The effects of gender, age and stress on motives underlying food choice

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ABSTRACT

Investigating motivations underlying food choice is considered an important area of research to help understand why people choose certain foods. The aim of the present study was to investigate the effects of gender, age and stress on motivations underlying food choice. A convenience sample of participants (*N* = 100), aged 18 to 71, from Jersey, the University of Worcester and Cornwall took part in the present study. A between-groups, self-report questionnaire design was employed. The measures used were the Food Choice Questionnaire, which assesses nine factors relevant to peoples' food choice, and the Perceived Stress Scale, which measures the degree to which situations in a person's life, over the past month, were considered stressful. Findings were analysed using one-way between-groups multivariate analysis of variance, one-way between-groups analysis of variance and standard multiple regression. Results found statistically significant differences between men and women, and different age groups, but no differences were found between level of perceived stress and food choice motivations. Further analysis found gender, age and stress to be clear predictors for some of the food choice motivation factors. It was concluded that although some significant results were found, they did not provide any new or additional information to this area of research. Future research suggestions include whether or not self-efficacy can have an impact on food choice motivations and whether or not actual food choice is consistent with food choice motivations.

KEY WORDS:	FOOD CHOICE MOTIVATION	ATTITUDE	BEHAVIOUR	FOOD CHOICE QUESTIONNAIRE	PERCEIVED STRESS SCALE

Introduction

It can be reasonably argued that eating behaviours have changed dramatically over time (Ogden, 2007). The World Health Organisation (WHO; 2003) have found these changes are no longer restricted to industrialised nations, but can also be seen in developing countries, where natural diets have been replaced by diets high in fat and energy. This problem has now been recognised at a global level and is leading to an epidemic in chronic diseases which are largely preventable (WHO, 2003). So, if motivations underlying food choice are understood, strategies can be implemented to alter these choices and to encourage healthier diets (Shepherd, 1999). This literature review begins by providing an insight into important considerations for understanding food choice, with particular reference to the cognitive perspective in this area. The next section critically reviews the social cognition model, the theory of planned behaviour. The major section reviews individual and collective approaches to diet with critical evaluation of the literature and studies surrounding this area. The following section considers the influence gender, age and stress can have on eating behaviours. Lastly, consideration is given to the purpose and aim of the present study and the hypotheses to be tested.

Background of Study

Research on food choice has been developed in an attempt to understand reasons why people choose, and eat, certain foods (Conner & Armitage, 2008; Ogden, 2010). Birch (1999) explains, nearly all research in this area has been conducted among affluent white, middle class US and Western European populations due to the causal link between food choice and the current prevalence of overweight and obese people in these countries. However, Birch (1999) states research in this area would be more reliable if conducted across a variety of differing food environments.

Ogden (2010) acknowledges three perspectives for understanding food choice, developmental, cognitive and physiological. The developmental approach focuses on development of food preferences in childhood, with particular reference to social learning where the behaviour of others, or the influences of the media, can affect food choice (Nestle et al., 1998). Associative learning is also important within this approach and it refers to food being used as a reward, or paired with a reward (Birch, Zimmerman & Hind, 1980). The cognitive approach focuses on an individual's cognitions (Ogden, 2010) and is explained in more detail below. The physiological approach focuses on hunger and satiety which can be influenced by the appearance, smell or taste of a food (Ogden, 2010). Other researchers have also emphasised the importance of food availability (Birch, 1999; Rozin, 2006) and culture (Lau, Krondl & Coleman, 1984; Axelson, 1986) when understanding food choice.

It has been argued that although physiology plays an important role in food choice (Conner & Armitage, 2008) any effects are likely to be mediated by social influences (Rogers & Blundell, 1990; Birch, 1999). The cognitive perspective of food choice

regards social cognition and motivations as important and focuses on the extent to which cognitions predict and explain behaviour (Ogden, 2010). This approach draws upon social cognition models such as the Theory of Planned Behaviour (TPB; Ajzen, 1985). Social psychological variables including attitudes and behaviours are particularly important within social cognition models (Conner & Armitage, 2008) as they can be shaped by the beliefs and feelings about the effects of consuming particular foods (Rozin & Fallon, 1987; Ogden, 2010). For example, the belief that some foods are likely to make us more overweight than others or that some foods are unhealthier than others will influence food choice (Conner & Armitage, 2008). According to Shepherd (1999) studying the relationship between choice and the beliefs and attitudes held by an individual offers one possible route towards a better understanding of the influence of different factors on food choice.

The TPB (see figure 1) aims to explain behaviour that is both directly and indirectly under the control of the individual (Shepherd, 1999). Shepherd (1999) argues that the intention to perform behaviour is the best predictor of behaviour. Intention can be predicted by the individual's own attitude (is the behaviour good, beneficial etc.) and perceived social pressure (known as the subjective norm), (Shepherd, 1999). Attitude has been found a more successful predictor of behaviour than subjective norm, which has invariably failed to predict eating behaviour (Ogden, 2010). Studies have found attitude to be the best predictor of fat intake (Shepherd & Stockley, 1985), table salt use (Shepherd & Farleigh, 1986) and healthy eating (Povey, Conner, Sparks, James & Shepherd, 2000). However, empirical evidence supporting the link between attitude and behaviour has not always been clear (Shepherd, 1999). Axelson, Federline and Brinberg (1985) conducted a meta-analysis of studies linking attitudes to behaviour and found there was only a small (albeit statistically significant; $p < 0.001$) strength between attitudes and behaviour, leading to the conclusion that attitudes may not be a meaningful predictor of behaviour. Another component of the TPB is perceived behavioural control (Shepherd, 1999). This has been found an important aspect of predicting behaviour, particularly in relation to weight loss (Schifter & Ajzen, 1985) and healthy eating (Povey et al., 2000).

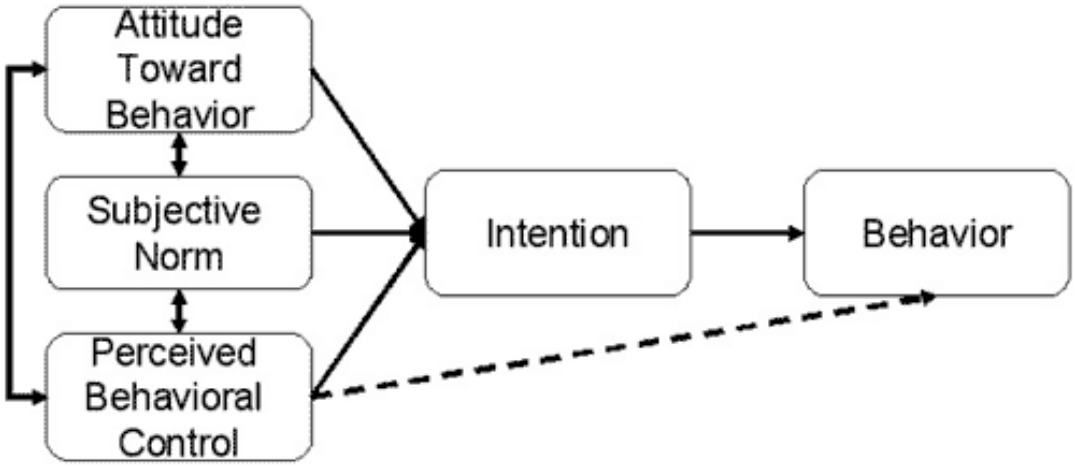

Figure 1: Ajzen's Theory of Planned Behaviour (Ajzen, 1991)

There are some shortcomings of the TPB which may alter the ability of this model to explain behaviour (Shepherd, 1999). The TPB does not take into account moral concerns including ethical considerations about the manufacture and country of origin of food (Ogden, 2010), or the choice of whether or not to consume genetically-modified foods (Shepherd, 1999). Sparks, Shepherd and Frewer (1995) researched this limitation and found moral and ethical considerations add to the prediction of intention from attitude, social norm and perceived behavioural control, but only to a moderate extent. The recognition of this shortcoming led to suggestions of modifications and extensions to improve the TPB (Shepherd, 1999). However, some research suggests there could be a gap between intentions and actual behaviour which implies intentions may not be the best predictors of behaviour and questions the ability of the TPB to predict behaviour (Ogden, 2010). This is known as the intention-behaviour gap (Gollwitzer, 1993; Sutton, 1998), and would suggest that whilst research into food choice motivations may be interesting, factors perceived as relevant to food choice may not be a true representation of actual dietary behaviour (Steptoe, Pollard & Wardle, 1995).

