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Citation: Santos, S., Vilela, S., Padrão, P. and Caraher, M. (2015). Sex-related dietary changes of Portuguese university students after migration to London, UK. *Nutrition and Dietetics*, 72(4), pp. 340-346. doi: 10.1111/1747-0080.12154

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Food habits and food choice motives among university students settled in
London: The influence of gender and nationality.

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Abstract

Background: This paper reports findings from a survey carried out in April–May 2009 of English and Portuguese university students in London. The aim of this study was to assess the effect of temporary translocation from Portugal to London and the influence of gender and nationality on food habits and food choice motives of university students.

Methods: In total, 101 university students (55 Portuguese – 26 males and 29 females and 46 English – 15 males and 31 females) from 12 London universities were interviewed and a questionnaire comprising of three major sections: (1) food habits; (2) food choice motives; (3) food preparation and purchasing behaviours was completed.

Results: Women showed healthier food habits than men by consuming more fruit and vegetables. With temporary translocation, males were more likely to change their dietary habits in line with those of the host country whereas females were more likely to maintain their Portuguese dietary habits but showed some modifications in an undesirable direction. English students consumed more crisps, chips, cooked vegetables, fresh fruit juice and chocolate and Portuguese students consumed more rice, red meat, fish and vegetable soup.

Conclusions: Differences in food habits and food choice motives were found in these university students with gender and culture playing a part. These differences were higher between nationalities than between genders.

Keywords: University students; food habits; food choice; temporary translocation; gender; nationality

Introduction

Migration to a new country can lead to changes in food habits, through a process of acculturation (Lee, Sobal, & Frongillo, 1999). Younger immigrants tend to change their food habits more readily than older immigrants (Lee et al., 1999; Pan, Dixon, Himburg, & Huffman, 1999). Few studies have investigated the effect of temporary translocation on eating habits. However, the work by Pan et al. (1999) suggested that eating patterns of international students tend to suffer significant and often undesirable changes, even with a short term stay in a new country (Pan et al., 1999). International students may face cultural adjustment pressure, unfamiliarity and discrimination in their living environment. They have to apply different mechanisms to cope with the short and long term stays abroad and with the different cultural, food and dietary environment (Constantine, Anderson, Berkel, Caldwell, & Utsey, 2005).

Food choice behaviour is complex and influenced by a variety of determinants related to the food, to the external environment and to the individual which interact to produce food choice (Murcott, 1998). Intra-individual determinants include physiological and psychological factors, acquired food preferences and knowledge and interpersonal or social determinants are, for example, the family and group influences (Eertmans, Baeyens, & Van den Bergh, 2001). There are other influences such as sensory characteristics, food-related expectations and attitudes, health claims, price, ethical concerns and mood (Prescott, Young, O'Neil, Yau, & Stevens, 2002).

There are important differences in food choice between genders. Women generally show a slightly healthier pattern of food choice (Westenhoefer, 2005). This can be

attributable to women's concern about weight control, their stronger beliefs in healthy eating and their better nutritional knowledge (Baker & Wardle, 2003; Wardle, Haase, Steptoe, Nillapun, Jonwutiwes, & Bellisle, 2004). Their traditional caring roles have been appointed as an explanation for this more accurate and extensive knowledge (Nash, 1990). For men the food decisions may be socially and culturally determined and are very much rooted in the ideology of what it means to be female and male (Fraser, Welch, Luben, Bingham, & Day, 2000; Levi, Chan, & Pence, 2006).

A number of studies have also reported the cultural differences in food choice and dietary behaviours. Large differences regarding weight concerns and dietary habits existed between university students from different countries, suggesting that local cultural factors and norms may moderate attitudes to weight and food (Bellisle, Monneuse, Steptoe, & Wardle, 1995; Wardle, Haase & Steptoe, 2006).

The aim of the present study was to evaluate the food habits and food choice motives of a sample of university students, examining the differences between both genders and both nationalities and also assessing the dietary changes of a group of Portuguese students after their temporary translocation to London.

Materials and Methods

Sample

The sample was drawn from Portuguese and English students enrolled at 12 universities in London, United Kingdom. For inclusion Portuguese university students were required to have lived in London for more than 1 month and for less than 10 years.

