The role of perceived descriptive and injunctive norms on the self-reported frequency of meat and plant-based meal intake in UK-based adults.

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Abstract

Perceived social norms refer to beliefs that people hold about what other people do (descriptive norms) and approve of (injunctive norms), and are associated with food intake. However, less is known about whether perceived social norms are associated with meat and plant-based meal intake. Using a cross-sectional survey design 136 participants (aged 19-66 years, mean age=39.63, SD=12.85 years, mean BMI=25.77, SD=5.30, 80.9% female, 77.9% omnivores, 22.1% flexitarians) answered questions about how frequently they consumed meat and plant-based meals, and how frequently they perceived people in their social environment to consume (perceived descriptive norms), and approve of consuming (perceived injunctive norms) meat and plant-based meals. Perceived descriptive and injunctive norms were positively associated with participants’ frequency of meat intake: participants ate meat more frequently when they perceived their significant other to frequently eat meat (descriptive norm), and when they perceived their significant other and friends to approve of (injunctive norm) frequently eating meat. Perceived descriptive norms were positively associated, but injunctive norms were negatively associated with participants’ frequency of plant-based meal intake: participants ate plant-based meals more frequently when they perceived their extended family, friends, and significant other to frequently eat plant-based meals. However, participants ate plant-based meals more frequently when they perceived their extended family to approve of less frequent plant-based meal intake. These results suggest that different social groups may be important for meat and plant-based meal intake, with significant others and friends appearing to be important reference points for both food types. Further research examining the contexts in which the different social groups influence eating behaviour would be of value.

**Keywords:** social norms; plant-based eating; meat intake; eating behaviour

1. Introduction

The farming and intake of animal products has potentially negative consequences for the environment and human health (Chai et al., 2019; Godfray et al., 2018; Hunter & Röös, 2016; Willett et al., 2019). The production of animal products generates 72-78% of total greenhouse gas emissions from agriculture, and meat intake, especially red and processed meat, is linked with poorer health outcomes (Godfray et al., 2018). A Lancet commissioned report concluded that a diet higher in plant-based foods, and lower in foods from animal sources may have health and environmental benefits (Willett et al., 2019). Research has shown that people are increasingly intending to eat less meat (Duchene & Jackson, 2019), and large reductions of greenhouse gas emissions are possible by reducing meat intake (Martin & Brandão, 2017). Thus, it is important to identify factors which may contribute to meat and plant-based meal intake (i.e. meals not containing meat) in order to improve the understanding of potential avenues for reducing meat, and increasing plant-based meal intake in the population.

Social norms are codes of conduct about how to behave (Cialdini & Goldstein, 2004; Higgs, 2015) and may be an important factor in people’s meat and plant-based meal intake.

According to the focus theory of normative conduct there are two types of social norms: Perceived descriptive and injunctive norms (Cialdini et al., 1990). Perceived descriptive norms refer to people’s perceptions of what other people do and these norms are believed to influence behaviour through providing a guide for how to behave in a situation when people are uncertain (Cialdini & Goldstein, 2004; Stok et al., 2016). Perceived injunctive norms refer to people’s perceptions of what other people approve of, and are believed to motivate behaviour through promising social rewards or punishments (Cialdini & Goldstein, 2004; Stok et al., 2016). Descriptive norms have been shown to be associated with eating behaviour in a number of studies (Higgs, 2015; Robinson, Sharps, Price, & Dallas, 2015; Robinson, Thomas, Aveyard, & Higgs, 2014; Schenk, Rössel, & Scholz, 2018; Sharps & Robinson, 2015; Stok, de Vet, de Ridder, & de Wit, 2016), and have a powerful influence on eating behaviour (Higgs, 2015; Robinson et al., 2014). The evidence surrounding the influence of injunctive norms on eating behaviour is mixed, however, the majority of correlational studies found that injunctive norms were associated with food intake (Stok et al., 2016). Therefore, further research is needed to understand the impact of injunctive norms on eating behaviour.

