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Sensory or non-sensory product attributes? Exploring motivations for students food purchasing decisions

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Abstract

Healthy dietary practices are essential for physical and psychological well-being. However, the vast majority of the population do not consume a diet which is compliant with UK recommended guidelines. Nutrition labels have been added to packaged goods to help consumers make more balanced food choices. However, food purchasing decisions are complex and there is growing concern about the prevalence of poor health behaviours and related psychological well-being amongst university student groups, in particular. The current study therefore sought to examine the importance of different selection factors which govern students' food choices and their potential link with student mental health. An experiment was conducted in which 257 undergraduate students, drawn from six different universities, completed a series of product evaluation tasks. The nutritional information of each product was manipulated using the Multiple Traffic Light (MTL) system to reflect bad (red) or good (green) nutritional quality. The price (high or low cost) and manufacturer packaging (with health claims present or absent) were also varied across five food types commonly consumed by students. Participants' perceptions of each product's healthiness, appeal and value for money were examined. Findings demonstrated that whilst students were able to accurately differentiate the healthiness of products (based on MTL labelling and manufacturer packaging claims), low cost products and product packaging that did not make health claims, were consistently rated as more appealing and more likely to be chosen by students over 'light' or 'diet' products. Whilst sensory appeal and value for money were found to be primary determinants of food choice, amongst the sample as a whole, students who reported greater trait anxiety were more likely to base food purchasing decisions around issues of product cost, personal weight control and item familiarity. The implications of these findings for student well-being and potential health promotion schemes are discussed.

Keywords:	University Students	Food purchasing decisions	Product attributes	Multiple Traffic Light	Trait anxiety

Introduction

Unhealthy dietary patterns are one of the major risk factors for the development of many diseases. These include cardiovascular diseases (Mikkilä, et al., 2007), cancers, diabetes and other conditions linked to obesity (World Health Organization, 2014). In addition, dietary patterns characterised by a high consumption of processed foods; high in energy and low in nutritional value, have been associated with an increased risk of mental health symptoms, such as depression (Akbaraly et al, 2009) and anxiety (Weng et al., 2012). In a recent study, Bakhiyari et al., (2013) assessed the relationship between anxiety levels and consumption of processed food, in a sample of young adults (aged between 18 and 35). It was found that young adults who had the greatest consumption of processed foods were 4.7 times more likely to obtain higher scores on the anxiety scale. Taken together, this highlights the importance of consuming a healthy diet for overall physical and psychological well-being. The current study therefore, seeks to examine key personal and psychological factors related to the interpretation of food products, and the dietary intentions of individuals, in order to better understand the motivations behind food choices.

Improving diet quality is a key health promotion strategy and it is important to create environments which promote and support people to make healthy dietary choices (Cowburn & Stockley, 2005). Supermarkets provide an ideal location to integrate tools which provide consumers with the means of making informed food choices. However, in this context, consumers are exposed to a mass of information on food products packaging alone, making it difficult at times for health related information to capture attention. This is considered necessary for health related information to be processed and impact upon subsequent buying behaviours (Bialkova, & van Trijp, 2010). Furthermore, it is known that the presentation of complex information can create anxiety (Hansen, Mukherjee & Thomsen, 2011).

As a result, front-of-pack (FOP) nutrition labels have been designed to highlight essential information about the nutritional value and composition of packaged food. In order to facilitate a healthy diet and provide a means of communicating relevant information to customers, with the aim of enabling shoppers to make quick and informed decisions regarding their food choices, at the point of sale (Grunert & Wills, 2007). Nutrition labels have been introduced voluntarily to the packaging of many

food products in the UK, by some retailers (e.g. Tesco, Sainsbury's, ASDA). The UK has the highest prevalence of FOP nutrition labels found on processed food and convenience products (e.g. frozen goods and breakfast cereals), in the European Union, and has played a prominent role in promoting the use of the traffic light labelling system (Genannt Bonsmann et al., 2010).

One of the main reasons consumers report using FOP information is to avoid the consumption of negative nutrients, such as additives, artificial colours and flavours (Shine, O'Reilly & O'Sullivan, 1997). Despite this, many consumers do not make use of nutritional information in real shopping situations, especially when under time pressure and when decisions are based on brand identity (Wasowicz-Kirylo & Stysko-Kunkowska, 2011). Evidence so far has been inconclusive with regards to whether the use of nutrition information significantly improves dietary quality (Cristoph, An & Ellison, 2015). It follows that, even for individuals who are highly motivated to eat healthily do not always consume a diet which is compliant with recommended guidelines (Naughton, McCarthy & McCarthy, 2015). This implies that other factors are involved in personal food selection, which may be of greater influence in determining actual purchasing behaviour.

Food choice is a complex process. Furst, Connors, Bisogni, Sobal, & Falk (1996) suggest that food selection is based on both conscious reflections as well as a result of automatic, habitual and subconscious mechanisms. Factors such as taste, price and packaging (Lalor, Maden, Mckenzie & Wall, 2011), brand (Ares, Giménez & Deliza, 2010), nutritional information, convenience, trying to maintain, control or lose weight (Glanz, Basil, Maibach, Goldberg & Snyder, 1998) and product familiarity (Aschemann-Witzel & Hamm, 2010) have been previously identified in governing individual food choices, which include both sensory and non-sensory product attributes. Underwood, Klein and Burke (2001) proposed that extrinsic cues (such as price or brand) are utilised by consumers to derive information with regards to intrinsic product attributes, such as the taste, feel and smell. As Steenhuis, Waterlander and de Mul (2011) suggest, price has a dual role in the decision making process. On the one hand, the greater the price the greater the monetary sacrifice and the lower the purchase intention, but price can also have a positive effect on perceived product quality, which can in turn lead to increased purchase intention.

An individual's personal values, interests or traits are also central to establishing idiosyncratic food choice criteria (Chen, 2007). Motivations influencing individuals' food choices can reflect cognitive and affective orientations, nutrition knowledge as well as perceived barriers (Campos, Doxey & Dammond, 2011; Graham, Pelletier, Neumark-Sztainer, Lust & Laska, 2013; Naughton, McCarthy & McCarthy, 2015; Silayoi & Speece, 2004; Wills, Genannt Bonsmann, Kolka & Grunert, 2012). In a supermarket context, it could be that consumers' attention may be directed towards specific product attributes which are important or relevant to them, leading to subsequent evaluations of product appeal, healthiness or value for money. Ultimately increase or decrease their willingness or intention to purchase particular items.

Whilst the health claims made on product packaging can have a positive impact on consumers, the evidence base regarding the effectiveness on buying motives is equivocal (Wills, Bonsmann, Kolka & Grunert, 2012). Some studies report strong correlations between the presence of health claims, perceived healthiness and willingness to buy products (Van kleef, Van Trijp & Luning, 2005). Other studies have found contradicting results (Saba et al., 2010). For example, Bech-Larson and Grunert (2003), reported that consumers perceptions of the healthiness of products with health claims is more dependent on their perceptions of the nutritional value of the base product, as opposed to any health claims present on food products packaging.