According to Shepherd (1999) relatively little is known about effective ways of influencing dietary choices. Recommendations can be made to reduce fat and increase fruit and vegetable consumption in the diet (Shepherd, 1999) or to reduce salt and increase complex carbohydrate and fibre consumption (Steptoe et al., 1995), but according to the Department of Health (1994) this produces relatively little change. In order to overcome obstacles and make effective modifications to dietary patterns it must be understood what determines an individual's choice of foods (Steptoe et al., 1995; Shepherd, 1999).

Differences in diet and dietary related behaviours can be either individual (psychological) or collective (social and cultural), (Crossley & Khan, 2001; Crossley & Nazir, 2002). Cultural forces include food production, manufacture and marketing (Fine & Leopold, 1993), whilst individual forces relate to various psychological and motivating factors such as taste, sensory appeal, habit, weight control, ethical concern, price, convenience and stress, all of which have been shown to influence food selection (Steptoe et al., 1995; Crossley & Khan, 2001; Crossley & Nazir, 2002).

A Food Choice Questionnaire was developed by Steptoe et al. (1995) to assess the relative importance of various motivating factors at the individual level, nine key factors emerged. Health was considered a major factor taken into account when people choose food (Steptoe et al., 1995) and was found important both for health reasons and for concern over personal physical appearance (Hayes & Ross, 1987; Cockerham, Kunz & Lueschen, 1988). Mood was also considered an important factor (Steptoe et al., 1995) because stress and negative emotions were found to influence food selection (McCann, Warnick & Knopp, 1990). Parraga (1990) found likes, dislikes, habit and senses were all relevant to food choice and so familiarity and sensory appeal were considered important factors (Steptoe et al., 1995). Growth in environmental awareness has led natural ingredients and packaging to have an impact on food choice,

therefore, natural content and ethical concern were considered important factors (Steptoe et al., 1995). Weight control was considered a major determinant of food choice for those concerned about body weight, with price and convenience also considered important in food selection (Steptoe et al., 1995).

In contrast to Steptoe et al.'s (1995) view that health is a major factor of importance, Conner and Armitage (2008) argue, the main determinant of consumption is the flavour or taste of the food, therefore sensory appeal could be considered the most important factor. Shepherd (1999) agrees, arguing beliefs about the healthiness of food are much less important than factors such as sensory appeal, whilst price and convenience have minimal effects on food choice. However, in addition it could be argued that wider societal influences such as social class (Steptoe & Wardle, 1999), income (Steptoe et al., 1995), religion (Crossley & Nazir, 2002) or the media (Conner & Armitage, 2008) may have a large impact on food choice, which suggests food choice can be driven by factors beyond the control of the individual (Drewnowski & Darmon, 2005; Conner & Armitage, 2008; Ogden, 2010). If social class and income are used as an example, some people may have no choice but to disregard choosing food for health reasons (Drewnowski & Darmon, 2005). Drewnowski and Darmon (2005) have observed sensory appeal, convenience and price are more practical food choice considerations for people limited to social and economic resources.

According to Crossley and Nazir (2002) contemporary research goes beyond motivating factors being determined at the level of the individual and suggests these factors vary amongst people with differing levels of education or socio-economic groupings (Steptoe & Wardle, 1999; Crossley & Khan, 2001). This supports the idea that wider societal influences can have an impact on food choice (Drewnowski & Darmon, 2005) and implies individual and collective dietary behaviours are inextricably linked.

Crossley and Khan (2001) conducted a study investigating motives underlying food choice, with participants ranging in age from 28 to 63. In this study, occupation was used as an indicator of socio-economic grouping. Findings showed those in the lower socio-economic group (porters/cleaners) rated convenience, price, mood and familiarity as more important than those in the higher socioeconomic group (dentists) who rated natural content and ethical concern as more important. Gender differences were also observed with women rating convenience, price and familiarity as more important than men. Crossley and Khan's (2001) study had limitations as the range of occupations consisted only of those from a dental background. Therefore, the study is not representative of a wider population which would differ in occupation and socioeconomic status.

Motivational factors have also been found to differ between students and non-students, diet classification (standard, low in red meat or vegetarian) and gender (Pollard, Steptoe & Wardle, 1998). Pollard et al. (1998) conducted a study investigating motives underlying healthy eating, in which participants' age averaged 30.7 years. It was found that students rated price as more important, and ethical concern, health, natural content, sensory appeal, mood and weight control as less important than did non-

students. Respondents classifying their diet as low in red meat rated health, natural content, weight control and ethical concern as more important than those who classified their diet as standard (Pollard et al., 1998). Vegetarians rated ethical concern as more important than those who classified their diet as standard, suggesting the decision to be vegetarian is based on ethical rather than health related concerns (Pollard et al., 1998) while women rated weight control, health and natural content as more important than men (Pollard et al., 1998), which contrasts with Crossley and Khan's (2001) findings that women rated convenience, price and familiarity as more important than men.

The diet classifications in Pollard et al.'s (1998) study are broad, suggesting there were limitations. For example, "how is a standard diet classified?" and one person's consideration of a diet low in red meat may be considered high in red meat for another. Also, there are many classifications of vegetarian with some vegetarians deciding to eat fish or even poultry. Therefore, even though the findings indicate a relationship between motivational factors and type of diet, the broad diet classifications suggest these findings may not be as accurate as one is led to believe. The sample for Pollard et al.'s (1998) study was also limited to students and residents in London, therefore not taking into account students and residents from other areas. Pollard et al. (1998) state there was only a moderate response rate (241 respondents) and so the results are unlikely to be representative of the British population or to be generalisable internationally. As Cockerham, Kunz and Lueschen (1988) observed, motivating factors can vary considerably between Western societies.

Crossley and Nazir (2002) conducted a study investigating motives underlying food choice, which offered no age classifications, but found motivational factors differed between students' level of study (first year and fifth year), gender, ethnic background ('White British' and 'Other Ethnic groups'), type of accommodation (group 1: living in catered halls or parental home, group 2: living in non catered halls or non-university accommodation) and socio-economic status. Findings showed first year students rated mood convenience and sensory appeal as more important than fifth year students and women rated health, mood, convenience, sensory appeal and weight control as more important than men (Crossley & Nazir, 2002). This is in contrast to Crossley and Khan's (2001) study which found women rated convenience, price and familiarity as more important than men, but similar to Pollard et al.'s (1998) study which found women rated weight control, health and natural content as more important than men. Crossley and Nazir (2002) found the 'other ethnic groups' rated familiarity as more important than the 'White British' group. Type of accommodation and socio-economic status offered no difference in motivational factors, which is in contrast to Crossley and Khan's (2001) study which found differences between high and low socio-economic groups for convenience, price, mood and familiarity. Crossley and Nazir's (2002) study is limited as the sample was comprised only of dental students from one British university. This does not allow the results to be representative of the food choice motivations of other students from different disciplines or from other universities in the UK or internationally (Crossley & Nazir, 2002). It also does not allow the results to be representative of non-students differing in occupation and socio-economic status.