To recruit Portuguese students an invitation flyer/poster was publicized on the students' union notice boards in 5 universities, published on the newsletter for the international students in 1 university and sent by email to the responsible for the international office of the London and Portuguese universities who forwarded the emails to Portuguese students.

Portuguese students were requested to identify and invite English students from their universities to participate in this study (a total of 28 were recruited this way). To supplement these numbers the researchers also recruited 18 English students at library and students' union of the universities where Portuguese students were identified.

Those participants who agreed to take part of the study were invited to a face-to-face interview to complete an eating patterns questionnaire. Prior to the interview an information sheet with some explanations about the study, an informed project consent form which had to be signed and a copy of the questionnaire were given to each participant. Completion of the questionnaire required approximately 30 minutes. Responses to the questionnaire were voluntary and anonymity was ensured. The study was approved by the Ethics Committee of University of Porto, Portugal and was conducted between April and May of 2009.

Questionnaire Development

The questionnaire was used to obtain data about socio-demographic characteristics, consumption frequency of selected food items, motives underlying food choices and food preparation and purchasing behaviours. The first section of the questionnaire, regarding personal information, included questions about sex, age, living arrangements, duration of residency in London for Portuguese students, course attending and presence of any disease that requires a specific diet. Portuguese participants were also requested to report their height in addition to body weight immediately before coming to London and at the time of the interview. English students only had to report their current height and weight.

To obtain the data for this paper only the food frequency and food choice questionnaires were used.

The Food Frequency Questionnaire developed by Lopes (2000) was modified by excluding the semi-quantitative structure. The questionnaire used in this study only assessed the frequency of consumption of each food item (Qualitative Food Frequency Questionnaire). Some foods were also joined in the same group (Lopes, 2000). Based on information present in a report developed by the Standing Advisory Committee on Nutrition (SACN), some foods were included which allowed a better reflection of local eating habits and food availability in England (SACN, 2008). The Food Frequency Questionnaire included a total of 67 food items. To measure the frequency of consumption of each food item was used the scale of the Food Frequency Questionnaire

developed by Lopes (2000), which had the following response options: “6+ times per day”, “4–5 times per day”, “2–3 times per day”, “once per day”, “5–6 times per week”, “2–4 times per week”, “once a week”, “1–3 times per month” and “never or less than once a month” (Lopes, 2000). In the questionnaires for Portuguese participants each food item was rated twice, according to the reported frequency of consumption in Portugal and in London.

The Food Choice Questionnaire was based on the work by Fotopoulos et al. (2008). The measurement scale ranging from “extremely unimportant” to “extremely important” was maintained, the 9 motivational dimensions disappeared (Health, Mood, Convenience, Sensory Appeal, Natural content, Price, Weight control, Familiarity and Ethical concern) and the number of items was reduced (Fotopoulos, Krystallis, Vassallo, & Pagiaslis, 2009). A survey conducted by the UK Food Standards Agency was also used to confirm the inclusions already made and to allow the inclusion of new items (FSA, 2009). The present Food Choice Questionnaire was designed to assess a wide range of considerations that might be taken into account by individuals when choosing what to eat. It contained a total of 18 individual items which indirectly covered, as in the study by Fotopoulos et al. (2008), the 9 motivational dimensions. The individual items examined in this study were the following: “Nutritional information”, “Allergy advice”, “My health status”, “Contains no additives”, “Weight control”, “Food Hygiene”, “Sensory Characteristics”, “Gives me energy/Keeps me alert”, “Cheers me up”, “Easy and quick preparation/cooking”, “Availability in shops close to my home/work” and “Price”. Participants had to choose the importance of each item for

their food choices “on a typical day”. Portuguese participants had to answer twice to reflect food choice practices in Portugal and in London.

Statistical analysis

All analyses were performed using the Statistical Package for the Social Sciences (SPSS for Windows, release 14.0, 2005).

