

# Attitudes towards following meat, vegetarian and vegan diets: an examination of the role of ambivalence

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(Received 5 October 2000, revision 28 March 2001, accepted in revised form 3 May 2001)

Vegetarianism within the U.K. is growing in popularity, with the current estimate of 7% of the population eating a vegetarian diet. This study examined differences between the attitudes and beliefs of four dietary groups (meat eaters, meat avoiders, vegetarians and vegans) and the extent to which attitudes influenced intentions to follow each diet. In addition, the role of attitudinal ambivalence as a moderator variable was examined. Completed questionnaires were obtained from 111 respondents (25 meat eaters, 26 meat avoiders, 34 vegetarians, 26 vegans). In general, predictions were supported, in that respondents displayed most positive attitudes and beliefs towards their own diets, and most negative attitudes and beliefs towards the diet most different from their own. Regression analyses showed that, as predicted by the Theory of Planned Behaviour, attitudes, subjective norm and perceived behavioural control were significant predictors of intention to follow each diet (apart from the vegetarian diet, where subjective norm was non-significant). In each case, attitudinal ambivalence was found to moderate the attitude-intention relationship, such that attitudes were found to be stronger predictors at lower levels of ambivalence. The results not only highlight the extent to which such alternative diets are an interesting focus for psychological research, but also lend further support to the argument that ambivalence is an important influence on attitude strength.

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## Introduction

From once being viewed as decidedly odd and cranky (Weinstein & de Man, 1982), alternative diets characterized, to a greater or lesser degree, by the avoidance of animal products, have recently gained increasing popularity in the general population. In fact, recent estimates suggest that there are now approximately four million vegetarians in the U.K., representing some 7% of the population (The Vegetarian Society, 2000). It has also been suggested that the proportion of young people who are vegetarian is still higher (12%; The Vegetarian Society, 2000), with similar levels being reported among teenagers in

Australia (Worsley & Skrzypiec, 1998). In addition to these estimates, it has also been suggested that approximately 41% of the U.K. population are choosing to eat far less meat in their diet (The Vegetarian Society, 2000).

Within vegetarianism, the extent to which the individual may avoid animal products may vary, from the avoidance of red meat only, to the avoidance of meat, fish and eggs (lacto-vegetarian), to the avoidance of all products found to be derived from animals (vegan). Vegans are the strictest of all vegetarians, who abstain from either eating or utilizing all animal products. In this study, four different dietary groups were distinguished: *meat eaters*, *meat avoiders* (i.e. those who abstain from eating meat products), *vegetarians* (i.e. those who abstain from eating meat and fish), and *vegans* (i.e. those who abstain from eating any animal product).

Three of the most important reasons reported for choosing a *meat* eating diet over alternatives have been taste, health (Kenyon & Barker, 1998) and value for

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money (Richardson, Shepherd & Elliman, 1993). In addition, a group of non-vegetarian teenagers described the main reasons for eating meat as being that they were pressured by others, that vegetarianism was “unhealthy”, that they liked meat too much, that they did not have any “alternatives” (vegetarian meals were disliked, hard to prepare, boring or limited in choices), and that killing for meat is “acceptable” (Worsley & Skrzypiec, 1998). On the other hand, there are many possible reasons why people choose to follow meat avoidance, vegetarian and vegan diets over and above the traditional meat-centred diet. A study by Beardsworth and Keil (1991) found that reasons for becoming a vegetarian were generally “multi-stranded” with principal motives for conversion to a vegetarian diet being health, moral/spiritual, taste/texture and ecological. Other reasons that have been found to influence avoidance of meat products include ethical (Dwyer, 1991), raising or killing animals (Kenyon & Barker, 1998), disgust, and the influence of friends (Santos & Booth, 1996). Some of these beliefs have been found to differ between meat avoiders and vegetarians. For example, Santos and Booth (1996) found partial meat avoiders (i.e. those people who avoided at least one type of flesh food including fish) were more likely to give a diverse range of reasons for avoiding meat than total vegetarians who mainly reported ethical reasons as their principal motive for avoiding flesh foods. Reasons for avoiding meat included ethical, disgust, health, and social influences.

To date, there appear to be no published studies that have compared the attitudes and beliefs of meat eaters, meat avoiders, vegetarians and vegans. The majority of studies that have examined such beliefs have tended to label meat avoiders and vegans as “vegetarians”, rather than distinguishing between them. Veganism has been much ignored in research and is presently viewed in a similar way to vegetarianism before its current vogue. If it is considered that vegetarianism challenges conventional culture, it could be suggested that veganism challenges the same conventions to a greater degree. This study therefore examines the attitudes and beliefs of meat eaters, meat avoiders, vegetarians and vegans as four distinct groups. The groups can be regarded as being on a continuum, from meat eating at one end, the least restrictive of the four diets, to veganism at the other, which requires many dietary restrictions if it is to be adhered to.

### Beliefs

As described above, previous studies that have examined beliefs towards meat eating and vegetarian diets (e.g. Richardson *et al.*, 1993; Santos & Booth,

1996; Kenyon & Barker, 1998) have found each diet to be associated with a wide range of different positive and negative beliefs. One of the principal aims of this study was to compare how the salient beliefs held about each of the diets, differ between people in different dietary groups. It was hypothesized that people would hold most positive beliefs towards their own diet, and most negative beliefs towards the diet most distant from their own. This study used an open-ended method to enable individuals to elicit their own beliefs towards the different diets. The beliefs were then self-evaluated using two separate unipolar scales. The method employed had been originally used by Bell, Esses and Maio (1996) and was then used to calculate a value of ambivalence.