A recurring theme throughout the literature on food choice appears to be gender differences. According to the Institute of Medicine (2001), "*being male or female is an important fundamental variable that should be considered when analysing... research"* (p.7). According to Kandrack, Grant and Segall (1991) gender differences in food choice may be due to men exhibiting higher rates of risky behaviours and lower rates of healthy behaviours than women, whilst Crossley and Nazir (2002) state the cultural preference for slimness amongst women in western societies may alter their food preferences in comparison to men. This could help explain the notable differences between men and women surrounding food choice research. Wardle et al. (2004) conducted a study focusing on food choice behaviours in which participants ranged in age from 17 to 30. Findings showed women were 50% more likely than men to report avoiding high-fat foods and eating high-fibre foods, and 25% more likely to eat fruit on a daily basis (Wardle et al., 2004). Four times as many women as men reported dieting to lose weight and smoking was found to be more prevalent among men than women (Wardle et al., 2004). Limitations of this study extended to all participants being university students and therefore, not taking into account food choice behaviours from non-students. The range of food choice behaviours was also limited and did not consider those surrounding sugar or snacks in the diet (Wardle et al., 2004). However, decisions based on avoiding high fat foods or increasing high fibre foods were thought to contribute to motives for choosing foods (Wardle et al., 2004), which may prove a useful insight when considering reasons for food choice motivations with the absence of information on actual food choice behaviours.

According to Rozin (2006) almost everything can influence food choice. One example of this has been given by Brown (2006) who explains how food choices can change across the life-span, particularly at mid-life. Roberts (2008) suggests there is a positive correlation between increasing age and bodyweight, implying age may have an impact on food choice factors such as health and weight control. Jensen and Holm (1999) state, middle age adults are more likely to choose food for health reasons because of the increased likelihood of chronic diseases appearing at this time. Chambers, Lobb, Butler and Traill (2008) support this view stating older adults are more likely to make food choices based on health considerations while younger adults will be less concerned with health and instead focused on food preparation and knowledge, prices and time. Falk, Bisogni and Sobal (1996) conducted a qualitative study investigating food choice processes of older adults. Chambers et al. (2008) state there is a lack of qualitative studies investigating motivations towards healthier diets which take demographic differences into account. Instead, Chambers et al. (2008) have found qualitative studies observe one demographic variable in depth, which for Falk et al. (1996) were age differences.

Falk et al. (1996) interviewed 16 adults, over 65 years old, and found social context, sensory appeal, price, convenience and well-being were considered important when making food choices, therefore extending the view by Jensen and Holm (1999) and Chambers et al. (2008) that older adults choose food based simply on health reasons. Steptoe et al. (1995) conducted a study investigating motives underlying the selection of food, with participants ranging in age from 17 to 89, and found positive associations

between age and natural content, familiarity and ethical concern for both women and men. However, no association was found between age and convenience, or price, for women or men (Steptoe et al., 1995). This contradicts Falk et al.'s (1996) findings that, amongst other factors, price and convenience were considered important with increasing age. Westenhoefer (2005) also contradicts Falk et al.'s (1996) finding that sensory appeal is an important factor for older adults. Westenhoefer (2005) found sensory-specific satiety is reduced with age, which increases the likelihood of diets limited in variation amongst elderly people who no longer find pleasure in the sensory appeal of food. These contradictory findings indicate Falk et al.'s (1996) study could be questioned. For example, the small sample size (16 adults) used may have affected the validity of the results.

The literature reviewed so far implies food choice is not a constant phenomenon but dynamic, changing with differing circumstances, experiences and age of the individual (Conner & Armitage, 2008). There is evidence to suggest stress (and in particular perceived stress, Roberts, 2008) may have a major influence on food choice, beyond simply choosing foods to make us feel good (Steptoe et al., 1995; Conner & Armitage, 2008; Roberts, 2008). Health researchers have assumed stressful events are, to some extent, determined by an individual's perception of how stressful that event may be (Cohen Kamarck & Mermelstein, 1983). Therefore, the present study will define stress as the extent to which an individual perceives an event as stressful. Roberts (2008) states psychological and physiological responses to perceived stress may cause some individuals to be vulnerable to changes in eating behaviour. Roberts (2008) explains stress induced changes can trigger unhealthy eating, which may lead to low mood (Wardle & Gibson, 2002; McElroy et al., 2004) or even obesity (Wadden & Stunkard, 2002).

Stress and mood have been found to play a role in determining the selection of food, especially amongst women, who may use eating as a way of regulating emotions and maintaining emotional well-being (Wardle, 1987; Steptoe & Wardle, 1999). From a biological perspective, Oliver and Wardle (1999) found chronic perceived stress may cause individuals to alter their food intake because of increased arousal and cortisol production in the body. According to Dallman et al. (2003) a prolonged biological response to perceived stress may increase the motivation to eat comfort food.

Roberts, Troop, Connan, Treasure and Campbell (2007) found gender differences in eating behaviours related to stress, with 65-85% of women at risk of stress induced changes. Whitfield, Weidner, Clark and Anderson (2002) state, stress may increase the risk of health-damaging behaviours which includes unhealthy dietary patterns. However, in contrast to Roberts (2007), Whitfield et al. (2002) state stress is more likely to play a greater role for health-damaging behaviours among men than women.

According to Ogden (2007) self-efficacy may affect a stress response. The belief we have of our ability to control our own behaviour may determine whether a potentially stressful event will result in a stress response. Therefore, even though an event may be perceived and recorded as stressful, the confidence we have in our ability to overcome

the stressful event may mean that some behaviours, such as food choice, are not affected (Ogden, 2007). Stress responses may also be affected by the type of stress that is felt (Ogden, 2007). For example, Ogden (2007) differentiates between stress considered harmful and damaging, known as distress, and stress that is positive and beneficial, known as eustress. Distress can be subdivided into acute stress such as an exam, public talk or surgery, and chronic stress such as job stress or poverty (Ogden, 2007; Conner & Armitage, 2008).

Conner and Armitage (2008) state the general effect model has been used to assess the relationship between stress and eating. This model assumes that stress produces a physiological/biological change in an organism which in turn causes a change in eating behaviour (Conner & Armitage, 2008). However, research has primarily focused on animals with studies observing positive correlations between eating behaviours, such as eating and licking food and chronic stressors, such as isolation (Robbins & Fray, 1980; Greeno & Wing, 1994). Research conducted on humans has produced mixed results with one study finding no evidence between the amounts or type of food eaten and a chronic stressor (Bellisle et al., 1990) and another study finding an acute stressor will increase calorie intake, particularly from fatty foods (Michaud et al., 1990). Therefore, consistent results from such studies are yet to be found. The literature linking stress and food behaviours has concentrated on eating behaviours and actual food consumption (Conner & Armitage, 2008), rather than looking at determinants of food choice, therefore leaving a possible gap to be explored within the present study.

The Present Study

The present study has considered the topical relevance of research into food choice motivations, based on the increasing prevalence of unhealthy diets and overweight and obese people in Western European populations (Birch, 1999). Incentive for the present study developed from the belief that contributing to research in this area may further the understanding of motivations underlying food choice, with an objective to provide additional information which could be utilized in the future when implementing strategies to encourage healthier diets.

After reviewing the literature it was decided to retain gender as a demographic variable. This variable was considered important due to previous research showing clear differences in food choice motivations between men and women (Pollard et al., 1998; Crossley & Khan, 2001; Crossley & Nazir, 2002; Wardle et al., 2004). It was decided to use age as a demographic variable because whilst participants from previous studies have ranged in age, it has not yet been considered an important variable in research using the Food Choice Questionnaire. Stress was also chosen as a variable because the literature surrounding stress has focused around actual food choice rather than food choice motivations (Bellisle et al., 1990; Michaud et al., 1990). Therefore, consideration of stress and food choice motivations was regarded as an interesting and innovative research pursuit.

The present study utilized the Food Choice Questionnaire developed by Steptoe et al., (1995) therefore replicating studies by Pollard et al. (1998) Crossley and Khan (2001), and Crossley and Nazir, (2002) who also used this measure. Stress was measured using the Perceived Stress Scale developed by Cohen et al. (1983) and was unique to any of the literature reviewed. This methodology was used to observe the effects of gender, age and stress on motivations underlying food choice.

The hypotheses for the three variables are given below:

1.) It was hypothesised that women will rate health, weight control and natural content as more important than will men.

2.) It was anticipated that older participants will rate health, natural content and ethical concern as more important than will younger participants.

3.) It was predicted that participants with high stress will rate mood, sensory appeal and convenience as more important than will participants with low stress.

