craighero, 2004). Similarly, rats and  
189 chimpanzees display a tendency to copy the behaviour of conspecifics and this tendency increases  
190 with the number of animals demonstrating the behaviour (Chou and Richerson, 1992; Haun et al.,  
191 2012). Monkeys will copy of the food choices of another monkey when they migrate into a new  
192 environment, even if that choice goes against their own learned preferences (van de Waal et al. 2013).  
193 However, conformity via imitation or observational learning is not the same as adopting a group nom.

194 A critical difference is that there are emotional consequences when we follow (or do not follow) a  
195 social norm. We derive a sense of belonging by adopting the norms of a group and this may provide  
196 us with a sense of self-worth and esteem that might be considered rewarding (Deutsch and Gerard,  
197 1955). But we also know that there are social sanctions or punishments that arise from not following a  
198 norm (Baumeister & Leary, 1995; Fehr and Fischbacher, 2004). A consequence of not following a  
199 social eating norm might be embarrassment or the disapproval of others. Indeed, given that  
200 stereotypes associated with overeating are generally negative and overeating and obesity are  
201 stigmatized (Vartanian et al. 2007), it may be that following an intake norm is primarily motivated by  
202 a desire to avoid social sanctions associated with appearing to eat excessively (Herman et al. 2003).  
203 Regardless, while following an eating norm might be underpinned by processes such as imitation,  
204 mere imitation does not constitute socially normative behaviour in and of itself. Norms have force  
205 because deviations are discouraged by social judgement (approval or disapproval) and the emotions  
206 that accompany such judgements (Tomasello, 2008).

207

208 The value of the proposed model lies in providing a single framework for understanding the role of  
209 affiliation and informational motives in norm following behaviour and highlighting the evolutionary  
210 benefit of norm following and the power of norms. Further evidence in support of the model may be  
211 gathered from a consideration of the factors that affect whether a norm will be followed (or not),  
212 which will be considered next.

213

#### 214 **What factors affect whether an eating social norm is followed?**

215 Several factors have been identified that moderate norm following in the context of eating. However,  
216 relatively few studies have been conducted and so it is possible that important moderators have yet to  
217 be identified.

218

#### 219 *Norm uncertainty*

220 An evolutionary approach to understanding the following of social eating norms suggests that norms  
221 will be more likely to be followed when there is uncertainty about the consequences of food choice

222 (Laland, 2004). If individuals' personal experience means that they are not sure of how to behave then  
223 they should be more likely to follow the lead of others, because that will be the safest choice. In  
224 support of this idea, modelling of food intake is less likely in eating situations where there are already  
225 clear expectations about how much one should eat, for example at habitual eating occasions such as  
226 breakfast, versus snack sessions where intake norms are more uncertain and variable (Hermans et al.  
227 2010). It should be more adaptive to follow a norm when there is a clear consensus about that norm  
228 (Morgan et al. 2012). In support of this suggestion, it has been reported that when communicated  
229 intake norms are ambiguous participants are less likely to follow them (Leone et al. 2007). In general  
230 these data are in line with the results from studies of other types of social influence, such as  
231 conformity to the perceptual judgements of others (Asch, 1955). In a classic series of experiments,  
232 Asch asked participants to make a judgement about the length of a series of lines. In the Asch  
233 paradigm participants are shown one line on card which serves as the standard line and then three  
234 lines on another piece of card. The task is to match one of the three lines to the standard. The  
235 participant is unaware that the other “participants” in the study are actually confederates of the  
236 experimenter and have been instructed to give a specific answer that is sometimes correct, but  
237 sometimes incorrect. Asch reported that the majority of participants were not swayed in their  
238 judgements even when the confederates were unanimous in reporting incorrect responses about the  
239 line. 38% of participants could be persuaded to to give the wrong answer to the question when the  
240 confederates were all providing the wrong answer but there was even less conformity to the group  
241 when the participants had an ally who was consistent in providing the correct answer (Asch, 1955).  
242 Hence, social influence on both eating and perceptual judgements is affected by certainty about the  
243 norm.

244

245 Asch also found that conformity was less likely when there was a bigger discrepancy between the  
246 standard line and the comparator lines, presumably because participants were more confident of the  
247 “correct” answer when the discrepancy was large (Asch 1955). There have been few studies of  
248 modelling of eating in groups but it would be interesting to examine how food choices are affected by  
249 group norms and the extent to which these effects depend upon the certainty with which personal

250 choices are made. We have reported that modelling of food choices in a buffet line was rather limited  
251 insofar as the presence of one “unhealthy” or “healthy” eating confederate did not affect total calories  
252 selected at the lunch (perhaps because the participants had a clear sense of what constitutes an  
253 appropriate lunch), but the presence of the “unhealthy” confederate did liberate the participants to  
254 choose few low energy dense buffet items (Robinson and Higgs 2012). These data suggests a modest  
255 influence of the presence of a healthy eating dining companion on food choices in a context where  
256 there is free choice for a range of palatable food items, but it remains to be investigated whether  
257 greater modelling would be observed in the presence of a group of “healthy eaters”.