### The Theory of Planned Behaviour

Until now, studies examining meat avoidance, vegetarianism and veganism within the domain of psychology are virtually non-existent. Some of the only attempts to examine attitudes towards vegetarianism or meat avoidance were by Conner and van Dyck (1993), and Santos and Booth (1996). In the study by Santos and Booth (1996), a number of reasons for avoiding meat were identified, including: ethics of raising or killing animals, concern for health, sensory factors, disgust, and the influence of friends (see earlier). The study by Conner and van Dyck (1993) on the other hand, compared vegetarian and non-vegetarian beliefs about eating a vegetarian diet using the theoretical framework of the Theory of Planned Behaviour (TPB; Ajzen, 1991). It was found that vegetarian participants had more positive attitudes, more positive beliefs, and stronger intentions to eat a vegetarian diet than did non-vegetarians.

This study not only attempts to identify different beliefs towards meat eating, vegetarian, and vegan diets, but also aims to use a theoretical framework (namely the TPB) to examine the extent to which attitudes towards each diet predict intentions to follow such a diet. This model was considered to be particularly appropriate since it has been applied to the understanding of a wide variety of behaviours, many of which have been food-related (for reviews, see Conner & Sparks, 1996; Godin & Kok, 1996). It is an expectancy-value model of the attitude-behaviour relationship, which grew out of the Theory of Reasoned Action (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). The TPB states that an individual's decision to choose one behaviour over another where the behaviour is volitional (i.e. under the individual's complete control) will predict whether or not he or she will carry out that behaviour.

Proximal determinants of behaviour can be seen to divide into: (i) intention to engage in the behaviour, which is the individual's conscious plan to perform the behaviour; and (ii) perceptions of control over the behaviour, which is the individual's belief in his or her ability to perform (or not perform) the behaviour. Intention is seen as determined by three factors. These are: *attitude* which is described as the overall evaluation of the behaviour; *subjective norm* described as beliefs about whether others think you should or should not perform the behaviour; and *perceived behavioural control* (PBC) described as perceptions of the extent to which the behaviour is considered to be controllable.

In this study, the extent to which self-defined meat eaters, meat avoiders, vegetarians and vegans intend to follow a meat, vegetarian or vegan diet was examined. It was hypothesized that each dietary group would show strongest intentions to follow their own respective diets<sup>1</sup> and that attitudes, subjective norm and perceived control would influence intentions to follow each diet. In addition, it was hypothesized that each group would have more positive attitudes, stronger social pressure (subjective norm), and greater perceived control over their own particular diet, and weakest attitudes, social pressure and perceived control to that diet most distant from their own (i.e. meat eating vs. vegan, and *vice versa*).

### Self identity

Self-identity has been defined as the "salient part of an actor's self which relates to a particular behaviour" and "reflects the extent to which an actor sees him- or herself as fulfilling the criteria for any societal role" (Conner & Armitage, 1998; p. 1444). Some theorists have commented on the compatibility between identity theory and the TPB, due to the fact both consider behaviour to be influenced by conscious and rational decisions (e.g. Charng *et al.*, 1988; Conner & Armitage, 1998). Others have suggested that it may improve the predictive power of the normative component since it places the individual in a wider social context (Armitage & Conner, 1999). This has led to some studies, which have included self-identity as an additional predictor variable in applications of the TPB to food-related behaviours (e.g. Sparks & Shepherd, 1992; Sparks *et al.*, 1995; Armitage & Conner, 1999). In each of these studies, self-identity was found to have an independent predictive effect on

intentions. Since meat eating or avoidance could be described as a behaviour where self-identity is important, and it has been shown that one of the principal reasons for choosing to follow a specific diet is "health" (e.g. Worsley & Skrzypiec, 1998), self-identity was measured in this study as the independent predictor variable of "identity as a healthy eater". It was hypothesized that in accordance with previous studies, self-identity would be an independent predictor of intentions to follow each diet.

### Attitudinal ambivalence

The concept of attitudinal ambivalence has recently initiated interest among attitude researchers (Olsen, 1999; Riketta, 2000; Sparks *et al.*, 1997, 2001) and has been described as "the intraindividual copresence of positive and negative evaluations towards the same object" (Riketta, 2000). It therefore suggests that people who are ambivalent may perceive both advantages *and* disadvantages towards an object simultaneously, or have both positive and negative attitudes together. This challenges one of the traditional methods used in psychological research of measuring attitude by means of a set of statements together with a bipolar scale from "*strongly agree*" at one end-point to "*strongly disagree*" at the other. Such scales do not enable the respondent to agree with both end-points at the same time, and people with "ambivalent" feelings may result in selecting the mid-point as a compromise between the two disparate attitude components (Olsen, 1999). This suggests that "when a person checks the midpoint of a scale, it is not clear whether that person is indicating neutrality, uncertainty, indifference or ambivalence" (Breckler, 1994, p. 350). For this reason, ambivalence tends to be calculated indirectly by measuring responses to two separate questions, which evaluate the positive and negative components of attitudes separately.

Although the empirical validity of ambivalence measures has been somewhat under-explored, one method of calculating attitudinal ambivalence, which is found to have reasonable discriminative validity (Riketta, 2000)<sup>2</sup> is that described by Thompson, Zanna and Griffin (1995), and is the method employed in this study. It involves taking the mean of the separate positive (P) and negative (N) evaluations of the attitude object (i.e. the attitude "intensity") and subtracting from them the absolute difference between these evaluations (i.e. the attitude "similarity"). That is, ambivalence is denoted by

<sup>1</sup>It was anticipated that meat avoiders would have stronger intentions to follow "vegetarian diets" rather than meat or vegan diets.

<sup>2</sup>The authors would like to thank an anonymous reviewer for drawing our attention to this review of the empirical validity of different ambivalence measures.

the equation:

$$(P + N)/2 - |P - N|$$

where P and N are measured on two separate unipolar scales. In this study, the unipolar scales were generated by the unipolar evaluations given to each of the different self-reported beliefs of respondents.