Recent research has investigated the role of social norms on meat and plant-based eating. In one study, descriptive and injunctive norms were associated with the adoption of a vegetarian diet in university students (Schenk et al., 2018). In another study, descriptive norms increased interest in eating less meat, and doubled the percentage of people ordering a meatless lunch (Sparkman & Walton, 2017). Different social groups have been shown to have differing influences on eating behaviour, for example, groups of a closer social proximity (i.e. students at the same university) were found to influence eating behaviour among students more than groups of a more distant social proximity (i.e. students at a different university) (Cruwys et al., 2015). Furthermore, Pelletier, Graham and Laska (2014) showed that, in a sample of young adults, fruit and vegetable intake was associated with the perceived eating behaviour of friends. Whereas, fast food intake was associated with the perceived eating behaviour of family, friends, and significant others. However, less is known about how different social groups influence meat and plant-based meal intake. Furthermore, Pelletier et al (2014) examined a sample of young adults, so it is unclear whether social groups such as extended family would provide an important influence on the behaviour of a more diverse age range of adults.

The present study aimed to examine whether perceived descriptive and injunctive norms which participants held about the meat and plant-based meal intake of a variety of social groups in people’s social environment (extended family who participants did not live with, friends, and significant others) were associated with how frequently people reported eating meat and plant-based meals. It was expected that perceived descriptive and injunctive norms would be associated with meat and plant-based meal intake. It was also expected that descriptive and injunctive norms that participants held about significant others and friends may be more important than perceived norms about extended family.

1. Method

*2.1 Participants and design*

Two hundred and ninety seven UK-based adults were recruited through opportunity sampling and snowballing from social media (the researchers posted the advert on Twitter and Facebook on their personal accounts and in a variety of Facebook groups including a group about family lockdown activities, food groups, and groups for towns and cities (i.e. a group about a variety of topics for people who live in that area). Due to drop out, incomplete responses, and the exclusion of people who follow an exclusive plant-based diet [[1]](#footnote-1), the final sample consisted of 136 participants (aged 19-66 years, mean age = 39.63, SD = 12.85 years, mean BMI = 25.77, SD = 5.30, 80.90% female, 77.9% omnivores, 22.1% flexitarians). See Table 1 for a breakdown of the demographic characteristics by diet type (omnivore vs. flexitarian). An *a-priori* power analysis (G-power, *a* = .05, 85% power for a medium effect size, with 10 predictors) indicated that a minimum sample of 131 participants were required. The study employed a cross-sectional questionnaire design. The questionnaire was hosted on Qualtrics and took approximately 15 minutes to complete. Data collection took place in May 2020 and participants were not compensated for their time. This study received ethical approval from De Montfort University Health and Life Sciences ethics committee (ref: 3605). All participants were required to read an information sheet and give their consent before being allowed to continue with the study.

*2.2 Questionnaire measures*

*2.2.1 Demographic questions and participant’s diet*

Participants were asked their age, sex, ethnicity, height and weight. Participants were also asked about their living situation (i.e. who they live with). With regards to participant’s diet, participants were asked ‘Which best describes your dietary lifestyle?’ with options ‘Omnivore (a person who eats meat and plant-based food)’, ‘Pescatarian (A person who does not eat meat but does eat fish)’, ‘Flexitarian (A person who eats some meat and fish but mostly eats plant-based food)’, ‘Vegetarian (A person who does not eat meat or fish but does eat animal products such as eggs and milk)’, ‘Vegan (A person who does not eat or use animal products), and ‘Other’. People were categorised into high meat content diets (i.e. omnivores) which received a score of 2, and low meat content diets (i.e. flexitarians) which received a score of 1. A higher score on the ‘Participants’ diet’ variable indicates a higher meat content diet.

*2.2.2 Participants’ frequency of intake and approval*

To measure participants’ frequency of meat and plant-based meal intake, participants were asked *‘How often do you eat meals containing meat?’* and *‘How often do you eat plant-based meals (i.e. meals not containing meat)?’* To measure participants’ approval, participants were asked *‘How often do you think people should eat meals containing meat?*’ and *‘How often do you think people should eat plant-based meals?’* These questions, and the perceived descriptive and injunctive norm questions (below) were based on questions by Pelletier, Graham and Laska (2014) and Lally *et al* (2012), and were rated on a 5-point Likert-style scale with options ‘Never’ (a score of 1), ‘Monthly or less than monthly’ (a score of 2), ‘Weekly’ (a score of 3), ‘Several times a week’ (a score of 4), and ‘Daily or more than once per day’ (a score of 5). None of the questions were reverse scored.