In the food frequency questionnaire, frequency values from each food item response were grouped. So, “6 + per day” became 6 times per day, “4–5 times per day” became 4.5 times per day. “2–3 times per day” became 2.5 times per day and so on (Papadaki, Hondros, J, & Kapsokefalou, 2007). “Times” were equated to “portions” (Papadaki et al., 2007; Papadaki & Scott, 2002). Then, all these frequency values were transformed to servings per week. For those foods eaten on a daily basis, the calculated grouped values were multiplied with seven (days/week). The frequency value “1–3 times per month” became “2 times per month” and then was transformed to “0.5 times per week”. Lastly, the frequency value “Never or less than once per month” was considered “0 times per week”. To the food items consumed in specific seasons, the servings per week were multiplied with 0.25, considering an average seasonality of 3 months. To analyze the data of the Food Choice Questionnaire it was only done the codification of the measurement scale (0–“extremely unimportant”, 1–“unimportant”, 2–“slightly unimportant”, 3–“neither unimportant nor important”, 4–“slightly important”, 5–“important” and 6–“extremely important”).

The data was not normally distributed as verified by the Kolmogorov-Smirnov Z test. SO?... explain Within group differences in food intake and food choice before and after temporary translocation were evaluated using the Wilcoxon signed-rank test. Between group differences were evaluated using the Mann-Whitney test. The Spearman correlation coefficient measured the association between eating patterns and gender or nationality. All tests were two-sided and $P < 0.05$ was considered statistically significant.

Results

Sample characteristics

Questionnaires were completed by 101 university students (55 Portuguese and 46 English). The Portuguese group included 26 men and 29 women (47.3% and 52.7%, respectively), with mean ages of $24.5(\pm 3.8)$ years. They were in London for more than one month and for less than 10 years. The majority (66.7%) of Portuguese students reported having previously living in family home in Portugal. In London, the majority (57.4%) lived with friends, some in a student residence (20.4%) and a small proportion alone and in family home (13% and 9.3%, respectively). The English group included 15 men and 31 women (32.6% and 67.4%, respectively), with mean ages of $22.7(\pm 3.0)$ years. Around 55.8% of English students lived with friends and 30.2% lived in family home.

All participants reported being free of diet-related health problems. Only 7% and 4% of Portuguese and English participants were attending a nutritional/food science course.

There were no statistically significant differences in gender distribution between the Portuguese and English students. Other data were reported below with regard to gender.

Anthropometric Measurements

Height and weight were self-reported and body mass index –BMI – was then calculated. Eighty nine per cent of Portuguese students reported their body height and weight. In Portugal, an average body mass index (BMI) was significantly higher in males than in females (24.1 ± 3.0 vs. 20.4 ± 2.3 kg/m², $p < 0.001$). With temporary translocation to London, the mean BMI increased for both genders but the difference was not statistically significant. As exactly half of the English students didn't report their weight and height, the BMI obtained wasn't neither analyzed nor used to compare with Portuguese students.

Characterization of food habits

All the results reported below are shown in Tables 1, 2 and 3.

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- *Differences between genders*

In the both groups of Portuguese and English students, there was evidence of a difference between men and women's food habits.

In the Portuguese group, the consumption frequency of semi-skimmed milk, cheese, dairy desserts, red meat, hamburger, eggs, oily fish, chips, soft drinks, spirits and liqueurs was significantly higher in males than females. There was also a trend for males to have a higher consumption of white meat, beer and wine. The consumption frequency of skimmed milk, wholemeal breakfast cereals, vegetable soup and raw vegetables was significantly higher in females than males. There was also a trend for female students to have a higher consumption of fresh fruit.

In the English group, the weekly consumption of semi-skimmed, skimmed and "flavoured" milk tended to be similar in both genders. There was a trend for a higher weekly consumption of cheese and fresh fruit in English females. The frequency of consumption of bacon, hamburger, chips and beer was significantly higher for males and there was also a trend for a higher consumption of red and white meat in this gender.

- *Changes after temporary on translocation to London of Portuguese students, according to gender*

Some dietary changes occurred in both genders male and female of Portuguese students such as a significant decrease in their intake of ice creams; red meat; white, cod and shellfish; croissant, pastries, homemade cake; and vegetable soup, and an increase in their intake of hamburger; tea and tea with milk.