Method

Design

The present study employed a between-groups, self-report questionnaire design. There were three independent variables – gender, age and stress (the stress items were measured using a 5-point scale), and nine dependent variables, consisting of factors related to food choice – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, ethical concern (the factor items were measured using a 4-point scale).

Participants

Overall there were 100 participants, chosen because this sample size was considered adequate to test validity (Crossley & Khan, 2001). Each participant was in the gender, age and perceived stress conditions. The participants ranged in age from 18 to 71, with a mean age of 39.3 years (*SD* = 15.3). There were 49 males (49%) and 51 females (51%). Participants were a convenience sample recruited personally by the researcher from Jersey C.I, Worcester University and Camborne in Cornwall.

Measures

The present study used two self-report questionnaires for the collection of data. Stress was measured using the Perceived Stress Scale (PSS; Cohen et al., 1983). Factors influencing people's dietary choices were measured using the Food Choice Questionnaire (FCQ; Steptoe et al., 1995). A section for collection of demographic information (gender and age) was included at the top of the PSS.

The PSS (Cohen et al., 1983) is designed to measure the degree to which situations in a person's life, over the past month, were considered stressful. The PSS consists of 14 items designed to identify how unpredictable, uncontrollable and overloaded respondents find their lives. Items are aimed at respondents thoughts and feelings during the last month and all items begin with the same phrase "In the past month how often have you.....". Responses were measured on a 5-point scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often) and scores were calculated by reversing (e.g 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0) the seven positively stated items (items 4, 5, 6, 7, 9, 10 and 13) and then adding up all the items giving a total score between 0 (low stress) and 56 (high stress). Internal consistency for the PSS, using Cronbach's α, has been reported at 0.84, 0.85 and 0.86 suggesting a high level of reliability (Cohen et al., 1983).

The FCQ (Steptoe et al., 1995) is designed to assess the reasons behind people's food choices. The FCQ consists of 36 items grouped into nine different factors – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern (see appendix 1 for the item groupings). Participants were asked to endorse the statement "It is important to me that the food I eat on a typical day....." for each item, choosing between four responses: Not at all important, a little important, moderately important and very important. Each item was scored between 1 and 4 respectively. Scores on each factor were calculated by adding up the item scoring and then dividing by the number of items in that factor, therefore giving each factor an average score between a minimum of 1 and a maximum of 4. In the original development of the FCQ, Factor Analysis with Varimax Rotation was used to reduce 36 items to the nine general factors which accounted for 65.2% of the variance (Steptoe et al., 1995). Internal consistency of the FCQ factors has been reported as high, with Cronbach α scores as follows: *Health* = 0.81, *mood* = 0.83, *convenience* = 0.84, *sensory appeal* = 0.72, *natural content* = 0.86, *price* = 0.83, *weight control* = 0.85, *familiarity* = 0.72, *ethical concern* = 0.74 (Steptoe et al., 1995). Development of the scale resulted in a test-retest reliability > 0.70, suggesting that reliability of the scales was acceptable (Steptoe et al., 1995).

Procedure

A questionnaire pack containing a participant information sheet and consent form, the PSS, the FCQ and a debriefing sheet were given to individual participants (see appendix 2). The questionnaire pack was administered, by the researcher in January/February 2010, until the appropriate quota (100 participants) had been reached. Participants were individually briefed on the purpose of the study, informed it would take about 15 minutes of their time, reminded of their right to withdraw at any time and assured of confidentiality and anonymity. Participants were asked, individually, to thoroughly read the participant information sheet and consent form, and ask any questions before completing the questionnaires. The participants then proceeded to complete the questionnaires. Upon completion, the participants

individually read through the debriefing sheet, asked any further questions, which were subsequently answered, and thanked for their participation.

Ethical Considerations

British Psychological Society (2006) ethical guidelines were followed including fully informed consent given by each participant, the option and right to withdraw from the study, the assurance of confidentiality and anonymity, and acknowledgement of assent. Anonymity was guaranteed as participants were given a number for identification purposes and confidentiality was ensured as data was kept in possession of the researcher at all times and not passed to a third party.

Results

Analysis

Descriptive statistics were conducted on all variables. This included assessments of normality on all variables, with the exception of gender. Preliminary analysis of the data indicated it was appropriate to use parametric tests. Results were analysed using a series of three one-way between-groups multivariate analyses of variance (MANOVA) to ascertain differences between the independent variables – gender, age and stress, and the dependent variables – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. One-way between-groups analyses of variance (ANOVA) were used to follow up any significant differences found by the MANOVAs between the independent variables age and stress because they were categorised into three groups, and the dependent variables. A series of nine standard multiple regression analyses were used as an exploratory process to investigate which independent variables were the best predictor of the nine different dependent variables. For the present study, standard multiple regression required a minimum of 74 participants per predictor (independent variable). The formula for calculating sample size requirements is $N > 50 + 8m$ (where m = the number of independent variables, of which the present study has three), (Tabachnick & Fidell, 1996). Multiple regression requires the independent variables to be entered as continuous (age and stress) or dichotomous (gender). Therefore the present study had 100 participants per predictor ($N = 100$), thus exceeding the required minimum of 74.

Descriptive Statistics

A total of 100 participants ($N = 100$) took part in the present study. The sample included 49 men ($N = 49$, 49%) and 51 women ($N = 51$, 51%). Respondents ranged in age from 18 to 71 (see table 1 for mean and standard deviation). For the purposes of the MANOVA and the ANOVA age was categorised into three groups, according to the banding suggestions given by SPSS. Group 1: 29 years or less ($N = 39$, 39%), group 2: 30-49 years ($N = 28$, 28%) and group 3: 50 years and above ($N = 33$, 33%). Scores on the PSS were recorded between 3 and 37 (see table 1 for mean and standard

deviation) with the lowest possible score being 1 and the highest possible score being 56. For the purposes of the MANOVA stress was categorised into three groups, according to the banding suggestions given by SPSS. Group 1: scoring 18 or less (*N* = 34, 34%), group 2: scoring 19-24 (*N* = 35, 35%) and group 3: scoring 25 and above (*N* = 31, 31%). Scores on the FCQ were recorded between 1, which was the lowest possible score, and 4 which was the highest possible score, for health, mood, convenience, natural content, weight control, familiarity and ethical concern. Scores for sensory appeal were recorded between 1.8 and 4, and scores for price were recorded between 1.3 and 4 (see table 1 for means and standard deviations), (see appendix 3 for SPSS output of descriptive statistics).

Table 1
The means and standard deviations for age, stress and FCQ factor scores

	M	*SD*
Age	39.29	15.28
Stress	20.76	6.99
Health	2.80	0.67
Mood	2.21	0.62
Convenience	2.57	0.65
Sensory Appeal	3.11	0.52
Natural Content	2.65	0.86
Price	2.77	0.67
Weight Control	2.39	0.85
Familiarity	2.00	0.73
Ethical Concern	2.07	0.81

Assessments of normality: Assessments of normality were conducted on the nine dependent variables – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern to test for normal distribution and outlying cases. Assessments of normality were also carried out on two of the independent variables – age and stress, as required for multiple regression (Pallant, 2007), (see appendix 4 for SPSS output on assessments of normality).

Health: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. However, the histogram displayed a reasonably normal distribution of scores which was also supported by an inspection of the normal probability plots with the Normal Q-Q plot displaying a reasonably straight line, and the Detrended Normal Q-Q Plot displaying no real

clustering points with most collecting around the zero line. The box-plot confirmed there were no outliers or extreme points.

Mood: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. However, the histogram displayed a reasonably normal distribution of scores which was also supported by an inspection of the normal probability plots with the Normal Q-Q plot displaying a reasonably straight line, and the Detrended Normal Q-Q Plot displaying no real clustering points with most collecting around the zero line. The box-plot confirmed there were two outliers (cases 13 and 19 scored higher) but no extreme points. The outliers' scores were checked and found to be genuine as the values were not too different from the remaining distribution, and so it was decided the cases could be retained in the data file.