258

#### 259 *Norm referent group*

260 Some evidence suggests that choice norms are more likely to be followed if the referent group  
261 belongs to a socially proximal group or “in-group” with whom an individual perceives shared identity  
262 (See review by Cruwys, Bevelander, and Hermans in this issue.). For example, Cruwys and  
263 colleagues (2012) reported that a perceived eating norm affected behaviour when it came from a  
264 socially proximal group (fellow university students), but not when it came from a less proximal group  
265 (students from a rival university). A norm may be rejected if it comes from a social group with which  
266 a person does not wish to associate. For example, it has been reported that people are motivated to  
267 avoid the behaviour patterns of “out-groups” that are disliked, seen as lower status, or dissimilar, so as  
268 to distance themselves from that group (Berger & Rand, 2008; Berger and Heath, 2008). On the other  
269 hand, people tend to follow the norms of “out-groups” that are seen as aspirational (Englis and  
270 Solomon 1995). The degree to which participants identify with a norm group also moderates the  
271 influence of an eating norm: participants who identify more strongly with the norm group are more  
272 likely to follow the norm (Stok et al. 2014). Hermans et al. (2008) found that matching of food intake  
273 was less likely when a normal weight participant ate with an underweight confederate, possibly  
274 because the participants did not regard the underweight confederate as an appropriate model, or did  
275 not identify with the model. A similar effect has been reported by McFerran and colleagues whereby  
276 participants were less influenced by the choices of a confederate at a buffet when the confederate was  
277 overweight and the participant was normal weight than when both the confederate and participant

278 were normal weight (McFerran et al. 2010). These data are consistent with the idea that norms  
279 provide a shortcut for learning about appropriate food choices, because in-group members would be  
280 expected to provide the most reliable information about the consequences of eating in the group  
281 environment.

282

283 People with whom we have an intimate relationship (e.g. friendship or family relationship) might be  
284 expected to provide the most reliable norms because we are likely to share the same environment.  
285 However, there is evidence of similar modeling of food intake among both friends and strangers  
286 (Howland, Hunger, & Mann, 2012; Salvy et al. 2007; Kaisari and Higgs, this issue). Moreover, there  
287 are reports that modeling effects on intake are greater when the eating partners do not know each  
288 other than when they are siblings (Salvy, Vartanian, Coelho, Jarrin, & Pliner, 2008). It may be that  
289 these results are dependent upon the type of “friendship” and factors relating to shared identity and/or  
290 the need to affiliate. For example, I may perceive a shared identity with people whom I have never  
291 met before because we are similar in some way (e.g. same gender, age, social group). I may follow the  
292 lead of these “strangers” because I consider them “in-group” members. I may also follow the lead of  
293 strangers because I have a desire for social approval, especially if I perceive them to belong to a  
294 desirable “out-group”. This suggests that studies on how intimate relationships affect social influence  
295 should focus on manipulating specific underlying processes such as shared identity to tease out some  
296 of these potential influences.

297

### 298 *Individual characteristics*

299 There has been no systematic investigation of the effect of gender on social eating influences. In fact,  
300 most studies have recruited only women. Two studies failed to find modeling effects on eating in men  
301 (Salvy et al. 2007; Hermans, Herman, Larsen, and Engels 2010), although the reasons why this might  
302 be the case are unclear. Men may have a greater drive for distinctiveness than women do, which may  
303 lead to nonconformity in eating (Cross & Madson, 1997). On the other hand, it might be that women  
304 may possess a greater interest in facilitating positive social bonds than do men, perhaps due to higher

305 empathic tendencies (Eagly & Carli 1981). Evidence from studies of other types of social influence  
306 are consistent with the suggestion that women are more likely to follow social norms than are men  
307 (Eagly and Carli, 1981; Bond and Smith, 1996), but further investigation of gender differences in  
308 responses to eating norms and the underlying mechanisms is required before strong conclusions can  
309 be drawn.

310

### 311 *Food type*

312 Palatability considerations may override normative considerations. Pliner and Mann (2004) found that  
313 social norms did not influence participants to choose an unpalatable “healthy” cookie over a palatable  
314 “unhealthy” cookie. This may be in part because some people find it difficult to resist tempting foods  
315 and will go for the more palatable “unhealthy” cookie even if it is not the choice that other people are  
316 seen to make. It may be that social information cannot persuade people to consume foods that they  
317 dislike (or perhaps know to be potentially unsafe). However, evidence from Salmon and colleagues  
318 (2014) suggests that a social norm message may persuade people to consume more of a “healthy”  
319 food but only if the participants are lacking in self-control. In this study the “healthy” items were  
320 cereal bars and fruit and nuts rather than unpalatable foods. More data are required on the issue of  
321 how food type interacts with norm information to affect food intake and choice, especially for healthy  
322 foods such as vegetables that people typically regard as unpalatable.