*2.2.3 Perceived descriptive and injunctive norms*

Participants were asked to estimate how often they thought that the people they live with, their extended family (people they do not live with), their friends, and their significant other ate meat and plant-based meals. Participants were asked separate questions for each social group. For example, ‘*How often does your significant other eat meals containing meat?’, ‘How often do your friends eat meals containing meat?’* etc. and *How often does your family (who you do not live with) eat plant-based meals?’ etc.*

Participants were asked to estimate how often they thought that the people they live with, their extended family, their friends, and their significant other approved of eating meat and plant-based meals. As above, participants were asked separate questions for each social group. For example*, ‘How often do you think that your friends think that people should eat meals containing meat?’* and *‘How often do you think that your family (who you do not live with) think that people should eat plant-based meals?’*

*2.2.4 Additional questions*

Participants were also asked about fruit, vegetable, fast-food, sugar-sweetened beverage, and snack intake and approval for themselves and for the people in their social environment. These items were part of a larger study, the results of which are discussed in another paper (Sharps et al, in prep), and also helped to conceal the aims of this study by not just asking about meat and plant-based meal intake.

*2.3 Analysis strategy*

To examine whether participants’ own self-reported frequency of meat and plant-based meal intake was predicted by perceived descriptive and injunctive norms, four hierarchical regressions were conducted. First, a hierarchical regression was conducted to examine how perceived descriptive and injunctive norms that participants held about family and friends predicted participants’ self-reported meat intake. Second, a hierarchical regression was conducted to examine how perceived descriptive and injunctive norms that participants held about family, friends, and significant others predicted participants’ self-reported meat intake frequency. These regressions were repeated to examine how perceived descriptive and injunctive norms predicted participants’ plant-based meal intake frequency. The first step of all of the regression models contained the predictors participants’ diet (i.e. high meat content diet (omnivore) vs. low meat content diet (flexitarian), age, sex, and BMI. The second step contained injunctive norm predictors, and the final step contained descriptive norm predictors.

1. Results

*3.1 Meat intake*

*Family and friends*

The overall model significantly predicted participants’ self-reported frequency of meat intake, R2 = .63, F (8, 127) = 26.47, *p* <.001. Injunctive norms that participants held about friends were significantly positively associated with participants’ self-reported frequency of meat intake; participants ate meat more frequently when they perceived their friends to approve of frequent meat intake. Participant’s diet and BMI were also significantly positively associated with self-reported frequency of meat intake, whereby participants who had a higher meat content in their diet (i.e. omnivores), and those with a higher BMI reported eating meat more frequently. Whereas age was significantly negatively associated, whereby younger participants reported eating meat more frequently.

*Family, friends and significant other*

The overall model significantly predicted participants’ self-reported frequency of meat intake, R2 = .73, F (10, 89) = 24.50, *p* <.001. As in the previous analysis, injunctive norms that participants held about friends were significantly positively associated with participants’ self-reported frequency of meat intake. Descriptive and injunctive norms that participants held about their significant others were also significantly positively associated with participants’ self-reported frequency of meat intake; participants ate more meat when they perceived their significant other to eat and approve of frequent meat intake. Participants’ diet was significantly positively associated with self-reported frequency of meat intake, however, BMI and age were no longer significantly associated with self-reported frequency of meat intake.

*3.2 Plant-based meal intake*

*Family and friends*

The overall model significantly predicted participants’ self-reported frequency of plant-based meal intake, R2 = .52, F (8, 127) = 17.19, *p* <.001. Descriptive norms that participants held about their family and friends’ frequency of plant-based meal intake were positively associated with participants’ own self-reported frequency of plant-based meal intake; participants reported eating plant-based meals more frequently when they perceived their family and friends to frequently eat plant-based meals. Participants’ diet was significantly negatively associated with self-reported frequency of plant-based meal intake, whereby, a high meat diet (i.e. omnivore) was associated with less frequent plant-based meal intake.