One consumer group that has received little research attention regarding dietary choices are university or college-aged students (Christoph et al., 2015). This is surprising, given the large number of students now attending university and the impact the transition from a home environment to university accommodation, in conjunction with student lifestyle, can have on dietary behaviours. For most students entering higher education, it is not until this point that they will assume primary responsibility for their food behaviours (Beasley, Hackett & Maxwell, 2004). This transition encourages young adults to start developing their own habits, routines and preferences, with respects to food and dietary related decisions (Nelson, Story, Larson, Neumark-Sztainer & Lytle, 2008). Endorsing healthy dietary practices during this critical stage of an individual's life is paramount, as behaviours established during this time may well track into later adulthood (Akbaraly et al., 2009).

Nonetheless, university students are generally thought to have poor health behaviours and unfavourable dietary practices (Douglas et al. 1997; Cooke & Papadaki, 2014), even when compared to similarly aged non-academic counterparts (King, Garrett, Wrench & Lewis, 2001). Students generally do not consume recommended daily intakes of key nutrients. For example, Papadaki, Hondros, Scott and Kapsokefalou (2007) reported that students living outside of the family home during their studies were inclined to make more adverse food choices, with the consumption of fresh fruit, cooked and raw vegetables, oily fish and seafood, pulses and healthy fats decreasing and sugar intake increasing.

Students may not necessarily lack awareness of the relationship between diet and disease, or willingness to eat healthily. Their food choices may rather, be a consequence of perceived financial barriers. Financial well-being and security is of great importance to university students. However, the ability to cope financially has been considered merely average, amongst this sub-group (Lewis, Dickson-Swift, Talbot & Snow, 2007). Managing money throughout the term and avoiding debt may then be of primary interest. As the financial pressures on university students have increased in recent years, and concurrently the prevalence of low-cost economy food products has risen, students may feel unable to consume good quality food (Voh ah, Ebert, Ngamvitroj, Park & Kang, 2004).

Several studies have indicated a relationship between socio-economic position and diet quality (e.g. Drewnowski & Darmon, 2005; Rao, Afshin, Singh & Mozaffarian, 2013). Different socio-economic groups have been shown to vary considerably in their food purchasing behaviours, with disadvantaged groups being the least likely to purchase food consistent with recommended dietary guidelines (Backholer et al., 2015; Turrell and Kavanagh, 2006; De Irala-Estevez et al., 2000). Turell and Kavanagh (2006) through interviews discovered a strong association between household income and food cost concern. Respondents from lower income families were significantly more likely to report that the cost of food represented a barrier to purchasing healthy food items. As a result, these families' diets were lower in fibre, and higher in fat, sugar and salt than those from more economically advantaged groups. Steenhuis, Waterlander and de Mul (2011), similarly investigated how the role of price and perceptions of value for money differed between high and low income consumers. Participants were recruited from two supermarkets, two fast food

restaurants and one sports canteen. Sensory appeal and health were primary determinants in food choice for all consumers. However what was interesting to note, was that for low income consumers, the cost of food, mood and product familiarity were significantly more important, compared to the higher income group. It is possible that consumers with limited resources may opt for energy-dense diets, high in refined grains, added sugars and fats as an effective way to save money (Drewnowski & Darmon, 2005). We can see here that the cost of food is especially crucial for sub-groups of the general populations; like students, who rely on modest incomes and limited budgets (Mann, Reeve & Creed, 2002).

In addition, to dietary concerns, students in higher education express greater levels of psychological distress relative to their non-academic peers (Stallman, 2010; Stewart-Brown et al., 2000). Recent estimates suggest that one in five young people in the UK (aged 16 and over) now experience symptoms characteristic of general anxiety and depression (ONS, 2013). Moreover, the Mental Health Survey (2013) revealed that stress and de-motivation (80%), feeling down or unhappy (66%) and the experience of anxiety (55%), are among the top four symptoms experienced by students in Higher Education Institutes in the UK (NUS, 2013). Given the prevalence of mental distress in university students and the link between diet and mental health, it is therefore essential to investigate how students' food choices may be empirically related to indicators of mental health.

Hansen et al. (2011) conducted two studies with Danish consumers to find out whether the experience of anxiety during food selection influenced their information search behaviour and to investigate the moderating role of attitude towards nutritional claims, on the effect of anxiety. Results showed that generally consumers experienced anxiety during food choice, due to uncertainty about whether food products were bad for their health or not. Furthermore, they found that anxiety during food choice, increases information search behaviour. This effect was magnified when consumers held less favourable attitudes towards the nutritional claims present on the products packaging. This study shows that anxiety may have positive impacts on information search behaviour and consequently, may be a potential mediator in the relationship between nutrition label use, attitudes and diet quality at large. However, research in this domain is very much in its infancy. These effects need to

be examined in a larger proportion of populations and cultures before any firm conclusions can be made.

Whilst student diet-related behaviours and food choices are clearly a cause for concern, a systematic understanding of the key determinants of students' food choices is largely unexplored. This study therefore seeks to obtain data which will help to address this gap. No study has yet examined the correlates between student anxiety and food choice and how both factors relate to nutrition label use in university groups. In order to achieve this, a recognised paradigm for studying food choices in this research area will be adopted, involving alternate product evaluations (Siegrist, Leins-Hess and Keller, 2015; Bialkova et al., 2014; Cooke and Papadaki, 2015; Feunekesa, Gortemakera, Willemsa, Liona & Van den Kommerb, 2008; Naughton et al; Scarborough et al., 2015).

The main research questions to be explained in this study were therefore to consider:

i) What is the effect of the three non-sensory factors of FOP nutrition information, price, and product health claims on consumers' perceptions of the healthiness, appeal and value for money of different food items?

ii) How do FOP nutrition information, price and product health claims combine to influence students' food-product purchasing decisions?

iii) What is the relative importance of nutrition information against other competing sensory (e.g. taste) and non-sensory (e.g. ethical beliefs) product attributes on food choice in student groups?

iv) How is nutrition label use and motives for food choice linked to anxiety in student groups?

Method

Participants

Undergraduate students from six universities took part in this investigation. A total of 257 students (207 female and 46 male) began the survey, with 225 completing all product evaluations and questionnaires. This resulted in a final response rate of 90.3%. Participants ages ranged between 18 and 64 (*M*=19.80, *SD*=4.82). The sample was predominantly drawn from students at the University of Portsmouth (80.5%), from a range of degree courses and years of study. The remaining participants (19.5%) were recruited from five different geographically dispersed universities (Coventry, UEA, Exeter, Huddersfield & Staffordshire University), in an attempt to gain a broader representation of the nutritional and food purchasing habits of university students across the UK.

A number of methods were employed to recruit participants for this study. First year psychology students (*n*=207) were recruited through the University of Portsmouth, Department of Psychology participant pool system and were awarded course credit for their time. The remaining participants (*n*=46) were recruited via opportunity sampling of friends and associates known to the researcher and received no incentive or payment for their participation. These participants were recruited via a combination of advertisements placed on social media and direct eMail or online communication. All participants gave their formal consent to participate. It was noted that the sample reported an average weekly food spend of £26.62 (*SD*=18.47), ranging between £5.00 and £150.00 per student. This is similar to findings revealed in a recent survey, which found that students (*n*=2486) in England spend an average of £24.00 on weekly groceries (Natwest's Student Living Index, 2015). However, this differs to a typical non-student household in the UK who spend an average of £54.00 on food and £4.80 on non-alcoholic drinks every week. In the current sample, 76% of students reported grocery shopping in-store and 4.3% of students online, at least once per week. 47.9% of students reported using a shopping list, whereas 43.6% of students were considered to be more spontaneous shoppers and indicated buying whatever appealed to them when in-store (*n*=235).