Convenience: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.005$ level suggesting violation of the assumption of normality. However, the histogram displayed a reasonably normal distribution of scores which was also supported by an inspection of the normal probability plots with the Normal Q-Q plot displaying a reasonably straight line, and the Detrended Normal Q-Q Plot displaying no real clustering points with most collecting around the zero line. The box-plot confirmed there were four outliers (cases 5 and 100 scored lower whilst cases 36 and 40 scored higher) but no extreme points. The outlier's scores were checked and found to be genuine as the values were not too different from the remaining distribution, and so it was decided the cases could be retained in the data file.

Sensory Appeal: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. However, the histogram displayed a reasonably normal distribution of scores which was also supported by an inspection of the normal probability plots with the Normal Q-Q plot displaying a reasonably straight line, and the Detrended Normal Q-Q Plot displaying no real clustering points with most collecting around the zero line. The box-plot confirmed there were no outliers or extreme points.

Natural Content: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.05$ level suggesting violation of the assumption of normality. However, the histogram displayed a reasonably normal distribution of scores which was also supported by an inspection of the normal probability plots with the Normal Q-Q plot displaying a reasonably straight line, and the Detrended Normal Q-Q Plot displaying no

real clustering points with most collecting around the zero line. The box-plot confirmed there were no outliers or extreme points.

Price: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. The histogram was not normally distributed. However, an inspection of the normal probability plots revealed the Normal Q-Q plot displayed a reasonably straight line, and the Detrended Normal Q-Q Plot displayed no real clustering points with most collecting around the zero line. The box-plot confirmed there were no outliers or extreme points.

Weight Control: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. The histogram was not normally distributed. However, an inspection of the normal probability plots revealed the Normal Q-Q plot displayed a reasonably straight line, and the Detrended Normal Q-Q Plot displayed no real clustering points, although most did not collect around the zero line. The box-plot confirmed there were no outliers or extreme points.

Familiarity: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. The histogram was not normally distributed. However, an inspection of the normal probability plots revealed the Normal Q-Q plot displayed a reasonably straight line, and the Detrended Normal Q-Q Plot displayed no real clustering points with most collecting around the zero line. The box-plot confirmed there was one outlier (case 29 scored higher) but no extreme points. The outliers score was checked and found to be genuine as the value was not too different from the remaining distribution, and so it was decided the case could be retained in the data file.

Ethical Concern: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. The histogram was not normally distributed. However, an inspection of the normal probability plots revealed the Normal Q-Q plot displayed a reasonably straight line, and the Detrended Normal Q-Q Plot displayed no real clustering points, although most did not collect around the zero line. The box-plot confirmed there were no outliers or extreme points.

Age: Analysis suggested the extreme ages did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was significant at the $p < 0.01$ level suggesting violation of the assumption of normality. The histogram was not

normally distributed with most ages between 18-36 and 44-68. However, an inspection of the normal probability plots revealed the Normal Q-Q plot displayed a reasonably straight line, although the Detrended Normal Q-Q Plot displayed some clustering points and some collecting around the zero line. The box-plot confirmed there were no outliers or extreme points. Given that this variable was age, no cases were to be excluded.

Stress: Analysis suggested the extreme scores did not have a strong influence on the mean (see table 1 for mean and standard deviation) and the cases could be retained in the data file. The Kolmogorov-Smirnov statistic was not significant at the $p < 0.05$ level indicating normality. The histogram confirmed normal distribution which was also supported by an inspection of the normal probability plots, with the Normal Q-Q plot displaying a reasonably straight line, and the Detrended Normal Q-Q Plot displaying no real clustering points with most collecting around the zero line. The box-plot confirmed there were no outliers or extreme points.

Overall the assessments of normality conducted on the dependent variables – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern, and the independent variables – age and stress, showed any extreme scores did not have a strong influence on the means (see table 1 for means). This was observed by comparing the original means to the trimmed means for each variable (see appendix 4). The two mean values for each variable were consistently similar, which suggested any outlying cases were not problematic. This was supported by comparing outlying cases with the remaining distribution and finding them to be similar. Therefore, all cases were retained in the data file.

Inferential Statistics

Multivariate analyses of variance and univariate analyses of variance

The first one-way between-groups MANOVA was performed to investigate gender differences in the importance of factors relating to food choice (see appendix 5), with the expectation that women will rate health, weight control and natural content as significantly more important than men. Nine dependent variables were used, health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. The independent variable was gender. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. The cell sizes, means, standard deviations and *p*-values for the 3x9 factorial design are presented in table 2. There was a statistically significant difference, at the $p < 0.05$ level, between males and females on the combined dependent variables, $F(9, 90) = 2.58$; Wilks' Lambda = 0.79; partial eta squared = 0.20. When the results for the dependent variables were considered separately, there were three differences which reached statistical significance. A Bonferroni adjusted alpha level of 0.006 was used, and the first highly significant difference was found for health, $F(1, 98) = 12.47$, $p < 0.01$, partial eta squared = 0.11. An inspection of the mean scores

indicated that females rated health as moderately more important than males. The second highly significant difference was found for natural content, F (1, 98) = 9.74, p < 0.01, partial eta squared = 0.09. An inspection of the mean scores indicated that females rated natural content as moderately more important than males. The third highly significant difference was found for weight control, F (1, 98) = 17.41, p < 0.01 partial eta squared = 0.15. An inspection of the mean scores indicated that females rated weight control as moderately more important than males (see table 2 for means and standard deviations).

At the Bonferroni adjusted alpha level of 0.006, *mood* (F[1, 98] = 2.74, p > 0.05, partial eta squared = 0.03), *convenience* (F[1,98] = 0.23, p > 0.05 partial eta squared = 0.00), *sensory appeal* (F[1,98] = 1.51, p > 0.05, partial eta squared = 0.01), *price* (F[1, 98] = 0.24, p > 0.05, partial eta squared = 0.00), *familiarity* (F[1, 98] = 1.69, p > 0.05, partial eta squared = 0.02), and *ethical concern* (F[1, 98] = 0.52, p > 0.05, partial eta squared = 0.00) were not statistically significant (see table 2 for means and standard deviations). However, an inspection of the mean scores indicated that females rated mood, sensory appeal, price and ethical concern as slightly more important than males, whilst males rated convenience and familiarity as slightly more important than females (see table 2 for means and standard deviations).

Table 2
The mean scores of gender differences in the importance of FCQ factors with the number of participants (N) in each cell, standard deviations and p-values

	Males (N = 49)		Females (N = 51)		p
	M	*SD*	*M*	*SD*	
Health	2.57	0.68	3.02	0.58	<0.01
Mood	2.10	0.63	2.31	0.61	>0.05
Convenience	2.60	0.70	2.54	0.61	>0.05
Sensory Appeal	3.04	0.52	3.17	0.52	>0.05
Natural Content	2.39	0.84	2.90	0.80	<0.01
Price	2.73	0.69	2.80	0.64	>0.05
Weight Control	2.05	0.78	2.71	0.79	< 0.01
Familiarity	2.10	0.78	1.91	0.67	>0.05
Ethical Concern	2.01	0.88	2.12	0.73	>0.05

The second one-way between-groups MANOVA was performed to investigate age differences in the importance of factors relating to food choice (see appendix 6), with the expectation that older participants will rate health, natural content and ethical concern as significantly more important than younger participants. The dependent variables were health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. The independent variable was age (categorised into three groups: group 1: 29yrs or less, group 2: 30-49yrs, group 3: 50yrs and above). Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance

matrices, and multicollinearity, with no serious violations noted. The cell sizes, means, standard deviations and *p*-values for the 3x9 factorial design are presented in table 3. Although approaching significance at the $p < 0.05$ level, there were no statistically significant differences between the age groups on the combined dependent variables, $F(18, 180) = 1.58$; Pillai's Trace = 0.27; partial eta squared = 0.14. When the results for the dependent variables were considered separately, the only difference to reach statistical significance, using a Bonferroni adjusted alpha level of 0.006, was ethical concern, $F(2, 97) = 7.91$, $p < 0.01$, partial eta squared = 0.14. An inspection of the mean scores indicated that group 1 rated ethical concern as less important than either group 2 or group 3, (see table 3 for means and standard deviations).