*Family, friends and significant other*

The overall model significantly predicted participants’ self-reported frequency of plant-based intake, R2 = .59, F (10, 89) = 13.05, *p* <.001. As in the previous analysis, descriptive norms that participants held about their family and friends were significantly positively associated with participants’ self-reported frequency of plant-based meal intake. Descriptive norms that participants held about the plant-based meal intake of significant others was also significantly positively associated with participants’ self-reported frequency of plant-based meal intake; whereby participants ate plant-based meals more frequently when they perceived their significant to approve of frequent plant-based meal intake. Injunctive norms that participants held about family were significantly negatively associated with participants’ frequency of plant-based meal intake, whereby, the perception that family approved of frequent plant-based meal intake was associated with less frequent self-reported plant-based meal intake. Participant’s diet was significantly negatively associated with self-reported frequency of plant-based meal intake.

1. Discussion

In the current study, perceived descriptive and injunctive norms were associated with people’s meat and plant-based meal intake. The results showed that perceived descriptive norms that the participants held about significant others were positively associated with self-reported frequency of meat intake, and perceived descriptive norms that participants held about their extended family, friends, and significant others were positively associated with self-reported frequency of plant-based meal intake. The results also showed that perceived injunctive norms that participants held about significant others and friends were positively associated with self-reported frequency of meat intake, whereas perceived injunctive norms that participants held about family were negatively associated with self-reported frequency of plant-based meal intake. These findings are consistent with our hypotheses, supporting that both descriptive and injunctive norms were associated with frequency of meat and plant-based meal intake, and indicate that significant others and friends may be important for both meat and plant-based meal intake. These findings contribute to the literature investigating descriptive and injunctive norms and eating behaviour (Lally et al., 2011, 2012; Pelletier et al., 2014; Schenk et al., 2018; Stok et al., 2016) and provide the first evidence that different social groups may have different influences on meat and plant-based meal intake.

Descriptive norms are believed to influence behaviour due to providing a guide for how to behave in a situation when people are uncertain, and behaving in a similar way to others removes that uncertainty (Cialdini & Goldstein, 2004). Since plant-based eating is less prevalent than meat intake in the UK population (Lee & Simpson, 2016), people may be unsure of how frequently to consume plant-based meals, and may rely on the behaviour of multiple others (i.e. family, friends, and significant others) to determine the appropriate course of action (Cialdini & Goldstein, 2004; Sharps & Robinson, 2017). Whereas, since meat intake is prevalent (Lee & Simpson, 2016), people may be less uncertain of this behaviour and only look to one other social group.

Injunctive norms indicate the approval of others and are believed to motivate behaviour through promising social rewards or punishments (Cialdini & Goldstein, 2004; Deutsch & Gerard, 1955). Thus, social rewards or punishments from friends and significant others may be an especially important motivator for meat intake, and people may eat in line with the approval of their friends and significant others in order to gain these social rewards and avoid social punishments. However, anticipated social rewards or punishments from extended family appear to be less of a motivator. In this study, participants ate plant-based meals less frequently when they perceived their extended family to approve of frequent plant-based meal intake. According to psychological reactance theory, a force that implies that individuals should behave in a certain way can be viewed as a freedom threat and can trigger reactance (Brehm, 1966). Research has shown that injunctive norms can be vulnerable to reactance as they exert higher pressure to comply (Stok et al., 2014; Zhu & Pan, 2017), with high controlling messages producing more reactance than low controlling messages (Roubroeks et al., 2009). Therefore, in the current study the participants may have interpreted the perceived injunctive norms held by extended family as more controlling than those held by friends and significant others, thus only producing reactance against their extended family’s perceived injunctive norm. We did not measure how controlling the participants found the different social groups, and how willing they were to comply with injunctive norms and this would be valuable in future research.