323

### 324 **How do social norms affect eating behaviour?**

325 An important question that has yet to be addressed in any detail is how social norms affect eating.  
326 Answering this question will have implications for the potential use of social norms in interventions  
327 aimed at changing dietary behaviour. A person may decide to choose a “healthy” food option because  
328 others do so, but if this behaviour is based purely on public acceptance of the norm (in other words,  
329 the choice is made only so that that person wishes to be seen to conform), then this type of conformity  
330 is unlikely to form the basis of an effective, long term intervention on behaviour change. On the other

331 hand, if norms are changing underlying perceptions of oneself or of the food then this would suggest a  
332 private acceptance of the norm rather than mere public conformity, which might be more like to  
333 sustain behaviour change in the long run.

#### 334 *Change in self-perception*

335 It has been suggested that conforming to group norms may occur because it results in a positive  
336 change in self-perception and attitudes. If an observed norm is a “healthy” food choice and I identify  
337 with the norm referent group then I might see myself as the kind of person who makes “healthy” food  
338 choices and behave in a manner consistent with this self-identity (Bem, 1972). I might also feel that if  
339 other people like me are performing the behaviour then this means that I am capable of doing it,  
340 which could increase my feelings of self-efficacy for performing the behaviour (de Cremer and van  
341 Vugt, 1998). In the case of following healthy eating norms, Stok and colleagues (2014) have reported  
342 that the effect an eating norm about vegetable consumption increased self-reported vegetable  
343 consumption and that this effect was partially but not fully mediated by changes in self-identification  
344 and self-efficacy leaving some variance unaccounted for.

#### 345 *Change in sensory/hedonic evaluation of foods*

346 Another possible mechanism underlying how social norms affect eating is that they change the  
347 perception and evaluation of the foods. Asch suggested that participants may have conformed with the  
348 incorrect answer of the confederate because they experienced a perpetual distortion and perceived the  
349 incorrect stimuli as correct (1955). In support of this hypothesis, Berns and colleagues (2005) reported  
350 that conformity to the incorrect group in an Asch-like perceptual judgement task was associated with  
351 increased activity in areas of the brain associated with early visual processing. Others have reported  
352 that changes in brain reward networks are associated with adherence to social norms (for a review see  
353 Izuma, 2013). For example, the provision of social information, in the form of reviews about a song,  
354 increased activity in brain areas associated with reward when the songs were heard (Campbell-  
355 Meiklejohn et al., 2010).

356 In the case of eating, one could hypothesise that the behaviour of others might affect sensory/hedonic  
357 responses to food cues and food consumption, thus affecting food-related decisions. This might be  
358 achieved by modulation of expectations about the consequences of consuming that food. A food  
359 might be expected to have positive rewarding consequences and taste good because other people  
360 whom we identify with are eating it and enjoying it. Moreover, it could be that social influence is  
361 accompanied by neural changes that align the liking of the food with others' liking of the food, as has  
362 been shown for the effect of other external cues such as labels (Grabenhorst et al. 2009). In support of  
363 this idea, we have found that providing information about how much an in-group but not an out-group  
364 likes orange juice affects participants' expected liking for orange juice (Robinson and Higgs 2013). In  
365 addition, it has been shown that being in agreement with the preferences and decisions of others  
366 activates brain reward networks whereas being in disagreement has the opposite effect (Klucharev et  
367 al.2009; Botvinick et al. 2004). Thus, conformity to eating norms could be driven by increases in  
368 reward-related brain activity as behaviour comes in line with the group. Clearly, this hypothesis  
369 requires careful testing but it is consistent with the idea more generally that reward is at the core of  
370 social conformity (Zaki et al. 2011).

## 371 **Conclusions**

372 Normative social influence on eating is potent and pervasive. The presence of other people at an  
373 eating occasion or when choices are made about food has a powerful effect on behaviour. This may be  
374 because humans are have a highly developed capacity to learn from the behaviour of others and find  
375 the approval of others rewarding and disapproval aversive. It is proposed that eating norms are  
376 followed because they provide information about safe foods and facilitate food sharing. They are a  
377 powerful influence on behaviour because following (or not following) norms is associated with social  
378 judgements. Norm following is more likely when there is uncertainty about what constitutes correct  
379 behaviour and when there is greater shared identify the norm referent group. Social norms may affect  
380 food choice and intake by altering self-perceptions and the sensory/hedonic evaluation of foods. The  
381 same neural systems that mediate the rewarding effects of food itself are likely to reinforce the  
382 following of eating norms.



383 **Acknowledgements**

384 This work was supported by a grant from the Economic and Social Research Council, UK  
385 (ES/K002678/1).

386 **References**

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