Design

A 2x2x2 (product cost x nutritional label x health claim) mixed factorial design was employed. The first independent variable was the marked price of the product with participants being randomly allocated to one of two conditions: high-cost or low-cost products. This happened automatically once formal consent had been obtained.

In the first part of the study participants were requested to evaluate 20 different images of food products, with respect to its healthiness, value for money and overall appeal. Responses were measured on 10-point semantic differential scales, ranging from “not healthy to very healthy,” “not good value for money to very good value for money” and "not appealing to very appealing”. These comprised the three main dependent measures.

Examination of the required sample using power analysis suggests that to achieve a power value of 0.8, assuming a medium observed effect size (Cohen's *d*=0.5) and a two-tailed significance level of 0.05, a minimum sample size of 64 participants in each condition would be required (Cohen, 1992). In the present study, half of the participants (*n*=118) saw products labelled with a more expensive price and approximately half (*n*=118) saw the same products labelled with a lower price. The price difference between the two cost conditions was set between £0.60 and £1.00 depending on the product being evaluated.

The second independent variable was the front-of-pack (FOP) nutritional label. Participants saw four examples of each product type with the FOP label being manipulated to reflect 'good' (relatively healthy) nutritional information on two products and 'bad' (relatively unhealthy) nutritional information on the other two products. The perceived healthiness of the product was altered by manipulating the number of red, amber and green colour-codes shown for Fat, Saturates, Sugars and Salt content, within the standard FOP label guidelines proposed by the Department of Health and the Food Standards Agency (2013). Colour-codes are applied to all key nutrient information present in FOP labels, with the exception of energy which is always shown in white. Red represents high nutrient levels, amber; medium and green; low nutrient levels. One FOP label was presented alongside each product image including the price (Figure 1). All participants saw the same pairing of product stimuli and nutrition label type.

The final independent variable was the presence or absence of health claims made on the manufacturer's packaging. Two of the four items for each product category had health claims present on the FOP packaging (e.g. “0% fat,” "light", "diet", "reduced"). These items will be collectively referred to as ‘light’ products in this study. Conversely, products where no health claims were visible on FOP design will be referred to as ‘regular.’

One light and one regular product in each food category were paired with a good nutrition label. The remaining two items (one light, one regular) were paired with a bad nutrition label. The study design was therefore balanced such that each participant saw all possible combinations of nutrition labels and product health claim packaging.

Materials

Images of food items

Five product categories were used in the study. Categories were chosen by asking a selection of undergraduates (*n* = 10) across the universities, to write down food items they most commonly purchased. The most frequently reported product categories (breakfast cereals, pasta sauce, crisps, yoghurt and bread), were used in the main study. FOP images were sourced from a national food retailer website, enabling the average nutritional profiles for each category to be used as a baseline, when manipulating nutritional values across items. Images were resized to occupy a consistent display area on the computer screen (Figure 1). Product characteristics that were clear enough to be seen and that were likely to confound the main experimental manipulations (e.g. original FOP labels), were digitally removed using Photoshop. Otherwise, all aspects of the original packaging were left unaltered.

Figure 1: An example of a high cost bread item, with a good nutrition label, as presented to participants in the high cost condition

FOP nutrition labelling system and colour-codes

A template of a standard nutrition label was created and edited in Photoshop, to create 20 different nutrition labels that were paired with each product stimulus. Numerical information was kept consistent for all items in each product category. Alterations of <1g per serving size/100g, above or below each product's true values were made, in order for labels to appear visually different from one another. Alterations of <1% Reference Intake (RI), for an average adult above or below each product's true values were made, for the same reason.

In the 'good' nutrition condition, labels always consisted of two green and two amber colour-codes and in the 'bad' nutrition condition, labels always consisted of one green, one amber and one red colour-code. The key nutrient to which colour-codes were applied was systematically varied across products, and did not necessarily match the nutrient numerical values present (i.e. grams and RI %), in order to investigate the effectiveness of FOP colour-codes in correctly influencing students' perceptions of product 'healthiness'.

Questionnaire Measures

The General Health Interest and Knowledge Questionnaire (GHIK-Q): In order to assess participants' general attitudes towards healthy eating, nutritional knowledge, food shopping habits and lifestyle, a 32-item questionnaire was constructed. Items were developed from common themes found in the existing research literature concerning healthy eating (e.g. personal interest in health issues, perception of light and natural food product importance, etc.) and by adapting some items from existing food-related scales (e.g. the Health and Taste Attitudes Scale (HTAS), Roininen et al, 2001). Items consisted of short self-evaluative statements (e.g., 'I feel that I cannot eat a healthy diet because of my budget.'). Responses were made on a 7-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree" and were statistically evaluated using Factor Analysis to identify the primary latent constructs within the questionnaire.

Food Choice Questionnaire (FCQ): An adapted version of the FCQ (Steptoe, Pollard & Wardle, 1995) was used to examine some of the key motivations and influences underlying students' food choices. Participants were asked to affirm the statement "It is important to me that the food I eat on a daily basis…" by responding to a series of different food-related prompts some of which are health-based (e.g. "…is high in protein") or non-health based ("…is like the food I ate when I was a child"). Responses are rated on a 10-point Semantic Differential Scale with end-points of 1 (Very Unimportant) to 10 (Very Important). Mean importance ratings (between 1 and 10) were calculated for each aspect of food choice, as measured by each sub-scale for each participant, with higher scores indicating the factor had greater importance as a determinant of the participants food preferences. Steptoe et al. (1995) report the internal consistency of the FCQ factors to be high, with Cronbach's alpha scores of mood = 0·83, convenience = 0·84, sensory appeal=0·72, price=0·83, weight control=0·85, familiarity=0·72, and ethical concern=0·74.

Table 1

Sub-scales from the Food Choice Questionnaire (Steptoe et al., 1995) used in the present study

FCQ Factor	Definition	Example item: *"It is important to me that the food I eat on a daily basis…"*
Mood	Importance of choosing food that makes consumer feel better about themselves.	… cheers me up.
Convenience	Importance of choosing food that is easy to access and prepare.	… can be cooked very simply.
Sensory Appeal	Importance of choosing food that is pleasant to see, smell and taste.	… smells nice.
Price	Importance of choosing food that is not expensive or extravagant.	… is good value for money.
Weight Control	Importance of choosing food that does not affect participant's weight.	… is low in calories.
Familiarity	Importance of choosing food with which the participant is habitually familiar.	… is what I usually eat.
Ethical Concern	Importance of choosing food which reflects the participant's ethical, moral and political beliefs.	… is packaged in an environmentally friendly way.

Six-item short-form of the Spielberger State-Trait Anxiety Inventory (STAI-6): In this study, this six-item short-form of the STAI, developed by Marteau & Bekker (1992), was used to assess students generalised level of anxiety. This is a validated questionnaire, consisting of three anxiety present statements (I am tense, I am worried and I am upset) and three anxiety absent statements (I feel calm, I am

relaxed and I feel content), with a 4-point Likert rating scale. However, an adapted response prompt was used, whereby participants were asked to indicate how they generally feel, rather than giving a time-dependent response. Scores range from six and 24, with high scores implying greater levels of trait anxiety. A score of 40 or above on the full version of the scale, is thought to indicate potentially clinical symptoms (Knight, Waal-Manning & Spears, 1983). The authors report the reliability of the STAI-6 (Cronbach's alpha = 0.82) to be consistent with that found for the STAI-20 (Cronbach's alpha = 0.91). For the current sample, the reliability coefficient (Cronbach's alpha) of the STAI-6 was found to be 0.86 (n=232). In comparison to available norm data (based on the STA1-20), students (M=46.11) in this sample did not significantly differ in levels of trait anxiety from medical students (M=46.20), p =. 901 *n.s.* (Marteua & Bekker, 1992), but scored significantly higher than non-clinical volunteers (M = 33.39), p<.001 (Bieling, Antony & Swinson, 1998).