At the $p < 0.006$ level, *health* ($F[2, 97] = 3.66$, $p < 0.05$, partial eta squared = 0.07), *mood* ($F[2, 97] = 0.77$, $p > 0.05$, partial eta squared = 0.02), *convenience* ($F[2, 97] =0.63$, $p > 0.05$, partial eta squared = 0.01), *sensory appeal* ($F[2, 97] = 1.15$, $p > 0.05$, partial eta squared = 0.02), *natural content* ($F[2, 97] = 3.08$, $p \leq 0.05$, partial eta squared = 0.06), *price* ($F[2, 97] = 0.88$, $p > 0.05$, partial eta squared = 0.02), *weight control* ($F[2, 97] = 1.09$, $p > 0.05$, partial eta squared = 0.02) and *familiarity* ($F[2, 97] = 0.14$, $p > 0.05$, partial eta squared = 0.00) were not significant (see table 3 for means and standard deviations).

To follow up the statistically significant difference between the three age groups and ethical concern a one-way between-groups ANOVA was conducted (see appendix 7). The ANOVA confirmed there was a statistically significant difference at the $p < 0.01$ level for ethical concern and the three age groups, $F(2, 97) = 7.91$, $p < 0.01$. The effect size calculated using eta squared, was 0.14 which suggests a large difference in the means scores between the three groups (Cohen, 1988). Post-hoc comparisons using the Tukey HSD indicated that the mean score for group 1 was significantly different from group 3 at the $p < 0.01$ level. Group 2 did not differ significantly from either group 1 or group 3 (see table 3 for means and standard deviations).

Table 3
The mean scores of age differences in the importance of FCQ factors with the number of participants (N) in each cell, standard deviations and p-values

	Age						
	Group 1 <=29 (*N* = 39)		Group 2 30-49 (*N* = 28)		Group 3 50+ (*N* = 33)		*p*
	M	*SD*	*M*	*SD*	*M*	*SD*	
Health	2.58	0.78	2.93	0.43	2.94	0.64	<0.05
Mood	2.19	0.65	2.11	0.48	2.31	0.69	>0.05
Convenience	2.62	0.73	2.45	0.41	2.61	0.73	>0.05
Sensory Appeal	3.04	0.51	3.06	0.47	3.22	0.58	>0.05
Natural Content	2.39	0.99	2.76	0.79	2.85	0.66	≤0.05
Price	2.87	0.71	2.75	0.61	2.66	0.66	>0.05
Weight Control	2.34	0.99	2.25	0.77	2.56	0.71	>0.05
Familiarity	2.02	0.79	1.94	0.61	2.03	0.77	>0.05
Ethical Concern	1.72	0.72	2.12	0.66	2.43	0.87	<0.01

The third one-way between-groups MANOVA was performed to investigate stress differences in the importance of factors relating to food choice (see appendix 8), with the expectation that participants with high stress will rate mood, sensory appeal and convenience as significantly more important than participants with low stress. The dependent variables were health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. The independent variable was stress (categorised into three groups: group 1: scoring 18 or less, group 2: scoring 19-24, group 3: scoring 25 and above). Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. The cell sizes, means, standard deviations and *p*-values for the 3x9 factorial design are presented in table 4. There were no statistically significant differences, at the $p < 0.05$ level, between the stress groups on the combined dependent variables, $F(18, 178) = 1.27$; Wilks' Lambda = 0.79; partial eta squared = 0.11. When the results for the dependent variables were considered separately there were no differences reaching statistical significance using a Bonferroni adjusted alpha level of 0.006. *Health* ($F[2, 97] = 1.01$, $p > 0.05$, partial eta squared = 0.02), *mood* ($F[2, 97] = 2.26$, $p > 0.05$, partial eta squared = 0.04), *convenience* ($F[2, 97] = 1.60$, $p > 0.05$, partial eta squared = 0.03), *sensory appeal* ($F[2, 97] = 0.91$, $p > 0.05$, partial eta squared = 0.02), *natural content* ($F[2, 97] = 2.19$, $p > 0.05$, partial eta squared = 0.04), *price* ($F[2, 97] = 1.61$, $p > 0.05$, partial eta squared = 0.03), *weight control* ($F[2, 97] = 0.17$, $p > 0.05$, partial eta squared = 0.00) and *ethical concern* ($F[2, 97] = 0.96$, $p > 0.05$, partial eta squared = 0.02) were not significant whilst *familiarity* ($F[2, 97] = 4.92$, $p < 0.01$ partial eta squared = 0.09) was approaching significance at the $p = 0.006$ level (see table 4 for means and standard deviations).

The MANOVAs were used to establish differences between the independent variables – gender, age and stress, and the dependent variables – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. Only one ANOVA was needed to follow up a statistically significant difference found between age and ethical concern in order to establish where the significant difference lay between the three age groups.

Standard multiple regressions: Standard multiple regressions were conducted on the dependent variables – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. The multiple regression model fitted to each dependent variable consisted of the independent variables – gender, age and stress. Standard multiple regressions were used to investigate how well the independent variables were able to predict the dependent variables. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homoscedasticity, and multicollinearity and singularity, with no serious violations noted. The results of the standard multiple regressions including β values and significance levels, significance level of the models, and R^2 are presented in table 5 (see appendix 9 for SPSS output on standard multiple regressions).

Table 4
The mean scores of stress differences in the importance of FCQ factors with the number of participants (N) in each cell, standard deviations and p-values

	Stress						*p*
	Group 1 <=18 (*N* = 34)		Group 2 19-24 (*N* = 35)		Group 3 25+ (*N* = 31)		
	M	*SD*	*M*	*SD*	*M*	*SD*	
Health	2.92	0.56	2.78	0.78	2.68	0.63	>0.05
Mood	2.02	0.58	2.30	0.65	2.30	0.61	>0.05
Convenience	2.44	0.55	2.72	0.65	2.53	0.74	>0.05
Sensory Appeal	3.01	0.54	3.15	0.53	3.16	0.50	>0.05
Natural Content	2.88	0.72	2.59	0.84	2.46	0.97	>0.05
Price	2.61	0.64	2.88	0.62	2.81	0.73	>0.05
Weight Control	2.43	0.81	2.40	0.88	2.32	0.87	>0.05
Familiarity	1.71	0.62	2.05	0.57	2.25	0.90	<0.01
Ethical Concern	2.20	0.75	1.93	0.86	2.08	0.81	>0.05

Health: A standardised multiple regression model was fitted to the dependent variable health with gender, age and stress as independent variables. Case number 12 was found to be unusual. However, the maximum value for Cook's distance was checked and found to be below 1 (0.14) which suggests the case was not a major problem and was not going to influence the results of the model (Pallant, 2007). The model was highly significant at the $p < 0.01$ level ($F[3, 96] = 6.34$) with the combined predictors accounting for 16% ($R^2 = 0.16$) of the variance in health scores. Gender was positively associated with health, made the largest unique contribution and was a highly significant predictor of health scores at the $p < 0.01$ level ($\beta = 0.34$), uniquely accounting for 11% of the variance. Age was positively associated with health and was approaching significance at the $p < 0.05$ level ($\beta = 0.18$) while stress was negatively associated with health but was not significant at the $p < 0.05$ level ($\beta = -0.09$).

Mood: A standardised multiple regression model was fitted to the dependent variable mood with gender, age and stress as independent variables. The model was not significant at the $p < 0.05$ level ($F[3, 96] = 1.86$) with the combined predictors only accounting for 5% ($R^2 = 0.05$) of the variance in mood scores. Gender was positively associated with mood and made the largest unique contribution, although it was not a significant predictor of mood scores it was approaching significance at the $p < 0.05$ level ($\beta = 0.17$). Age ($\beta = 0.11$) and stress ($\beta = 0.17$) were positively associated with mood, but were not significant at the $p < 0.05$ level.