The present study included a comparison of levels of attitudinal ambivalence between meat eaters, meat avoiders, vegetarians and vegans with regards to their attitudes towards eating a meat diet, a vegetarian diet and a vegan diet. Since it has been suggested that attitudinal ambivalence is a measure of attitude strength (Thompson *et al.*, 1995), with previous research showing that ambivalence results in unstable attitudes (Eagly & Chaiken, 1993), it was hypothesized that participants would show most ambivalence towards the diets closest to their own. For example, a meat eater would show most ambivalence towards a vegetarian diet, and least ambivalence towards their own diet. In addition, it was anticipated that ambivalence would moderate the relationship between attitude and intentions to follow each specific diet, such that people who showed more ambivalence towards the diet they were following would show weaker correspondence between their attitudes and intentions, compared to those with less ambivalence. To date, this effect had only been previously reported in one empirical study (Sparks *et al.*, 2001).

In summary, this study examined the differences in behavioural intention, attitude, subjective norm, perceived behavioural control and beliefs towards meat, vegan and vegetarian diets by individuals following meat, meat avoidance, vegetarian and vegan diets. The study then went on to explore the extent to which intentions to follow each diet were influenced by the different predictor variables (namely, attitudes, subjective norm and perceived control) and the additional variable of self-identity. Finally, the extent to which attitudinal ambivalence moderated the attitude-intention relationship was tested.

## Method

### Sample

A total of 250 questionnaires was distributed to a convenience sample, of which a total of 111 individuals responded (44.4%; 67 male, 44 female). The mean age of the sample was 33.8 years ( $SD = 13.4$ , range from 21 to 93). Twenty-five participants classified themselves as *meat eaters*, 26 stated that they did not eat meat ("*meat avoiders*"), 34 stated that they did not eat meat or fish ("*vegetarians*"), and 26 classified themselves as

"*vegan*". The different dietary groups were of similar ages, with meat eaters the youngest group, (mean age 32.6 years,  $SD = 16.1$ ); then vegetarians, (mean age 33.7 years,  $SD = 15.6$ ); then vegans (mean age 34.0 years,  $SD = 8.73$ ); and finally meat avoiders (mean age 34.7 years,  $SD = 13.2$ ). The majority of meat eaters, meat avoiders and vegetarians were female (60.0, 69.2 and 70.6% respectively), and the majority of vegans were male (61.5%). About half of the sample (56.0%) was single: 64.0% of meat eaters, 54.2% of meat avoiders, 50.0% of vegetarians, and 57.7% of vegans. It is possible that this may be a reflection of the relatively young age of the sample. The majority of the sample was well educated, with 45.9% having qualifications up to and including a degree, and 35.8% having qualifications up to and including A-levels. Only two participants had no qualifications. Thirty-two percent of meat eaters were educated up to degree level, as were 54.2% of meat avoiders, 41.2% of vegetarians and 57.7% of vegans.

### Measures

The questionnaire consisted of a number of measures drawing on those used in previous studies that have examined the Theory of planned Behaviour (TPB; Ajzen, 1991) and attitudinal ambivalence (e.g. Bell *et al.*, 1996). The format for the TPB measures was based upon those used by Conner and Van Dyck (1993).

The following measures were taken:

- (i) *Self-reported demographic variables*. These included: gender, date of birth, marital status, educational qualifications and diet (namely, meat eater, meat avoider, vegetarian, or vegan).
- (ii) *Salient beliefs*. These were measured using an open-ended question, in which participants were asked to record their salient thoughts, beliefs and feelings towards each attitude object (i.e. meat, vegetarian, or vegan diet). Participants were then asked to rate each belief, on a scale from +3 to -3, where +3 is "extremely positive" and -3 is "extremely negative". The participants were asked to provide a maximum of eight thoughts, beliefs and feelings, and it was stressed that only those which immediately came to mind should be recorded. The positive and negative scores were separately summed for each person. The ratings given to each of the beliefs were then used to create a numerical index of ambivalence towards each type of diet (see below).
- (iii) *Behavioural intentions*. These were measured by recording participants' responses to a single statement regarding each diet, (e.g. "I intend to eat a vegetarian diet in the future"). Responses were measured on a 7-point scale that was

weighted on both ends (“strongly agree” to “strongly disagree”).

- (iv) *Attitudes*. Four items were used to assess participants’ attitudes towards meat eating diets, vegetarian diets and vegan diets respectively. Participants were asked how “bad” to “good”, “harmful” to “beneficial”, “unpleasant” to “pleasant”, “unenjoyable” to “enjoyable” each diet would be. Responses were made on 7-point scales, weighted at both ends, and scored  $-3$  to  $+3$  (positive scores indicating desirable characteristics). A measure of attitude was calculated from the mean score of the four items for each diet. Cronbach’s alpha values showed the attitude measures for each diet were reliable (meat eating,  $\alpha = 0.90$ ; vegetarian diet,  $\alpha = 0.80$ , vegan diet,  $\alpha = 0.89$ ).
- (v) *Perceived behavioural control*. Three items were used to assess PBC for each of the three diets. These were: “how much personal control do you feel you have over eating a vegetarian diet in the future?” (complete control–very little control); “to what extent do you see yourself as capable of following a vegetarian diet in the future?” (“very capable” to “not very capable”); and “how easy or difficult do you think it would be to follow a vegetarian diet in the future?” (“very easy” to “very difficult”). These items were scored on 7-point scales, which were weighted at both ends, and scored between  $-3$  and  $+3$  with higher scores indicating a greater perceived control. PBC scores were calculated from a mean of the three items for each diet (meat diet,  $\alpha = 0.66$ ; vegetarian diet,  $\alpha = 0.70$ ; vegan diet,  $\alpha = 0.81$ ).
- (vi) *Subjective norm*. Normative measures were taken for each diet. These consisted of a measure of normative pressure from specific others (e.g. “my friends think I should eat a vegetarian diet”), which was measured on a 7-point scale, weighted at both ends (“not at all” to “to a very great extent”) and scored between  $+1$  and  $+7$ . The specific others were family, friends, health experts, colleagues and partner. Motivation to comply with the specific others was also measured (e.g. “with regards to your diet, how much do you want to do what your friends think you should?”). This was scored on a 7-point scale (“not at all” to “very much”) which was weighted at both ends, and scored between  $+1$  and  $+7$ . A measure of subjective norm was calculated by multiplying each response for normative pressure from specific others with the respective motivation to comply component, and taking the mean value of the five products. Reliabilities for the subjective norm values were calculated for each diet (meat diet,