Procedure

This study was presented to participants via the online survey hosting website, *Qualtrics*. All students gave their formal consent to take part, by clicking on the response option of the consent page, before proceeding. Demographic information (age, gender, student status) was collected before being randomly assigned to either the high-cost or low-cost product condition.

In the first part of the study, participants evaluated a total of 20 images of food products, with respect to perceived healthiness, appeal and value for money. Four examples of each food item were displayed sequentially with the order of the five different categories of food product being randomly determined for each participant. Respondents provided product evaluations immediately after seeing each individual food image. Rating scales were located beneath each item. The format of presentation was consistent across all 20 images and there were no time constraints for participants to make their assessments.

After completing evaluations of all four examples within one food category, all four products were again displayed concurrently. This time horizontally, with a nominal price situated underneath each item (Figure 2). No nutrition labels were shown at this stage.

Figure 2: An example of the re-priced items

In conjunction with this, participants were asked the following question: "If the four [named category: e.g. pasta sauce] products you have seen were re-priced, which would you purchase?" The four price points shown were selected such that for two items (one light, one regular) an identical price was shown, which was set to fall approximately mid-way between the high-price and low-price item (i.e. intermediately priced) choice being compared. The highest price option was always set to the price of the most expensive product displayed in the high cost experimental condition and the lowest price option was always set to the price of the cheapest product displayed in the low cost experimental condition. For this part of the study, all participants viewed the same four products and price points when making their purchase decisions. This forced-choice design was used in order to determine (i) the number of times participants chose a high-cost 'light' product over a much lower cost 'regular' product and (ii) the number of times participants would choose a 'light' product over an identically priced 'regular' product. Participants were also asked to briefly explain their choice.

After completing evaluations of the food items in the experimental part of the study, participants completed the two food-related questionnaires (GHIK-Q and FCQ), followed by the STAI-6. The average survey completion time was 21 minutes.

This study was conducted in accordance with the British Psychological Society's (BPS) ethical guidelines and code of practice for research involving human

participants and was subject to ethical review as specified by the University of Portsmouth, Department of Psychology Research Ethics Committee (Appendix 1).

Results

In this section: (i) an analysis of students' evaluations of the healthiness, appeal and value for money, of different products is first considered, as a function of health claims, nutrition information and product cost; (ii) Results of a factor analysis of the GHIK-Q, is then presented, to provide an evaluation of the key components which underlie student food choices; (iii) Next, Pearson's correlations between the GHIK-Q and the FCQ are considered, to assess the relationship between these two models of food choice; (iv) A content analysis of core motivators for students' food choices, based on their qualitative responses to the food selection tasks is then provided; (v) Lastly, the role of trait anxiety in relation to key determinants of food choices is evaluated.

How does the presence of health claims, nutrition information and product cost influence students' perceptions of food products?

The three product evaluation measures (healthiness, appeal and value for money) were analysed using a 2 (health claim: present or absent) x 2 (Nutrition Label: good or bad) x 2 (cost: high or low) mixed multivariate analysis of variance (MANOVA) to explore whether there were differences in participants' evaluation ratings between conditions. A significant multivariate effect of health claim was found ($F(3,232)=65.10$, $p<.001$, Wilks' $\lambda=.54$). This suggests that on its own, the presence of health claims on the products packaging influenced students' product evaluations. Univariate data for each main effect are shown in Table 2. The separate univariate analyses revealed that 'light' products (i.e. health claims present), were rated as less appealing, were not considered good value for money, but received higher ratings of perceived healthiness, in comparison to regular products.

A significant multivariate main effect of nutrition label was also found ($F(3,232)=128.40$, $p<.001$, Wilks' $\lambda=.38$), suggesting that nutritional labels in general, played a prominent role in influencing students' perceptions of product qualities. Univariate analyses indicated that products which were paired with a good nutrition

label, were always rated as healthier and more appealing, but were not considered to provide better value for money than regular products.

The multivariate main effect of product cost was also found to be statistically significant ($F(3,232)=60.16$, $p<.001$, Wilks' $\lambda=.56$). Low-cost items received significantly higher ratings for value for money, however no differences in product healthiness or overall appeal between high and low-cost products were observed.

Further examination of the multivariate interaction effects suggested a significant interaction occurred between Health Claim and nutrition label ($F(3, 232)=112.86$, $p<.001$, Wilks' $\lambda = .407$, $\eta^2p=.59$). Figure 3 illustrates the interaction of health claim and nutrition label on product healthiness evaluations ($F(,232)=30.327$, $p<.001$, $\eta^2p=.115$). Light products received significantly higher ratings of healthiness, compared to regular products. This was more pronounced when the health claim was shown in conjunction with a 'good' nutrition label (containing no red 'traffic lights'). It follows that both good nutritional information and 'light' or 'healthy' packaging claims were required for products to be evaluated as healthier. No other significant two-way or three-way multivariate effects were found.

Figure 4 illustrates the interaction of health claim and nutrition label on ratings of product appeal ($F(1,234)=197.329$, $p<.001$, $\eta^2p=.446$). Light products were rated as more appealing than regular products when combined with poor nutritional information. Paradoxically, products with good nutritional information were evaluated as more appealing when combined with regular products.

No significant univariate interaction between nutrition label and Health Claim occurred when ratings of value for money were assessed ($F(1, 234)=3.412$, $p =.066$ n.s., $\eta^2p=.014$)

Table 2

Main effects of health claims, nutrition labels and product cost on participants' (*n*=236) perception of food products

Measure	IV	Condition	*M*	95% CI		*F*	*p*	η^2
				Lower Bound	Upper Bound			
Health	Health Claim	Light	5.85	5.70	6.00	129.57	<.001	.36
		Regular	5.34	5.18	5.49			
	Nutrition Label	Good	6.11	5.96	6.26	219.86	<.001	.48
		Bad	5.07	4.90	6.26			
	Cost	Low	5.73	5.52	5.93	3.27	.07 n.s.	.01
		High	5.46	5.25	5.66			
Appeal	Health Claim	Light	5.88	5.73	6.04	6.47	.01	.02
		Regular	6.02	5.87	6.18			
	Nutrition Label	Good	6.35	6.20	6.51	201.33	<.001	.46
		Bad	5.56	5.40	5.71			
	Cost	Low	6.06	5.85	6.26	1.10	.16 n.s.	.01
		High	5.85	5.64	6.06			
Value	Health Claim	Light	5.55	5.39	5.71	43.97	<.001	.16
		Regular	5.85	5.68	6.02			
	Nutrition Label	Good	5.73	5.56	5.89	1.16	.28 n.s.	.01
		Bad	5.67	5.50	5.84			
	Cost	Low	6.57	6.35	6.80	116.70	<.001	.33
		High	4.83	4.60	5.05			