Convenience: A standardised multiple regression model was fitted to the dependent variable convenience with gender, age and stress as independent variables. The model was not significant at the $p < 0.05$ level ($F[3, 96] = 0.12$) with the combined predictors accounting for none of the variance in convenience scores ($R^2 = 0.00$). Gender was negatively associated with convenience and made the largest unique contribution, although it was not a significant predictor of convenience scores at the $p < 0.05$ level ($\beta = -0.05$). Age ($\beta = 0.01$) and stress ($\beta = 0.04$) were positively associated with convenience, but were also not significant at the $p < 0.05$ level.

Sensory Appeal: A standardised multiple regression model was fitted to the dependent variable sensory appeal with gender, age and stress as independent variables. The model was not significant, although it was approaching significance at the $p < 0.05$ level ($F[3, 96] = 2.15$). The combined predictors accounted for 6% ($R^2 = 0.06$) of the variance in mood scores. Age was positively associated with sensory appeal and made the largest unique contribution, although it was not a significant predictor of sensory appeal scores it was approaching significance at the $p < 0.05$ level ($\beta = 0.19$). Stress was positively associated with sensory appeal and was also approaching significance at the $p < 0.05$ level ($\beta = 0.18$) whilst gender was positively associated with sensory appeal, but was not significant at the $p < 0.05$ level ($\beta = 0.13$).

Natural Content: A standardised multiple regression model was fitted to the dependent variable natural content with gender, age and stress as independent variables. The model was highly significant at the $p < 0.01$ level ($F[3, 96] = 6.49$) with

the combined predictors accounting for 16% (R^2 = 0.16) of the variance in natural content scores. Gender was positively associated with natural content, made the largest unique contribution and was a highly significant predictor of natural content scores at the $p < 0.01$ level (β = 0.31), uniquely accounting for 9% of the variance. Age was positively associated with natural content and also made a statistically significant contribution at the $p < 0.05$ level (β = 0.20), uniquely accounting for 4% of the variance in natural content scores. Stress was negatively associated with natural content and was not significant at the $p < 0.05$ level (β = -0.14).

Price: A standardised multiple regression model was fitted to the dependent variable price with gender, age and stress as independent variables. The model was not significant at the $p < 0.05$ level (F[3, 96] = 0.691) with the combined predictors only accounting for 2% of the variance in price scores (R^2 = 0.02). Age was negatively associated with price and made the largest unique contribution, although it was not a significant predictor of price scores at the $p < 0.05$ level (β = -0.11). Stress (β = 0.06) and gender (β = 0.05) were positively associated with price, but were also not significant at the $p < 0.05$ level.

Weight Control: A standardised multiple regression model was fitted to the dependent variable weight control with gender, age and stress as independent variables. The model was highly significant at the $p < 0.01$ level (F[3, 96] = 6.65) with the combined predictors accounting for 17% (R^2 = 0.17) of the variance in weight control scores. Gender was positively associated with weight control, made the largest unique contribution and was a highly significant predictor of weight control scores at the $p < 0.01$ level (β = 0.39), uniquely accounting for 15% of the variance. Age was positively associated with weight control but was not significant at the $p < 0.05$ level (β = 0.10). Stress was negatively associated with weight control but was also not significant at the $p < 0.05$ level (β = -0.08).

Familiarity: A standardised multiple regression model was fitted to the dependent variable familiarity with gender, age and stress as independent variables. The model was not significant, although it was approaching significance at the $p < 0.05$ level (F[3, 96] = 2.20). The combined predictors accounted for 6% (R^2 = 0.06) of the variance in familiarity scores. Stress was positively associated with familiarity, made the largest unique contribution and was a significant predictor of familiarity scores at the $p < 0.05$ level (β = 0.23), uniquely accounting for 5% of the variance. Age was positively associated with familiarity but was not significant at the $p < 0.05$ level (β = 0.05). Gender was negatively associated with familiarity but was also not significant at the $p < 0.05$ level (β = -0.12).

Ethical Concern: A standardised multiple regression model was fitted to the dependent variable ethical concern with gender, age and stress as independent variables. The model was highly significant at the $p < 0.01$ level (F[3, 96] = 5.29) with the combined predictors accounting for 14% (R^2 = 0.14) of the variance in ethical concern scores. Age was positively associated with ethical concern, made the largest unique contribution and was a highly significant predictor of ethical concern scores at

the $p < 0.01$ level ($\beta = 0.38$), uniquely accounting for 13% of the variance. Gender ($\beta = 0.09$) and stress ($\beta = 0.03$) were positively associated with ethical concern scores but were not significant at the $p < 0.05$ level.

Standard multiple regressions were used to establish which independent variables – gender, age or stress, were the best predictor of the dependent variables – health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern. This allowed for any significant associations between the independent and the dependent variables to be observed.

Discussion

Results of the present study demonstrate the predicted gender differences in Food Choice Questionnaire (FCQ) factors, therefore confirming the experimental hypothesis that women will rate health, natural content and weight control as more important than will men. Results were not as conclusive for age, with older participants in group 3 (50 years and above) rating ethical concern as more important than younger participants in group 1 (29 years or less). However, the experimental hypothesis, that older participants will rate health, natural content and ethical concern as more important than will younger participants, could not be confirmed. There were no differences found between level of perceived stress and the FCQ factors, therefore rejecting the experimental hypothesis that participants with high stress will rate mood, sensory appeal and convenience as more important than will participants with low stress. Further analysis provided supporting evidence that gender was a clear predictor of health, natural content and weight control. Age was a clear predictor of ethical concern and interestingly a mild predictor of natural content, and stress was found to be a mild predictor of familiarity.

The gender differences which emerged in this study were consistent with those of previous studies (Pollard et al., 1998; Crossley & Nazir, 2002). The fact that both health and weight control emerged as more important for women compared with men may suggest that healthy food choices made by women have a strong relationship with weight control (Wardle et al., 2004) and image concern (Hayes & Ross, 1987; Cockerham et al., 1988). The largest gender difference in scores on the FCQ factors was seen for weight control, therefore it seems likely that this factor played the most important role in ensuring that women also rated the health factor as more important than men, and are therefore more concerned with a healthier diet (Wardle et al., 2004). Crossley and Nazir (2002) suggest an alternative explanation that dietary restraint, rather than healthy food choices, and the prevalent cultural preference for slimness may account for the greater concern over weight control in women than men.

Table 5
Results of standard multiple regressions of gender, age and stress on FCQ factors: β values with significance levels

	Health	Mood	Convenience	Sensory Appeal	Natural Content	Price	Weight Control	Familiarity	Ethical Concern
Gender	0.34***	0.17	-0.05	0.13	0.31**	0.05	0.39***	-0.12	0.09
Age	0.18	0.11	0.01	0.19	0.20*	-0.11	0.10	0.05	0.38***
Stress	-0.09	0.17	0.04	0.18	-0.14	0.06	-0.08	0.23*	0.03
Model	**				***		***		**
R^2	0.16	0.05	0.00	0.06	0.16	0.02	0.17	0.06	0.14

Note: ***p* < 0.05; ****p* < 0.005; *****p* < 0.0005

The natural content factor has been found to be highly associated with the health factor (Steptoe et al., 1995), which could be a reason why women have also rated natural content as more important than men. Wardle et al. (2004) found women are more likely to eat fruit and high fibre foods whist avoiding high fat foods, which implies women are more likely to choose foods for their natural ingredients. According to the Theory of Planned Behaviour (TPB), the importance women place on health, natural content and weight control could suggest there is a perceived social pressure (subjective norm) to be slim and healthy (Shepherd, 1999). The cultural preference for slimness, as indicated by Crossley and Nazir (2002) suggests this assumption may be true. Attitude towards food may also be a reason for considering these factors as important. For example, if a woman believes certain foods are healthy, natural and low in calories she may have more motivation for choosing these foods. Wardle et al. (2004) state women are more likely than men to translate these attitudes into actions which may suggest there could be gender differences in the application of the TPB.