$\alpha = 0.85$ , vegetarian diet,  $\alpha = 0.75$ , vegan diet,  $\alpha = 0.71$ )<sup>3</sup>.

- (vii) *Self-identity*. Four items were included to measure the extent to which the participants identified themselves to be healthy eaters. These were: “I think of myself as a healthy eater” (“strongly agree” to “strongly disagree”), “I think of myself as someone who is concerned about the consequences of what I eat” (“strongly agree” to “strongly disagree”), “I think of myself as someone who is concerned with healthy eating” (“strongly agree” to “strongly disagree”), and “I think my diet is...” (“very healthy” to “very unhealthy”). These four items were scored  $-3$  to  $+3$ , the higher scores reflecting stronger self-identity with being a healthy eater. A “self-identity” score was calculated from the mean of the four items ( $\alpha = 0.72$ ).
- (viii) *Attitudinal ambivalence*. This was calculated using the sums of scores obtained from the beliefs. The following equation was used to calculate a score of attitudinal ambivalence for each participant:

$$(P + N)/2 - |P - N|$$

where P is the total score of the *positive* evaluations, and N is the total score of the *negative* evaluations (maximum score of ambivalence =  $+12$ ; minimum score =  $-12$ ).

### Procedure and analysis

A “snowball sampling” procedure was used to distribute questionnaires. Questionnaires were distributed to willing individuals and relevant organisations such as the local Vegetarian Society, Vegan Society, and local wholefood shops. Non-random distribution was essential, since approximately equal groups of vegetarians, vegans, meat eaters and meat avoiders were required, in order to facilitate statistical comparisons.

It was communicated to all subjects that their answers would be completely confidential and the questionnaire totally anonymous. All returned questionnaires were coded and stored on the computer, and analysed using SPSS for Windows (Norusis, 1993). The open-ended questions were analysed using a form of content analysis (Weber, 1990). This involved categorising specific

<sup>3</sup>Several studies have noted the poor predictive power of the direct measure of subjective norm within the TPB (e.g. Conner & Armitage, 1998). Indeed, Armitage and Conner (2001) use a meta-analysis to demonstrate that across studies, a composite measure of subjective norm was more predictive than a direct measure. For this reason, in this study a composite measure of subjective norm was employed. Use of a simple measure of the mean of normative beliefs did not substantively alter the findings.

responses with similar meanings into broader “themes”. Independent coding revealed a high level of agreement on classification of beliefs (>90%). A 2-way MANOVA of mixed design was used to examine whether there were any differences between values of intentions, attitudes, subjective norm, perceived behavioural control, attitudinal ambivalence, and self-identity *within* groups (i.e. for the different types of diet rated), and *between* groups (i.e. for the different types of diet followed). Univariate effects were then explored by performing separate ANOVAs for each variable. Finally, multiple regression analyses were carried out for each diet to examine the extent to which theory of planned behaviour variables predicted intentions to follow the specific diet. Attitudinal ambivalence and self-identity were included in the regression equation as independent predictor variables. In addition, the moderating effects of ambivalence and dietary group were explored.

## Results

### Salient beliefs towards the different diets

Beliefs towards eating a *meat diet* showed that meat eaters were the *only* respondents to report any positive beliefs about this type of diet (See Table 1).

For each of the other dietary groups, the most salient beliefs exhibited are shown to be negative towards eating meat, with all of the groups suggesting that such a diet is “unhealthy”, or “cruel and barbaric”. This is not particularly surprising, since one of the principal reasons for changing to non-meat diets is likely to be due to negative beliefs concerning meat. The salient beliefs of meat eaters about eating a meat diet on the other hand, are seen to be both positive and negative, suggesting that even though they do eat meat, they also feel some ambivalence towards eating it.

The most salient beliefs reported towards eating a *vegetarian diet*, showed that all four groups described it as being healthy, although meat eaters held the most negative beliefs towards vegetarian diets (see Table 2).

It can be seen from Table 2 that although meat eaters displayed mainly negative beliefs towards vegetarian diets, vegetarians viewed their own diets completely positively, and vegans described a vegetarian diet in terms of both positive and negative beliefs, therefore showing the most ambivalence. All of the different dietary groups held the belief that a vegetarian diet is “healthy”, with it being the most salient belief for meat eaters, meat avoiders and vegetarians. The most salient belief reported by vegans on the other hand was that a vegetarian diet is

**Table 1.** Table showing most salient beliefs towards eating a *meat diet* for the four dietary groups

Meat eaters	<i>N</i>	Meat avoiders	<i>N</i>	Vegetarians	<i>N</i>	Vegans	<i>N</i>
Taste	13	Cruel & barbaric	9	Unhealthy	17	Cruel and Barbaric	15
Fattening	12	Fattening	8	Cruel & barbaric	13	Unhealthy	11
Nutritional or balanced	9	Unhealthy	7	Health scares	7	Horrible	9
Wide or varied choice	8	Environmental problems	6	Inhumane	6	Environmental problems	6
Health scares	8	Expensive	5	Murderous	5		