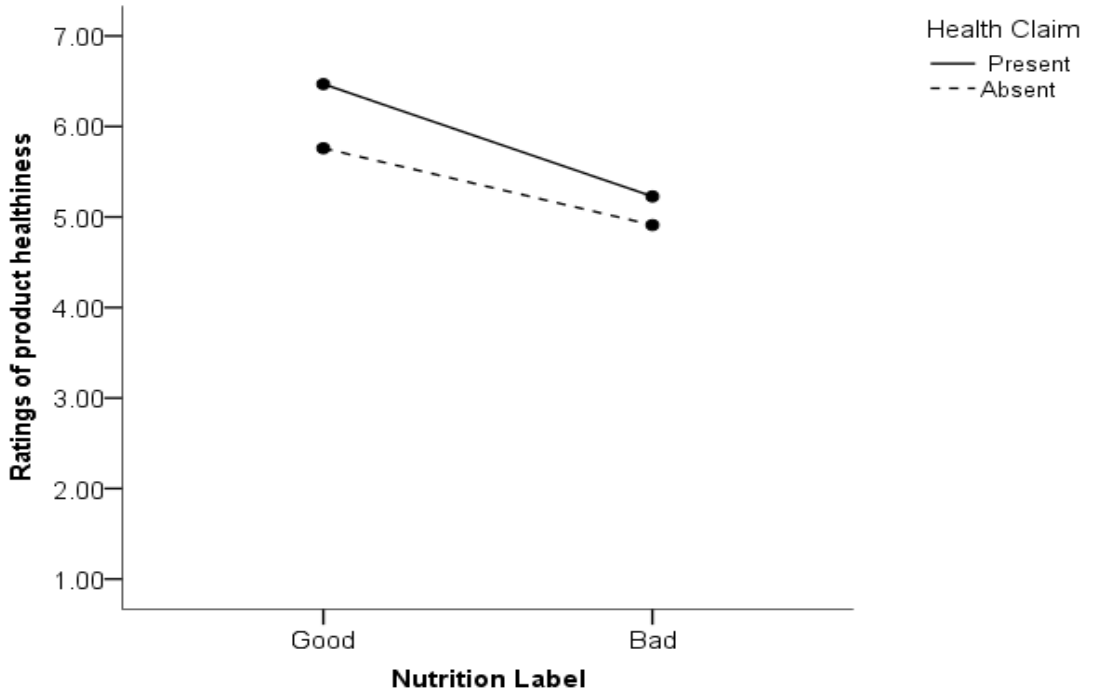

Figure 3: Students ratings of products healthiness with good and bad (colour codes) nutrition labels and whereby a health claim was either present or absent

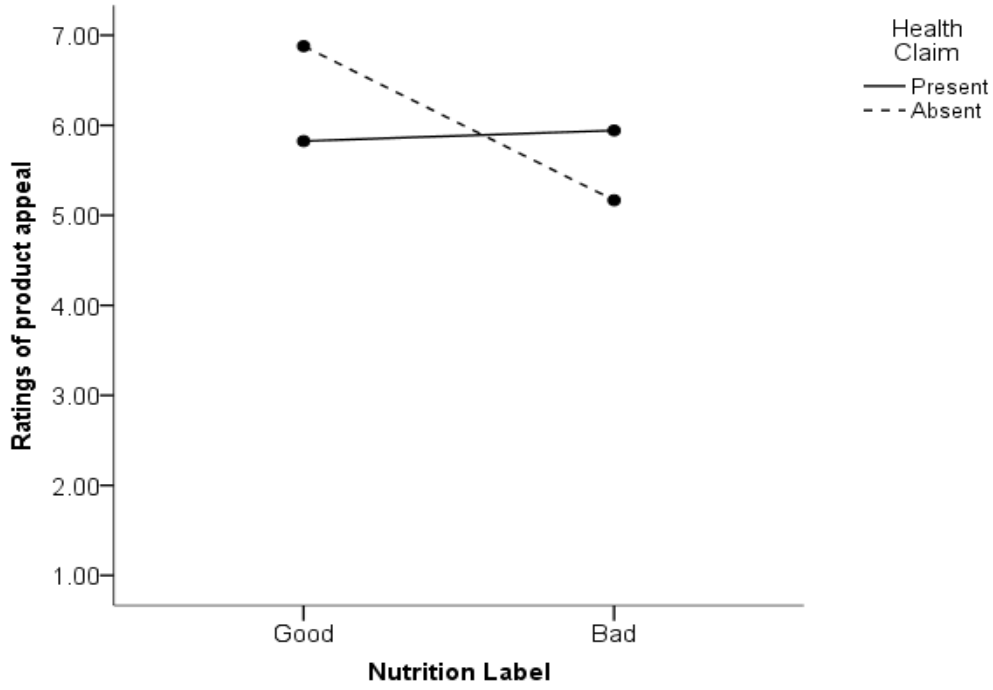

Figure 4: Students ratings of product appeal with good and bad (colour codes) nutrition labels and whereby a health claim was either present or absent

Do students choose value over health claims?

To evaluate the relative importance of product cost verses 'healthiness', a one-way ANOVA was conducted comparing the four combinations of cost (high or low price) and health claim (present or absent). In order to examine the frequency with which students selected each product type (regular and light) and cost combination. A significant difference between group means ($F(2, 255)=165.06$, $p<.001$, Wilks' λ = .44, η^2p= .56), was observed, with a large effect size. Figure 5 illustrates that intermediately priced, light products (M=0.65, SD= 0.76) were chosen approximately twice as many times as high cost, light products (M=0.37, SD=0.70). However, no difference was observed between the number of times an intermediately-priced regular product and low-cost regular product was chosen, with both conditions having identical means (M=2.08, SD=1.26). This demonstrates that regular products that were reasonably priced were the most appealing for students. And so, value for money rather than health claims, was a key determinant of students' food choices, with regular products being selected significantly more often than light products.