An important consideration in the present research is the social context in which the meals took place. According to the focus theory of normative conduct, several norms exist at the same time, and any single norm will only influence behaviour in situations that activate that specific norm (Cialdini et al., 1990). In the current study we did not ask participants to specify who they ate their meals with and where. Therefore, it may be that the perceived behaviour (descriptive norms) and approval (injunctive norms) of significant others is important in some contexts, such as the home environment, whereas the perceived behaviour and approval of other social groups may be important in other contexts. Examining who participants eat their meals with and where would allow for a greater understanding of when the different social groups influence behaviour.

While this study provides valuable insight into the way in which different social groups may affect meat and plant-based intake in UK adults, the study is not without limitations. First, in the current study we examined whether the type of relationship was associated with eating behaviour, however, it is also possible that dietary lifestyle (i.e. being a flexitarian) predicts the relationships people have and who they choose to associate with. Research showed that vegetarians were more likely to have vegetarian friends and partners than omnivores were (Nezlek et al., 2020). This suggests that there may be a bi-directional relationship, whereby, people may associate with others with similar dietary lifestyles as themselves and eat in a similar way to their social groups due to following the same dietary lifestyle. In this study we did not ask participants about the dietary lifestyles of people in their social groups, therefore it was not possible to examine if this was the case. In future research it would be interesting to recruit a larger proportion of flexitarians and to examine whether this bidirectional relationship may exist among flexitarians and omnivores. Second, this study had a predominantly female, omnivorous sample, therefore, it would valuable to examine whether the same social groups may be important for meat and plant-based meal intake in a larger sample of males and flexitarians. Third, in this study we measured self-reported frequency of intake. Examining the influence of different social groups on actual eating behaviour would provide more insight into which social groups influence meat and plant-based meal intake.

In conclusion, these results indicate that perceived descriptive and injunctive norms may be important influences on meat and plant-based meal intake. People may look to friends and significant others to inform their frequency of meat intake, and their family, friends, and significant others to inform their frequency of plant-based meal intake. Understanding the social context of where meals take place and who with, and understanding how socially close participants feel to the social groups would be valuable to further understand the impact of these social groups on meat and plant-based meal intake. The study examined self-reported frequency of intake in a predominantly female, omnivorous sample, therefore, further research is needed to examine the influence of social norms on people’s actual intake in a larger group of males and flexitarians.

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Table 1. Demographic characteristics of omnivores and flexitarians

|  |  |  |
| --- | --- | --- |
| Demographics | Participants’ diet | |
|  | Omnivore (n = 106) | Flexitarian (n = 30) |
| Mean Age (SD) | 39.90 years (12. 73 years) | 38.30 (13.38 years) |
| Age range | 19 - 66 years | 20 – 62 years |
| Sex | 85F, 21M, 1 undisclosed | 25F 5M |
| Mean BMI (SD) | 26.20 (5.44) | 24.14 (4.40) |
| Ethnicity | 84.9% White British/ European  2.8% Black or Black British-African or Caribbean  1.0% Asian or British Asian Indian  1.0% Chinese  10.3% undisclosed | 90.0% White British/ European  3.3% Black or Black British-African or Caribbean  6.7% undisclosed |
| Living situation | 83.0% with family (spouse and/or children or parents and siblings)  12.3% live alone  4.7% with unrelated housemates | 79.9% with family (spouse and/or children or parents and siblings)  13.2% live alone  6.9% with unrelated housemates |
| Employment | 53.5% Full time employment  9.3% Part time employment  8.1% Self-employed  14.0% Full time student  5.8% Retired  9.3% Unemployed/ prefer not to say | 45.8% Full time employment  12.5% Part time employment  16.7% Self-employed  16.7% Full time student  8.3% Unemployed/ other |
| Occupation | 79.3% Professional occupation  17.8% Manual worker  2.9% Did not specify | 80% Professional occupation  5% Manual worker  15% Did not specify |