**Table 2.** Table showing most salient beliefs towards eating a *vegetarian diet* for the four dietary groups

Meat eaters	<i>N</i>	Meat avoiders	<i>N</i>	Vegetarians	<i>N</i>	Vegans	<i>N</i>
Healthy	12	Healthy	21	Healthy	25	Hypocritical	18
Expensive	10	Humane	7	Humane	11	Humane	14
Nutritionally unbalanced	9	Nutritionl and balanced	7	Ethical	10	Healthy	12
Boring or bland	8	Unfattening	5	Tasty	10	Imaginative	4
Low in fat	6	Restrictive	4	Cheap	8	Environmentally friendly	4

**Table 3.** Table showing most salient beliefs towards eating a *vegan diet* for the four dietary groups

Meat eaters	<i>N</i>	Meat avoiders	<i>N</i>	Vegetarians	<i>N</i>	Vegans	<i>N</i>
Nutritionally unbalanced	12	Restrictive	12	Restrictive	14	Humane	19
Extreme	8	Difficult to maintain	8	Humane	11	Healthy	16
Restrictive	8	Nutritionally unbalanced	8	Healthy	9	Environmentally friendly	12
Unnatural	8	No variety	6	Ethical	7	Restrictive	4
Boring or bland	7	Ethical	6				

*N* = Number of people who mentioned each theme. Total possible *N*s for each group are as follows: meat eaters (*N* = 25), meat avoiders (*N* = 26), vegetarians (*N* = 34), vegan (*N* = 26).

“hypocritical”. This seems to be the main belief that differentiates the vegan attitude towards eating a vegetarian diet, from the attitude of the vegetarian

Finally as expected, the beliefs towards eating a *vegan diet* became gradually more positive as the participants’ diets became more restrictive. All four groups agreed that vegan diets are “restrictive” (see Table 3).

It can be seen from Table 3 that meat eaters showed the most negative beliefs towards a vegan diet, followed by meat avoiders, then vegetarians who showed both positive and negative thoughts about it (therefore showing the most ambivalence), and finally vegans, who were most positive about their diet. That is, it suggests that the closer the profile of the participant’s diet to veganism (i.e. how similar the foods eaten and foods rejected are), the more positive the beliefs towards a vegan diet. This could be explained by a continuum of increasing understanding as the individual’s diet becomes more restrictive.

### Differences towards diets across dietary groups

A 2-way mixed MANOVA (type of diet rated  $\times$  own dietary group) revealed a highly significant multivariate effect for type of diet rated [ $F(2,460) = 124.0$ ,  $p < 0.0001$ ], own dietary group [ $F(3,459) = 133.0$ ,  $p < 0.0001$ ], and two-way interaction [ $F(6,457) = 113.0$ ,  $p < 0.0001$ ]. The univariate effects were therefore explored (see Table 4).

It can be seen from the univariate  $F$ s reported in Table 4 that levels of perceived behavioural control and attitudinal ambivalence are significantly different across own dietary groups, although there were no significant differences for intention, attitude, subjective norm, or self-identity. There were significant differences for all the dependent variables depending upon the type of diet people were rating, independent of which diet they were currently following, and more interestingly, a significant interaction effect for all of the dependent variables.

**Table 4.** Results of univariate ANOVA analysis of own dietary groups (namely meat eater, meat avoider, vegetarian, vegan) by type of diet rated (namely meat, vegetarian and vegan diet)

	Dietary group $F(3, 104) =$	Type of diet $F(2, 104) =$	Dietary group $\times$ Type of diet $F(6, 104) =$
Intention	2.45	63.0***	54.3***
Attitude	0.88	93.6***	36.8***
Subjective norm	0.77	43.3***	21.6***
Perc. behavioural control	8.43***	79.9***	37.4***
Attitudinal ambivalence	6.70***	7.34***	13.4***
Self-identity <sup>a</sup>	1.46	—	—

$N = 111$ .

<sup>a</sup>Self-identity was measured towards eating a healthy diet only, and not towards specific types of diet. Therefore there are no values for “type of diet or for the interaction”.

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

**Table 5.** Means and standard deviations of scores for all of the dependent variables for each dietary behaviour split by dietary group of the respondent. *SD* scores are shown in brackets

Type of diet	Dietary group of respondent											
	Meat eaters ( $N = 25$ )			Meat avoiders ( $N = 26$ )			Vegetarians ( $N = 34$ )			Vegans ( $N = 26$ )		
	<i>Meat</i>	<i>Veg.<sup>a</sup></i>	<i>Vegan</i>	<i>Meat</i>	<i>Veg.<sup>a</sup></i>	<i>Vegan</i>	<i>Meat</i>	<i>Veg.<sup>a</sup></i>	<i>Vegan</i>	<i>Meat</i>	<i>Veg.<sup>a</sup></i>	<i>Vegan</i>
Intention	1.60 (1.92)	-0.18 (2.20)	-2.82 (0.50)	-1.67 (1.46)	1.80 (1.32)	-1.25 (1.94)	-2.75 (1.08)	2.91 (0.38)	-0.30 (1.67)	-3.00 (0.00)	-0.16 (2.67)	2.81 (0.49)
Attitude	1.60 (1.04)	1.11 (1.54)	-1.17 (1.27)	-0.76 (1.76)	2.27 (0.94)	0.05 (1.42)	-1.50 (1.28)	2.29 (1.04)	0.68 (1.16)	-2.16 (1.28)	1.82 (1.40)	2.50 (0.78)
Subjective norm	18.70 (8.67)	12.90 (6.78)	5.97 (4.37)	11.30 (6.30)	14.70 (6.92)	5.90 (4.57)	7.66 (3.93)	16.30 (9.75)	7.82 (6.09)	7.02 (5.39)	13.20 (7.13)	12.50 (7.38)
Perceived behavioural control	4.95 (1.52)	3.95 (1.54)	0.95 (0.95)	2.67 (1.66)	5.03 (0.72)	2.81 (1.46)	1.64 (1.66)	5.50 (0.50)	2.87 (1.41)	2.37 (1.64)	5.06 (1.29)	5.19 (0.77)
Attitudinal ambivalence	2.00 (3.46)	1.28 (3.95)	-2.38 (3.49)	-2.38 (4.20)	-1.90 (3.44)	-0.25 (2.52)	-3.25 (4.47)	-1.63 (3.82)	0.74 (2.65)	-5.27 (3.99)	-0.23 (2.60)	-3.06 (3.64)