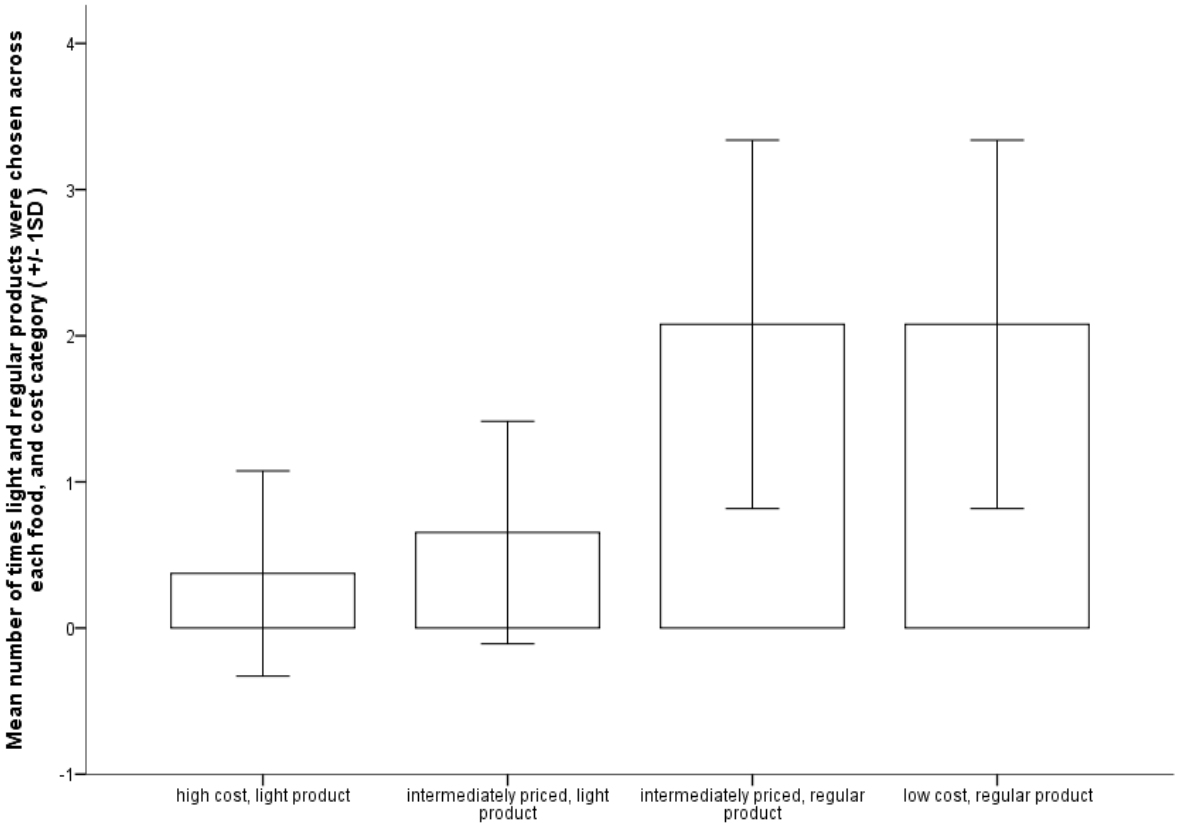

Figure 5: Shows the mean number of times, each product was chosen as a function of cost (high or low) and health claim (present or absent) (n = 257)

Underlying components of food choice

To explore the pattern of responses in participants' replies to the 33-item GHIK-Q, a factor analysis was performed. Parallel analysis was performed using Monte Carlo principal components extraction (Watkins, 2000; 2005), to determine the number of factors, that best captured, the underlying components of food choice measured by the questionnaire. The Kaiser-Meyer-Olkin measure (.84) suggested a good factor model.

Parallel analysis compares the size of the eigenvalues with those obtained from a randomly generated data set of the same size. Only three factors were retained that exceeded the maximum eigenvalue, from the randomly generated data set (=1.78). This method of identifying the correct number of components has been shown to be the most accurate, when deciding how many factors to keep (Pallant, 2010). The three-factor solution accounted for 39% of the variance in responses. Oblique rotation was used to determine factor composition. Factor loadings for each item are shown in Table 3.

The first factor, which accounted for 23.19% of the variance in food behaviours, was titled "health consciousness". Positive loadings on this factor suggest food purchasing behaviour would be greatly influenced by positive nutritional information on packaged goods, as well as healthy ingredients without artificial substances.

The second factor that emerged from this analysis, accounted for 10.26% of the variance in food behaviours. This factor was named "light sceptic," as items that constituted this factor reflected a belief that light products are <u>not</u> necessarily better for one's health. Positive loadings on this factor suggest that individuals were less likely to choose food products that were marketed with claims of being lower in fat or sugar.

The third factor that was extracted accounted for 5.87% of the variance in food behaviours. This factor was termed "food knowledge certainty," as items that contributed to this factor were mainly related to nutrition knowledge and awareness. Positive loadings on this factor, suggest that students were habitual shoppers, very definite about what food types they thought were healthy, and less willing to buy unfamiliar food items.

Table 3

Factor loadings for the factor analysis of the General Health Interest and Knowledge Questionnaire (GHIK-Q)

Question	**Oblimin primary factor**		
	Factor 1	Factor 2	Factor 3
It is important to me that the food I eat on a daily basis is nutritious	.79	-	-
I am very particular about the healthiness of food	.76	-	-
It is important to me that the food I eat on a daily basis keeps me healthy	.75	-	-
I eat what I like and I do not worry about healthiness of food	-.71	-	-
It is important to me that the food I eat on a daily basis contains a lot of vitamins and minerals	.69	-	-
It is important to me that the food I eat on a daily basis is high in protein	.65	-	-
The healthiness of food has little impact on my food choices	-.64	-	-
I usually look at nutrition information on products before deciding to buy	.63	-	-
The healthiness of snacks makes no difference to me	-.60	-	-
I do not care about additives in my daily diet	-.60	-	-
I always follow a healthy and balanced diet	.60	-	-
It is important to me that the food I eat on a daily basis is good for my skin/teeth/hair/nails	.59	-	-
I try to eat foods that do not contain additives	.58	-	-
It is important to me that my diet is low in fat	.56	-	-
I regularly take some form of physical exercise	.55	-	-
I try to get variety in my diet	.54	-	-
I do not try to avoid any foods, even if they may raise my cholesterol	-.51	-	-
There are specific reasons that affect my food choices (e.g. diabetic, special dietary requirements)	.38	-	-
I would like to eat only organically grown vegetables	.31	-	-
I feel that I cannot eat a healthy diet because of my budget	-.28	-	-
In my opinion light products don't help to drop cholesterol levels	-	.81	-
I do not think that light products are healthier than conventional products	-	.79	-
In my opinion, the use of low fat/light products does improve one's health	-	.78	-
I believe that eating light products keeps one's cholesterol level under control	-	-.75	-
I believe that eating light products keeps one's body in good shape	-	-.74	-
In my opinion, by eating light products one can eat more without consuming too many calories	-	-.45	-
Sodium and salt are the same thing	-	-	.54
In my opinion, artificially flavoured foods are bad for my health	-	-	.37
If I am buying food and I feel under time pressure, this affects how I shop	-	-	.34
All saturated fats are bad for my health and should be avoided	-	-	.32
I usually always end up buying the same things when I go shopping for food	-	-	.32
I am aware of what Reference Intakes are	-	-	-.23
In my opinion, organically grown foods are no better for my health than those grown conventionally	-	-	.20
Eigenvalue	7.65	3.39	1.94
Total variance explained by factor %	23.19%	10.26%	5.87%

Relationship between the General Health Interest and Knowledge Questionnaire and the Food Choice Questionnaire (Steptoe et al., 1995)

Pearson's correlations were computed between each sub-scale of the GHIK-Q and the sub-scales of the FCQ. These analyses revealed seven significant correlations between health consciousness, light scepticism and food knowledge certainty with the FCQ sub-scales, once Bonferonni corrections for repeated testing were applied (Table 4).

Table 4

Pearson's correlations between GHIK-Q and FCQ sub-scales (N=232)

	FCQ Sub-scale						
GHIK-Q Sub-scale	Mood	Convenience	Sensory appeal	Price	Weight control	Familiarity	Ethical concern
Health Conscious	.08	-.27***	-.06	-.12	.54***	-.05	.30***
Light Sceptic	-.01	-.05	.14*	-.13*	-.40***	.04	-.02
Food Knowledge Certainty	.28***	.19**	.29***	.30***	.07	.14*	.10

*p<.05 (2-tailed), **p<.01 (2-tailed), ***p <.001 (2-tailed)

Note. Bonferroni corrected probability for family-wise error is p = .0024

A negative correlation was found between health consciousness and convenience suggesting that students who obtained high scores on health consciousness were less attracted to products that were quick and easy to prepare. Significant, positive correlations were found between weight control and ethical concern, with health consciousness. These suggested that where weight management and ethics were a primary influencer of food choices, students were also more likely to be health conscious.