Table 2 Mean (SD) perceived descriptive and injunctive norms

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Type of norm | Social group | All participants | | Omnivores | | Flexitarians | |
|  |  | Meat | PB | Meat | PB | Meat | PB |
|  | Participants’ own eating behaviour | 3.74 (0.94) | 3.18 (1.09) | 4.08 (0.66) | 2.85 (0.89) | 2.53 (0.73) | 4.33 (0.92) |
|  | Participants’ own approval | 3.44 (0.81) | 3.97 (0.73) | 3.67 (0.66) | 3.82 (0.67) | 2.63 (0.77) | 4.50 (0.68) |
| Perceived descriptive norms | Extended family | 3.83 (0.99) | 3.02 (1.19) | 3.89 (1.03) | 2.94 (1.17) | 3.63 (0.85) | 3.30 (1.24) |
|  | Friends | 3.92 (0.83) | 3.06 (1.06) | 3.97 (0.77) | 3.01 (1.07) | 3.73 (0.98) | 3.23 (1.04) |
|  | Significant others | 3.85 (1.23) | 2.94 (1.18) | 4.11 (0.96) | 2.71 (1.08) | 2.96 (1.61) | 3.74 (1.18) |
| Perceived injunctive norms | Extended family | 3.66 (1.10) | 3.49 (1.09) | 3.69 (1.12) | 3.51 (1.07) | 3.57 (1.04) | 3.43 (1.17) |
|  | Friends | 3.65 (0.91) | 3.45 (1.04) | 3.72 (0.86) | 3.42 (1.01) | 3.40 (1.04) | 3.53 (1.14) |
|  | Significant others | 3.68 (1.14) | 3.16 (1.31) | 3.91 (0.98) | 3.00 (1.31) | 2.86 (1.32) | 3.73 (1.16) |

1 Participants rated their frequency of consumption and approval, and their perceptions of the frequency of consumption and approval from 1 (never) to 5 (daily or more than once per day).

Table 3. Associations with reported meat intake

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | Model 1  Unstandardised B, CI | | Model 2  Unstandardised B, CI | | | Model 3  Unstandardised B, CI | |  |  |
| Family and friends (n = 136) | | Adjusted R2  R2 change  Participants’ diet | | .52\*\*  .53\*\*  1.52 (1.25, 1.79)\*\* | | .60\*\*  .09\*\*  1.46 (1.22, 1.71)\*\* | |  | .60  .01  1.44 (1.19, 1.69)\*\* | | |
|  | | Age | | -.02 (-.02, -.01)\* | | -.01 (-.02, -.01)\* | |  | -.01 (-.02, -.004)\* | | |
|  | | Sex | | .08 (-.20, .37) | | .16 (-.10, .41) | |  | .17 (-.09, .43) | | |
|  | | BMI | | .03 (.01, .05)\* | | .02 (.002, .04)\* | |  | .02 (.001, .04)\* | | |
|  | | Family injunctive norms  Friend injunctive norms | |  | | .18 (.08, .28)\*  .16 (.03, .28)\* | |  | .10 (-.04, .24)  .15 (.02, .28)\* | | |
|  | | Family descriptive norms  Friend descriptive norms | |  | |  | |  | .11 (-.05, .27)  .01 (-.13, .16) | | |
|  | |  | |  | |  | |  |  | | |
| Family, friends, and significant others (n = 100) | | Adjusted R2  R2 change  Participants’ diet | | .50\*\*  .52\*\*  1.41 (1.09, 1.73)\*\* | | .68\*\*  .19\*\*  1.14 (.86, 1.42)\*\* | |  | .70\*  .03\*  1.02 (.74, 1.30)\*\* | | |
|  | | Age | | -.02 (-.03, -.004)\* | | -.01 (-.02, -.004)\* | |  | -.01 (-.02, .001) | | |
|  | | Sex | | .18 (-.18, .55) | | -.01 (-.32, .30) | |  | -.11 (-.42, .19) | | |
|  | | BMI | | .03 (.01, .06)\* | | .02 (-.001, .04) | |  | .02 (-.002, 04) | | |
|  | | Family injunctive norms | |  | | .16 (.06, .27)\* | |  | .03 (-.11, .18) | | |
|  | | Friend injunctive norms | |  | | .16 (.03, .30)\* | |  | .15 (.01, .28)\* | | |
|  | | Significant other injunctive norms | |  | | .21 (.10, .32)\*\* | |  | .16 (.04, .28)\* | | |
|  | | Family descriptive norms | |  | |  | |  | .14 (-.02, .30) | | |
|  | | Friend descriptive norms | |  | |  | |  | -.06 (-.22, .09) | | |
|  | | Significant other descriptive norms | |  | |  | |  | .17 (.04, .29)\* | | |
| \**p* < .05  \*\**p* < .001 |  | |  | | | |  |  | |  |  |