*SD* scores we shown in brackets.

<sup>a</sup>Veg. = vegetarian.

The significant interaction effects were examined in more detail by examining the mean scores for the key dependent variables for each diet (i.e. meat eating, vegetarian, vegan) as split by the dietary group the respondent belonged to (see Table 5).

Examination of the means showed that in support of the hypothesis, participants had positive *intentions* to follow their own diets, and negative intentions to follow other diets, which is fairly unsurprising, since it could be assumed that the individual would only intend to eat the diet he or she has chosen to follow. In addition, intentions became less positive as the diet became less similar to their own, in support of the hypothesis. Participants were also found to have most positive *attitudes* towards their own diet, and most negative attitudes towards the diet most different to their own (i.e. vegan vs. meat, or *vice versa*). If these diets are thought of in terms of a continuum of restrictiveness, with meat at one end, and veganism at the other, attitudes and intentions could be described as becoming less positive as the participant moves from their own position on the continuum towards the other(s). It is interesting, that meat eaters and vegans both have positive attitudes towards vegetarianism. It could be suggested that this is because vegetarianism represents a compromise between the two diets, drawing on aspects from both, e.g. vegetarian food is widely available now and considered to be healthy (as is a balanced meat diet), but could also be considered as ethically and morally correct (as is a vegan diet). Vegetarians and meat avoiders had less favourable attitudes towards meat diets than vegan diets. This is possibly due to the fact that this was the diet they had originally changed from (100% of vegetarians and meat avoiders had changed from a meat diet) because they were not satisfied with it in some way. Also, meat eaters were found to report less positive attitudes towards their own diet compared to any of the other groups. This may be a reflection of the fact that meat eaters are less likely to have made an informed decision to follow their diet, than are people in other groups, who have chosen to restrict their diet in some way.

The hypothesis was also generally supported in that people were found to report the highest levels of *social pressure* and *perceived behavioural control* associated with their own diet (apart from vegans, who reported having higher social pressure to follow a *vegetarian* diet), and lowest levels in the diet most distant from their own. It is possible that vegans reported having a stronger social pressure to follow a vegetarian diet rather than their own, due to the sheer difficulty of following such a restrictive diet in a social context. For example, going to people's houses for meals, or eating out at a restaurant becomes an awkward prospect

when meat, fish, milk products or eggs are off the menu.

Partial support was found for the hypothesis regarding levels of *ambivalence*<sup>4</sup> being higher for those diets that are closest to those of the participant. For example, vegetarians and meat avoiders were found to show lower levels of ambivalence towards their own diet (they had a mainly positive attitude) and a meat diet (they had a mainly negative attitude), but showed the highest level of ambivalence towards a vegan diet. It is possible that this level of ambivalence towards a vegan diet may be due to the fact that veganism is in some ways viewed as similar to vegetarianism (i.e. they both have similar ethical and moral standpoints and are more restrictive than a meat diet), and in other ways not (i.e. the exclusion of dairy products from a vegan diet), leading the vegetarian or meat-avoider to feel ambivalent about following such a diet. Vegans were also seen to show little ambivalence towards their own diet (they had a mainly positive attitude), and a meat diet (they had a mainly negative attitude), but a higher level of ambivalence towards a vegetarian diet. This increase in ambivalence possibly stems from viewing vegetarianism as a "step in the right direction", that is, humane and healthy, but overwhelmingly hypocritical.

Finally, contrary to the hypothesis, meat eaters were seen to show more ambivalence towards their own diet than the other diets. This is an unexpected finding, which is reflected by the distribution of positive and negative beliefs, and suggests that this group may see more positive and negative aspects associated with their own diets, than with the other two. This is possibly a reflection of the contradiction between the traditional view of the balanced meat diet, and the more recent concerns about the extent to which meat is healthy (e.g. salmonella, bovine spongiform encephalopathy).

### Regression analyses

Multiple regression analyses were then carried out for each diet. In the first block, the TPB variables were entered together (namely, attitude, subjective norm, perceived behavioural control), at step two, self-identity as a healthy eater was entered, at step three, attitudinal ambivalence and dietary group were entered, and at a final step interactions between

<sup>4</sup>It should be noted that negative scores for attitudinal ambivalence do not imply that a person has "negative ambivalence", but rather are a product of the equation used to calculate this variable, and indicate that such a person has "lower ambivalence" than a person with a positive score does.