Results of previous research have found age differences in food choice to be associated with health (Jensen & Holm, 1999; Chambers et al., 2008) and ethical concern (Steptoe et al., 1995). Interestingly, the present study did not confirm the association between increasing age and health, even though this factor appears to be the most prevalent for older adults (Jensen & Holm, 1999; Chambers et al., 2008). However, older participants in group 3 (50 years and above) rated ethical concern as more important than younger participants in group 1 (29 years or less), which confirms the findings of Steptoe et al. (1995) who found ratings of ethical concern increased with age. One reason for this might be because older adults are more concerned with, or feel more responsible for, environmental issues associated with food production, packaging and country of origin (Steptoe et al., 1995). It could be argued that older adults are more environmentally and politically aware which is having a consequential effect on their food choice motivations (Steptoe et al., 1995). Further analysis found age to be a clear predictor of ethical concern, therefore supporting the relationship between age and ethical concern. According to the TPB, the subjective norm can be a predictor of behaviour (Shepherd, 1999). Therefore, older adults may feel social pressure to be environmentally aware and responsible. This may be one reason their motivations in food choice are directed towards ethical concern.

Further analysis found age to be a mild predictor of natural content which, as previously mentioned, is highly associated with the health factor (Steptoe et al., 1995). Therefore, even though the present study did not find any evidence supporting age differences and health, there was a mild association between age and natural content which is closely linked to health (Steptoe et al., 1995). It is possible that not everyone regards health as important when they increase in age. Some people may accept an increase in bodyweight (Roberts, 2008) and the increased likelihood of chronic diseases (Jensen & Holm, 1999); for others chronic diseases, or an increase in bodyweight, may not occur with increasing age, therefore, it would not be a concern. For this reason it is plausible to assume the majority of older adults in the present study were not as concerned with health as previous research has suggested, therefore allowing the results to be valid.

In terms of the differences between food choice motivations and high or low stress it was surprising to discover that there were no statistically significant results. Given that Roberts (2008) found stress to be a significant predictor of changes in eating behaviour and Whitfield et al. (2002) observed stress may increase health damaging behaviours, such as unhealthy dietary patterns, it was thought that there would be some differences in FCQ factors. The findings of Michaud et al.'s (1990) study that stress will increase calorie intake, particularly from fatty foods, was thought to imply that sensory appeal may differ in relation to high or low stress. Other evidence also suggested that stress would determine food choice as it may help to regulate emotions and therefore, mood should be regarded as an important factor (Wardle, 1987; Steptoe & Wardle, 1999), but neither of these assumptions was confirmed. However, on reflection, research conducted on stress has been inconclusive (Conner & Armitage, 2008; Ogden, 2010) and mainly focused on actual dietary behaviours (Bellisle et al., 1990; Michaud et al., 1990) rather than food choice determinants, as researched in the present study. Other reasons which may account for the lack of significant results include the type of stress or degree of self-efficacy (Ogden, 2007) felt by participants in the present study at the time of completing the Perceived Stress Scale (PSS). If self-efficacy was high and the type of stress felt was positive and beneficial then although people may have reported high stress, it may not have been the type of stress that would affect food choice motivations. This would support the validity of the present study, even though the expected outcome was not observed. Further investigation would need to be conducted in order to determine whether or not self-efficacy or type of stress can have an impact on food choice motivations. Without research into this area it is difficult to decipher whether or not the results of the present study are valid and show stress has no effect on food choice motivations.

It was interesting to discover further analysis revealed stress to be a mild predictor of familiarity. Steptoe et al. (1995) found a positive association between familiarity and mood, suggesting people whose dietary selection is influenced by the need to regulate stress responses also prefer familiar foods. Familiarity in food choice refers to the extent to which a person will eat the food they are accustomed to, rather than being adventurous (Steptoe et al., 1995). For this reason it could be said that habit is closely related to familiarity and therefore, food choice (Parraga, 1990). Habit and familiarity may be important food choice considerations when people are stressed because it may give them a sense of control (Steptoe et al., 1995). According to the TPB, perceived behavioural control determines the ability of an individual to control the outcome of behaviour (Shepherd, 1999). Therefore, it is possible that if an individual believes they can exert control over their food choice, either by choosing foods because of familiarity, or habit, they may feel more in control of stressful situations.

It is important to highlight the limitations of the present study. The sample size of 100 was chosen because it was considered adequate to test validity (Crossley & Khan, 2001). However, in retrospect a sample size of 100 participants is arguably too small. Although results of the present study are interesting in their own right, and were gathered from three separate locations (Jersey, University of Worcester and Cornwall)

to encourage generalisability, they are unlikely to be representative of the British population because of the small sample size.

Data for the present study was collected following the Christmas period in the months of January and February. For this reason it could be assumed that participants may have been more aware of their food choices at the time of participating in this study. However, Conner and Armitage (2008) have identified the dynamic nature of food choice, which suggests determinants of food choice are unlikely to remain consistent throughout the year. Further research could ask participants if they are currently dieting to lose weight in order to account for at least one confounding variable.

Another limitation is that the present study relied on self-report measures for the collection of data. This may have caused a bias in participants' responses for the FCQ in which they answered in terms of how they perceived they were expected to reply. Alternatively when completing the PSS, respondents may not have wanted to appear as stressed as they actually were, especially because most of them knew the researcher personally and may have wanted to maintain some privacy.

It seems evident that there are some limitations to this type of methodology. According to Crossley and Nazir (2002), recent research has questioned the quantitative and survey methodologies employed by most research into food choice. Chambers et al. (2008) state there is a lack of qualitative studies investigating food choice motivations. Further research could consider the possibility of qualitative methods, such as interviews or focus groups, in combination with the quantitative methods of self-report measures in order to gain a more valid representation of motivations in food selection.

The FCQ is concerned with factors perceived as relevant to food choice. It may also be beneficial to consider investigating actual food choice to determine whether or not respondents' motivations are consistent with their actual dietary behaviours. If consistent, it would help support the theoretical application of the TPB, that intention is a good predictor of behaviour (Shepherd, 1999). However, if food choice motivations were found to be inconsistent with actual dietary behaviour, it would support research suggesting there is an intention-behaviour gap and intentions are not good predictors of behaviour (Gollwitzer, 1993; Sutton, 1998).

There were a number of demographic factors not considered in the present study which may be relevant to consider in future research. Previous research has identified that income, education (Steptoe et al., 1995), socio-economic status, religion (Crossley & Nazir, 2002), and occupation (Crossley & Khan, 2001) have an effect on food choice motivations. These wider societal influences have been found important because of the practical implications in regards to food choice (Drewnoski & Darmon, 2005; Conner & Armitage, 2008; Ogden, 2010). For example, if healthy food is not an affordable option, people of lower socio-economic status may not choose food for this reason (Drewnoski & Darmon, 2005). However, this may not reflect their health awareness or desire to be healthy. Health behaviours, including smoking and dieting status, have also been considered important (Wardle et al., 2004) because higher rates of risky behaviours

have been found to influence food choices in a negative way (Kandrack et al., 1991). Consideration of these variables in future research could help provide a wider understanding of the food choice motivations of individuals whilst, at the same time, limit any confounding variables. This could allow a more valid outcome from the research.

Conclusion

This study has presented an investigation into the effects of gender, age and stress on motivations underlying food choices. Significant differences were found between men and women, and different age groups, but not between different stress levels; this may have been due to the type of stress or self-efficacy felt by respondents. It was hoped that insight into these motivations would provide further information towards the understanding of food choice and the development of strategies aimed at encouraging healthier diets. However, the only results which may be useful for this purpose are those found for the effects of gender differences on motivations underlying food choice, which have already been observed in previous research. Although this indicates that some of the results from the present study are consistent with those already found, it does not add any new or additional information to this area of research.

The present study has successfully provided an insight into the food choice motivations of a small sample of the population, with results confirming and supporting some of the previous research. If consideration is given to the future research suggestions that have been provided, other researchers may be encouraged to continue this line of investigation to reveal the information that the present study was unable to observe.

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