A negative correlation between light scepticism and weight control were found, signifying that students' who are sceptical of light products, were unlikely to purchase food items for reasons relating to weight control.

Food certainty was correlated positively with mood, sensory appeal and price, suggesting that students who more regularly choose familiar products are more attracted to cheaper foods with high emotional appeal.

Relationship between food choices with health consciousness, light scepticism and food knowledge certainty

GHIK-Q sub-scales were correlated with the number of times high or low-cost, light and regular products were selected (Table 5). Students who scored highly on health consciousness were more likely to choose expensive light products during the food selection task. The reverse effect was observed between food knowledge certainty and the frequency of selecting high cost, light products suggesting that students who obtained higher scores for food knowledge certainty, selected high cost, light products less often. No correlations were found between light scepticism and the number of times products were chosen. Additionally, students who reported a greater use of nutrition labels were also found to be more likely to purchase high cost, light products.

Table 5

Correlations of frequency of food choice, as a function of cost, with the GHIK-Q sub-scales (*n*=233)

Factor	High cost, light product	Intermediate cost, light product	Intermediate cost, regular product	Low cost, regular product
(1) Health Conscious	.19**	.09	-.09	-.09
(2) Light Sceptic	.00	.04	-.05	-.05
(3) Food Knowledge Certainty	-.13*	-.01	-.01	-.01
(f2) Uses nutrition information	.19**	.08	-.11	-.11

*p<.05 (2-tailed), ** p<.01 (2-tailed)

Note. Bonferroni corrected probability for family-wise error is p = .0042

Motives for students' food choices

As part of the food selection task, participants were asked which of the four product items within each category they would purchase and why. Theme-based content analysis (TBCA) was applied to their responses. Table 6 shows seven main themes that students used to explain their food choices with the number of times each theme was mentioned.

Responses corroborated earlier statistical analyses showing that the cost of an item was the single most influential factor that both determined and restricted product choice, where students were on a tight budget. This took precedence over nutritional value. Another common reason for product selection was value for money. Students often expressed a willingness to pay more for a product, if the utility of their investment could be maximised; e.g. being able to get more than one meal out of a product. The cost of the item was seen as justified if there was more than one aspect of the item that made it worth paying for. This could have been a combination of taste, health, appealing packaging or quality.

Sensory Appeal was the third most influential factor motivating students' food choices. The sensory attributes of the food products often took precedence over the health aspect when selecting food. When students reported no difference in taste perceptions, between products, the cheapest item was preferred. Students expressed the importance of balance between enjoying the food you eat, as well as making healthy choices. Likewise, students would not select healthier options, if it meant they would not enjoy it.

Table 6

Main themes identified using content analysis, highlighting students' reasons for food product choices (n = 232)

Theme	Definition	Number of Times Mentioned	Indicative Reasons Given by Students
Price	The price of an item was the predominant influencer in product choice	217	"Cheapest wins when you're on a student loan" "I am a student, I don't have money to spend on fancy bread"
Value for Money	Indicates money well spent, or the utility derived from the product choice	179	"Would get more use out of a larger container rather than a smaller one ...more desserts!" "with 24 pieces that box would be enough for 18 breakfasts and that's much more than a basic box of cereal would provide so despite it being slightly more expensive, its better value for money and also the most healthy"
Sensory Appeal	Describes gratification of any of any of the five senses	135	"In my opinion, the crunchy nut option is far the most appealing as it tastes the best and I'm not fussed about how healthy I'm being" "I prefer the taste of crunchy nut compared to regular/healthier products"
Health	Respondents indicated choosing a product because it was perceived to be healthier or nutritionally more valuable.	111	"All of the light or 0% fat/sugar products are actually less healthy than their originals because of the substitutes they put in there to compensate" "I'd choose the product with less sugar, no matter the price"
Familiarity and preference	Respondents indicated previous product experience. Liking the product was the primary influencer in product choice	108	"I would go for my favourite out of the four as I know I like it, regardless of price" "Crunchy nut is a brand that I know and love – you have to enjoy what you're eating as well as being healthy, there is a balance"
Brand Trust	Respondents indicated trust in the quality of branded goods, demonstrating an assumption that commercial brands are better than store brands	33	"Brands which you know are good, like Dolmio, you think will taste better so I'd be more obliged to go for it, as I find that own brands taste cheap and not very nice" "The everyday value one didn't seem healthy enough; It's too cheap to be good!"
Package Design and Marketing	Responses indicates an attraction to the products packaging and thus enhanced appeal	28	"I prefer the packaging" "Cheap product but still gives the impression of being healthy, appealing packaging (doesn't come across as a value product)"

Almost half of students expressed that the nutritional value of products was an important factor when deciding which food to buy. Some students indicated choosing a product because it was lower in salt or sugar, or higher in fibre. Many students spoke negatively of light products and expressed concerns about the manufacturing of such goods, communicating the belief that light products were typically not healthier than regular products. This was especially the case for the yoghurt category.

Confidence and familiarity in the quality of the product was an additional theme identified by students. Students reported choosing items they knew how to cook with. In addition, some respondents indicated that product packaging alone was a primary influence on food choice, when a lack of experience with other alternatives existed. In such instances, recognised, commercial brands were likely to be selected.

The relationship between anxiety and food choice

Pearson Correlation coefficients were calculated to examine the degree to which trait anxiety was associated with students nutrition label use. A small, but positive correlation, was found between levels of trait anxiety and reported nutrition label use, ($r(n=232)=.13$, $p=.048$). This shows participants who scored higher on trait anxiety were more likely to report using nutritional information, when making food purchasing decisions in everyday life.

In addition, Pearson correlations between anxiety and motivations for food choice, showed that individuals higher in trait anxiety tended to be more concerned about product cost ($r(n=232)=.15$, $p=.19$), more motivated to purchase food associated with weight control ($r(n=232)=.15$, $p=.025$ and were more likely to stick to familiar products (i.e. food knowledge certain), ($r(n=232)= .15$, $p=.023$), when deciding which food products to buy. However, it should be noted that food choice correlations with anxiety were generally associated with a small effect size ($r <.2$) and once Bonferroni correlations for family-wise error were applied, these relationships became not statistically significant (Table 7). This suggests that further evaluations of the relationships between anxiety and food choice may be required.

Table 7

Correlations between Anxiety and motivations for food choice (*n*=232)

Factor	Anxiety Score
Mood	.12
Convenience	.11
Sensory Appeal	.06
Price	**.15***
Weight Control	**.14***
Familiarity	-.02
Ethical Concern	-.03
Health Conscious	-.01
Light Sceptic	-.09
Food Certainty	**.15***

*. Correlation is significant at the .05 level (2-tailed).

Note. Bonferroni corrected probability for family-wise error is p = .0045

Discussion

This study sought to consider the important issue of student dietary practices. In particular, to evaluate how students interpret and respond to indications of food quality (packaging, health claims and nutritional labels) verses cost, when deciding what products to buy. The impact of personal attributes including trait anxiety levels and multiple components of health and purchasing attitudes on food choice, were also taken into consideration.