**Table 6.** Results from multiple regression analyses for intentions to eat meat, vegetarian and vegan diets

Predictor variables	Type of diet		
	Meat ( $\beta$ )	Vegetarian ( $\beta$ )	Vegan ( $\beta$ )
Attitude (ATT)	0.426***	0.295**	0.424***
Subjective norm (SN)	0.185*	0.116	0.148***
Perc. beh. control (PBC)	0.324***	0.422***	0.473***
Self-identity (SI)	-0.015	-0.067	-0.054
Attitudinal ambivalence	-0.146*	-0.131	-0.013
Dietary group (DG)	0.416***	-0.158	0.221**
Ambivalence $\times$ ATT	-0.757***	-0.327*	-0.264*
Ambivalence $\times$ SN	0.124	0.110	0.052
Ambivalence $\times$ PBC	-0.069	0.429	-0.292
Ambivalence $\times$ SI	-0.063	-0.036	-0.047
Ambivalence $\times$ DG	0.321	-0.267	0.040
Dietary group $\times$ ATT	-0.140	-0.170	0.216
Dietary group $\times$ SN	0.054	-0.840	-0.128
Dietary group $\times$ PBC	-0.363	0.487	0.337
Dietary group $\times$ SI	0.210	-0.587*	0.004

All beta values in the table are those at entry.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

ambivalence or dietary group and the other variables were entered to test for moderator effects. This latter analysis enabled us to examine whether the influence of each variable on intentions varied as a function of ambivalence and dietary group. Table 6 presents the results of the regression analyses for each diet. The table reports betas at entry for simplicity although the analyses were carried out by entering the variables in blocks.

For intentions to eat a *meat* diet, the variables explained 83.8% of the variance in intentions [ $F(15, 85) = 29.4$ ,  $p < 0.0001$ ]. Stronger intentions were associated with more positive attitudes towards eating a meat diet, perceiving more social pressure to eat a meat diet, perceiving more control over eating such a diet, having less ambivalence towards eating a meat diet, being a meat-eater, and one interaction (ambivalence  $\times$  attitude). Self-identity as a healthy eater was not found to predict intentions to eat a meat diet, either on its own, or as an interaction, and neither were any of the other interactions with ambivalence or dietary group. Simple slope analyses (Aiken & West, 1991) revealed that the ambivalence  $\times$  attitude interaction was attributable to attitudes being weaker predictors of intentions at higher levels of ambivalence.

For intentions to eat a *vegetarian* diet, the variables explained 52.2% of the variance in intentions [ $F(15, 83) = 6.03$ ,  $p < 0.0001$ ]. Stronger intentions were associated with more positive attitudes towards eating a vegetarian diet, perceiving more control over eating such a diet, and two interactions (ambivalence  $\times$  attitude, dietary group  $\times$  self-identity). Subjective norm, self-identity as a healthy eater, ambivalence and dietary

group were not found to be significant predictors of intentions. No other interactions were found to be significant apart from those reported. Simple slope analyses (Aiken & West, 1991) revealed the nature of these interactions. The ambivalence  $\times$  attitude interaction was attributable to attitudes being weaker predictors of intentions at higher levels of ambivalence. The dietary group  $\times$  self-identity as a healthy eater interaction was attributable to self-identity being a more powerful predictor of intentions to eat a vegetarian diet in the meat-eating group.

Finally, for intentions to eat a *vegan* diet, the variables explained 83.2% of the variance in intentions [ $F(15, 83) = 26.5$ ,  $p < 0.0001$ ]. Stronger intentions were associated with more positive attitudes towards eating a vegan diet, perceiving more social pressure to eat a vegan diet, perceiving more control over eating such a diet, being a vegan, and one interaction (ambivalence  $\times$  attitude). Neither self-identity as a healthy eater nor attitudinal ambivalence were found to be independent predictors of intentions. Once again, simple slope analyses (Aiken & West, 1991) showed that the ambivalence  $\times$  attitude interaction was attributable to attitudes being weaker predictors of intentions at higher levels of ambivalence.

## Discussion

### Salient beliefs towards the different diets

A whole range of beliefs were elicited regarding the different diets, many of which concurred with those

from previous studies (e.g. Beardsworth & Keil, 1991; Dwyer, 1991; Richardson *et al.*, 1993; Santos & Booth, 1996; Kenyon & Barker, 1998). In addition, the results from the beliefs supported the hypothesis that participants would show the most positive beliefs towards their own diets. The hypothesis that people would hold most negative beliefs towards the diet most distant from their own was only upheld for the vegan diet, since for the meat eating diet, the beliefs shown by all of the other dietary groups were entirely negative.

It was interesting that some meat eaters considered a vegetarian diet to be healthy, since previous research (e.g. Freeland-Graves *et al.*, 1986) has found that non-vegetarians thought a vegetarian diet to be less healthy than their own. This view is perhaps reflected in the nine respondents who suggested that a vegetarian diet is “*nutritionally unbalanced*”. On the other hand, perhaps the results from the present study reflect a trend where public knowledge about vegetarianism is growing, leading to its increasing acceptance.

### The Theory of Planned Behaviour

In general, the results from the significant interactions found in the MANOVA analysis, supported the hypotheses in that participants showed most positive intentions, attitudes, social pressure and greater perceived control towards their own diet, and were least positive about the diet most distant from their own. In addition, people were generally found to show more ambivalence towards the diet closest to (but not the same as) their own.

Results from the regression analyses were found to give partial support to the hypothesis that all three TPB predictor variables (namely, attitudes, subjective norm, and perceived behavioural control) would successfully predict intentions. This was true in all cases, apart from intentions to eat a vegetarian diet, where subjective norm was found to be non-significant. A possible explanation for this finding could be that pressure from significant others is less important for vegetarians, than for vegans or meat eaters. Indeed, it could be argued that vegans may find it very difficult to sustain such a restrictive diet if they did not have a certain amount of social support from people around them. Perceived behavioural control was the strongest predictor of intention for vegetarian and vegan diets. Although this result is in contrast with Conner and van Dyck’s (1993) findings that attitudes are better predictors of intention to eat a vegetarian diet than PBC, it may be explained by the nature of the behaviours. That is, in order to eat a vegetarian or vegan diet, it is necessary for a person to have some control over what he or she eats, independent

of whether he or she has a positive or negative attitude towards the diet. Finally, the attitude  $\times$  ambivalence interaction was the strongest predictor variable for intentions to eat meat.