Table 4. Associations with reported plant-based meal intake

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | Model 1  Unstandardised B, CI | | Model 2  Unstandardised B, CI | | | Model 3  Unstandardised B, CI | |  |  |
| Family and friends (n = 136) | | Adjusted R2  R2 change  Participants’ diet | | .33\*\*  .35\*\*  -1.42 (-1.79, -1.06)\*\* | | .35  .03  -1.43 (-1.80, -1.07)\*\* | |  | .49\*\*  .14\*\*  -1.29 (-1.61, -.96)\*\* | | |
|  | | Age | | .01 (-.01, .02) | | .01 (-.01, .02) | |  | .004 (-.01, .02) | | |
|  | | Sex | | .26 (-.12, .65) | | .29 (-.10, .67) | |  | .12 (-.23, .47) | | |
|  | | BMI | | -.03 (-.06, -.001)\* | | -.03 (-.06, .002) | |  | -.01 (-.04, .02) | | |
|  | | Family injunctive norms  Friend injunctive norms | |  | | .13 (-.01, .27)  .08 (-.07, .23) | |  | -.14 (-.31, .03)  -.05 (-.20, .11) | | |
|  | | Family descriptive norms  Friend descriptive norms | |  | |  | |  | .30 (.14, .46)\*\*  .30 (.14, .45)\*\* | | |
|  | |  | |  | |  | |  |  | | |
| Family, friends, and significant others (n = 100) | | Adjusted R2  R2 change  Participants’ diet | | .30\*\*  .33\*\*  -1.27 (-1.71, -.84)\*\* | | .35\*  .07\*  -1.16 (-1.59, -.73)\*\* | |  | .55\*\*  .20\*\*  -.86 (-1.23, -.48)\*\* | | |
|  | | Age | | .01 (-.01, .02) | | .01 (-.01, .02) | |  | -.002 (-.02, .01) | | |
|  | | Sex | | .19 (-.30, .69) | | .26 (-.24, .75) | |  | .10 (-.33, .53) | | |
|  | | BMI | | -.04 (-.07, -.003)\* | | -.03 (-.06, .01) | |  | -.01 (-.04, 02) | | |
|  | | Family injunctive norms | |  | | .07 (-.10, .23) | |  | -.21 (-.40, -.02)\* | | |
|  | | Friend injunctive norms | |  | | .06 (-.14, .26) | |  | .04 (-.15, .23) | | |
|  | | Significant other injunctive norms | |  | | .18 (.03, .33)\* | |  | -.04 (-.19, .11) | | |
|  | | Family descriptive norms | |  | |  | |  | .21 (.04, .39)\* | | |
|  | | Friend descriptive norms | |  | |  | |  | .22 (.03, .40)\* | | |
|  | | Significant other descriptive norms | |  | |  | |  | .36 (.18, .53)\*\* | | |
| \**p* < .05  \*\**p* < .001 |  | |  | | | |  |  | |  |  |

1. Participants were recruited as part of a larger study investigating the influence of social norms on eating behaviour of a variety of foods, including meat and plant-based meals (Sharps et al, in preparation). People of all dietary lifestyles (i.e. omnivores, flexitarians, pescatarians, vegans and vegetarians) were eligible to take part, however, people who followed an exclusive plant-based diet were excluded from this element of the study as it was not possible to determine which social factors were associated with the frequency of meat and plant-based meal intake, since vegans and vegetarians only eat plant-based meals. [↑](#footnote-ref-1)