Students' evaluations of packaged foods healthiness and appeal varied as a function of the FOP colour-codes. In other words, products that were presented in conjunction with a relatively healthier nutrition label, received higher ratings of healthiness and appeal. This provides evidence that students do respond to nutrition information when considering food and adds support for the effectiveness of the FOP colour-codes in aiding consumers' judgements, with regards to a products' nutritional

value (Borgmeier & Westenhoefer, 2009; Kelly et al., 2009; Hawley et al., 2013). In contrast to some previous research (e.g. Siegrist et al., 2015), participants in this study were required to make decisions in the presence of realistic images of food packages, alongside the nutritional information for each product. It could be argued that even with the presence of competing variables, such as brand information and package designs, which have been shown to influence consumers' perceptions (Ares et al., 2010; Van kleef et al., 2005; Lalor et al., 2011), students still process the nutritional colour-codes of the FOP labelling system. One of the most worthwhile aspects of this labelling system is that it is accessible to consumers who may not possess extensive nutrition knowledge, or may not understand the numerical information presented along with signposting cues (i.e. FOP colour-codes). However, it is known that label comprehension and perceiving a product as healthy in itself, may not necessarily influence food purchasing behaviour (Sacks, Rayner & Swindon, 2009; Wills et al., 2012) and therefore, may not necessarily affect students diet quality (Ollderding, Wolf & Contento, 2011) outside the experimental context of this study.

Other factors influencing consumer food choices are price and taste (Lalor et al., 2011). Less than half of the students (39%) in this study reported using nutrition information when making food purchasing decisions. These results are similar to data collated in a recent review paper (Cristoph et al., 2015), in which a weighted average of label use frequency among college students and young adults was calculated. Interestingly, it is known that the frequency of nutrition label use is typically much lower among sub-groups of the population with lower income (Compos et al., 2011). It was found in the current study that when given the choice between higher-cost healthy products and lower-cost regular products, students indicated a strong preference for the latter.

Qualitative data obtained from the food selection task, also suggested that price was the principal reason for product selection, followed by value for money and sensory appeal. These factors often took precedence over other decision-making criteria such as health, familiarity, brand trust and package design. These findings are consistent with previous models of food choice (e.g. Steptoe et al., 1995) which were primarily based on student samples and found that sensory appeal, convenience and price were more important to consumers, although sensory appeal was rated less

favourably for lower income groups. The researchers suggested that this may have been because individuals with less disposable incomes are less able to take taste into consideration, against other competing priorities.

Students perceived light products as healthier than regular products, but less appealing and less value for money. However, mean ratings of product healthiness were far greater as a function of the FOP colour-codes than as a function of health claims (Table 2). This highlights that whilst health claims can have a positive influence on consumers' perceptions of product healthiness and can provide a useful guide in helping consumers identify healthier food products, nutritional information, such as FOP labels, which are perhaps seen as having more scientific credibility, have a more prominent role in influencing consumers' perceptions of product healthiness.

Regular products were chosen about three times more often than light products in the food selection task. This could have been because students were inferring taste, based on the health claims present. Generally, consumers prefer high fat products because of their taste-related expectations (Miklavec, 2015). Some students in justifying their product selections often mentioned the actual "unhealthiness" of many ostensibly low fat products, demonstrating high product awareness and knowledge on the part of some of those surveyed. For example, it was highlighted that to remove something, like fat, in a product, it would be necessary to compensate for taste, by adding in additional unhealthier ingredients, in an attempt to preserve taste, and thus these products may not necessarily be better for you (Miklavec, 2015). Students often expressed the view that yoghurt was an inherently healthy product, and consequently displayed negative attitudes towards the additional health claims made on the packaging of these products. This observation is consistent with previous studies showing consumers have pre-determined attitudes towards products which make health claims (Groeppel-Klein, 2010). Furthermore, these findings are in line with previous research which have shown that consumer' perceptions of products healthiness were primarily based on the nutritional value of the base product, rather than the health claims (Bech-Larson & Grunert, 2003). Likewise, students' perceptions of the inherent health benefits of the base product led to negative attitudes towards these products health claims, leading to a decreased willingness to purchase these items in the food selection task. However,

health claims may be regarded as more acceptable on some products as opposed to others, although this does not necessarily alter existing attitudes towards the product. On the other hand, products that are perceived as being less healthy have been shown to benefit more from carrying health claims (Wills et al., 2012). A finding consistent with the general observation in the current study that products labelled as "light" were rated as being more healthy than regular products.

Whilst health was still identified as a relatively important motivator for product choice by a fair proportion of the current sample (*n* = 111), it seems that for many students, a perceived lack of means to be able to afford healthier food more often, may contribute to the range of products they limit themselves to choosing. Health may be relevant, but not a sufficient factor when it comes to selecting which foods to buy, which sometimes is sacrificed to remain within budget.

It follows that future nutrition education programmes in this population may need to show students how they can make cheap and healthy meals quickly, as individuals perceived lack of cooking skills have been linked to poorer diet quality (Graham et al., 2013). Cooking classes can equip students' with the skills and confidence in their ability to prepare healthy meals, increasing self-efficacy. Such education programmes could also work to increase knowledge and attitudes towards the importance of food quality, given the lack of reported nutrition information use in the present sample. Since students in this study showed a strong preference for regular products over healthier products, even when identically priced. Cost alone does not simply determine student food choice. Issues such as the image and assumed attributes of 'light' products (e.g. taste, enjoyment) must therefore be considered. Future research could examine the effect, experimentally, of reducing the cost of healthy food items and increasing the price of typically less healthy items, to better understand the relationship between price and food purchasing decisions in student groups. Furthermore, Public Health interventions which are aimed at addressing the economic environment should prioritise both price and value (Steenhuis et al., 2011).

Partial evidence was found to suggest a relationship may exist between trait anxiety and nutrition label use, consistent with previous findings (Hansen et al., 2011). It has been suggested that anxiety may motivate consumers to search for health-related information in order to inform their final decisions with regards to a product's

nutritional value, due to a lack trust in product packaging claims, as reliable source of health-related information.

Weak relationships were also found between trait anxiety and motivations for food choice. Students who were generally anxious were more likely to choose food based on low price irrespective of budgetary constraints, concerns over personal weight control, and opt for choices which emphasized familiarity or consistency with their own food beliefs. As the cost of food was the primary determinant of food purchasing decisions in the sample as a whole, this effect appears to be magnified in those who have a general tendency to worry. Furthermore, as the majority of the study sample was first year students, it could be that a lack of previous experience in managing finances contributed to higher levels of concern with the cost of food. Interestingly, it is known that students who use nutrition labels are more concerned with the fat content and calories in food products (Marietta, Kathleen & Anderson, 1999). This is supported by the high prevalence of label use and greater concern over weight control among more anxious students in this study.

Taken together, these findings provide support for the notion that an individual's personal interests, student status and traits are influential in determining unique food choice criteria, as well as attention to nutrition information, in line with previous authors (Compos et al., 2011; Graham et al., 2013; Naughton et al., 2015; Silayoi & Speece, 2004; Wills et al., 2012). UK students provide a unique case when it comes to understanding food choices. Whilst they evidently are aware of and can accurately identify healthier food types, it seems that cost rather than health value remains a primary motivator of their actual choices. In addition, this study provides an indication of a relationship between trait anxiety levels and motivations for food choice. Although effect sizes were small, this does not eradicate the practical significance this may have in applied settings. Further investigation is required. It is fundamental to uncover ways in which barriers to healthy food choices can be overcome, among this population. So students feel able to both stay within budget and consume a good quality diet, which not only tastes good, but is considered good value for money, subsequently improving both physical and psychological well-being.

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