In each case, subjective norm was found to be the weakest predictor of intentions. One possible reason for this is that social pressure is simply not as important as attitudes and perceptions of control when deciding on whether to eat or avoid meat. However, it is also possible that it is a consequence of the poor predictive power of the construct, since previous reviews of the TPB have similarly found the subjective norm component to be poor at predicting intentions over and above attitudes and perceived behavioural control (e.g. Godin & Kok, 1996). It would be worthwhile applying the approach of Terry and Hogg (1996) who argue for a “reconceptualization of the role of social influence along the lines suggested by social identity and self-categorization theories” (p. 791). They suggest that the influence of normative pressure from specific referent groups on intentions is only evident for people who strongly identify with the specific group, and recommend that a measure of group identification is also taken, in addition to the standard measures of subjective norm.

### Self-identity

Contradictory to results from previous research (e.g. Sparks & Shepherd, 1992; Sparks *et al.*, 1995; Armitage & Conner, 1999), self-identity was not found to be an independent predictor of intentions for any of the diets. Although this may simply reflect the weak influence of the normative component for these specific behaviours, it is also possible that self-identity may have been a stronger predictor of intentions if it was measured in terms of the diet followed, (e.g. self-identity as a vegetarian, or a meat avoider) rather than self-identity as a “healthy eater”. Indeed the potential problem of “incompatibility” between the components of the TPB has been recognized by other authors as an important factor influencing the strength of the model (e.g. Ajzen, 1988; Eagly & Chaiken, 1993) and it would be interesting for further research to examine the role of self-identity by using a more compatible measure.

Somewhat unexpectedly, self-identity was found to significantly predict intentions to eat a vegetarian diet, when the interaction between self-identity and dietary group was put into the equation. When probed, the interaction was found to be attributable to self-identity being a more powerful predictor of intentions to eat a vegetarian diet in the *meat-eating* group. This is an interesting finding that may reflect the conceptualisation of vegetarian diets as being “healthy”, and suggests

that meat eaters who have stronger identities as healthy eaters are more likely to consider changing to a vegetarian diet than those who do not. This falls in line with the reasons for changing to vegetarian diets as identified by previous research (Beardsworth & Keil, 1991; Santos & Booth, 1996).

### Attitudinal Ambivalence as a Moderator

Finally, the hypothesis that ambivalence would moderate the impact of attitudes on intentions was supported. When the nature of the interactions were probed, in each case, attitudes were found to be stronger predictors of intentions at lower levels of ambivalence. That is, ambivalence was found to moderate the attitude-intentions relationship, in such a way, that higher levels of ambivalence weakened the relationship. This finding is consistent with others (e.g. Sparks *et al.*, 2001), and gives weight to the argument advocating exploration of the role of ambivalence within attitude research. It would also be interesting for further research to examine the impact of age, or length of times for which respondents had avoided eating flesh foods on attitudinal ambivalence. Indeed it could be proposed that those respondents who have been avoiding flesh foods for less time would be more likely to exhibit ambivalent attitudes, than those who have been following their diet for longer. On a more practical note, the findings from this study suggest that ambivalent attitudes are more likely to be potentially changeable than attitudes showing no ambivalence, having implications for those interested in promoting behaviour change. For example, it is possible that specific interventions could be designed which are matched to a person's level of ambivalence. People feeling ambivalent towards, say eating a healthy diet, would be given an intervention to increase their positive beliefs and decrease their negative beliefs towards eating a healthy diet, in addition to forming plans to help them actually implement the behaviour (Gollwitzer, 1990, 1999). On the other hand, people who show little ambivalence towards eating a healthy diet (i.e. hold mainly negative beliefs towards it), would receive an intervention to increase their level of ambivalence—that is, by increasing their positive beliefs. The design of such interventions could be useful for the promotion of change in population food consumption, with potential effects on public health.

### Limitations

Before concluding, it is important to draw attention to some of the potential limitations associated with the

study. First, the sample was a convenience sample with a fairly low response rate (44.4%), resulting in low numbers in each dietary group. Since the task of generating individual beliefs is a demanding one, it is possible that only individuals with particularly strong views chose to participate in this study. In further studies, it would be important to employ larger samples and to encourage higher response rates (e.g. by offering a financial incentive, or sending reminder letters), to try and reduce some of these possible biases. Second, it could be argued that the method of using questionnaires to collect information may be prone to biases, including ambiguity and social desirability bias (Crowne & Marlowe, 1960; Herbet *et al.*, 1995). Although these issues were borne in mind when designing and administering the questionnaires, it is almost impossible to eradicate them entirely and it is important to be aware of such limitations when interpreting the results.

### Conclusions

In summary, respondents tended to have most positive beliefs and attitudes towards their own diet, and most negative attitudes towards the diet most different from their own. The TPB components were found to predict intentions to eat meat, vegetarian and vegan diets, and in each case, increasing levels of ambivalence were found to reduce the size of the attitude–intention relationship. These results not only highlight the extent to which such alternative diets are an interesting focus for psychological research, but also lend further support to the argument that ambivalence is an important influence on attitude strength. From the results, it could be recommended that future research involving attitudes towards food choice should incorporate attitudinal ambivalence as a separate dimension. On a more practical level, there are important implications for the role of ambivalence in the process of health-related dietary change.

### Acknowledgements

The authors would like to thank the three anonymous reviewers for their helpful comments on earlier versions of this paper.

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