For Portuguese males, the consumption frequency of semi-skimmed milk significantly decreased and skimmed milk significantly increased. However, Portuguese males were still consuming higher intakes of semi-skimmed and lower intakes of skimmed milk than females. For males the reported The consumption frequency of cheese, yogurt, dairy desserts, eggs, smoked sausages, ham, marmalade, honey, jam, jellies, potatoes, rice and fresh fruit significantly decreased and bacon consumption significantly increased. In On moving to London, the intake of fresh fruit and marmalade, honey, jam and jellies was significantly lower in males than females SLIGHTLY CONFUSED SO WHAT WAS IT BEFORE THE MOVE? CAN U JUST MAKE THIS CLEARER?. There was a trend for a lower consumption of oily fish after temporary translocation but this consumption still was higher than in females. In London, there was also a significantly higher intake of red meat, bacon, soft drinks, spirits and liqueurs by males.

For females, the consumption frequency of chips and chocolate significantly increased with the translocation and there was also a trend for a higher intake of crisps and marmalade, honey, jam and jellies. In London, the trend was for similar frequencies of consumption of crisps and chips between genders and for a higher intake of chocolate in females. Lastly, there was a significantly decrease in the frequency of consumption of raw and cooked vegetables and a trend for a lower consumption of rice and potatoes. In

London, the consumption frequency of vegetable soup was significantly higher in females than males. There was also a trend for a higher consumption of raw vegetables by females.

- *Differences between Portuguese and English students, according to gender*

Comparing the food habits of the Portuguese students (in Portugal or in London) with the English students there were some statistically significant differences.

Between female, consumption frequency of cheese, dairy desserts, bacon, crisps, fresh fruit juice, wine, spirits and liqueurs, soft and sport drinks and tea with milk was significantly higher in English than Portuguese students, whether in Portugal or in London. The frequency of consumption of cooked vegetables was significantly higher in English than Portuguese females in London. A trend for these results had already been observed when compared with Portuguese females' intake in Portugal. Portuguese females, whether in Portugal or in London, showed a significantly higher intake of white bread and rice. Consumption frequency of yogurt and vegetable soup was significantly higher in Portuguese females in Portugal than English females. These results were maintained with temporary translocation but in London the differences were not statistically significant because Portuguese females lowered their consumption. Portuguese females in Portugal showed a significantly higher intake of

red meat and white fish than English, but on moving to London, the consumption of red meat became similar and the white fish became lower when compared to English females. Chips were consumed significantly more often by English than Portuguese females in Portugal. With temporary translocation, this last group of females increased their consumption and, in London, the trend was for similar consumptions in both groups. The consumption frequency of sausages and chocolate was significantly higher in English females than Portuguese in Portugal. On moving to In London there was only a trend for the same results with Portuguese females to increasing their consumption of sausages and chocolate? .

Between male, consumption frequency of wholemeal breakfast cereals was significantly higher in English than Portuguese students, whether in Portugal or in London. The frequency of consumption of cooked vegetables, marmalade, honey, jam and jellies, fresh fruit juice and chocolate was significantly higher in English than Portuguese males in London. A trend for a higher consumption of fresh fruit juice and chocolate by English had already been observed when compared with Portuguese males' consumption in Portugal. There was also a trend for English males to consume more raw vegetables than Portuguese males in London. English males showed a significantly higher intake of bacon and sausages than Portuguese males in Portugal. These results were maintained with temporary translocation but in London as the Portuguese males increased their consumption the differences were not statistically significant. Portuguese males in Portugal showed a significantly higher intake of smoked sausages, ham, white and cod fish and vegetable soup than English. In London, the consumption of these foods tended to become similar between both groups of males. A trend for a

higher consumption of oily fish and red meat by Portuguese males in Portugal was also observed. In London, these consumptions also tended to become similar between both nationalities with Portuguese lowering their consumption. Portuguese males when living in Portugal showed a significantly higher intake of rice than English. In London, the consumption of rice maintained higher but not statistically significant.

There was also a trend for English males to consume more crisps and chips than Portuguese males in Portugal but in London as the Portuguese males increased their consumption the trend was for similar consumptions in both groups. A significantly higher consumption of tea with milk in English than Portuguese in Portugal was observed and became only a trend after temporary translocation.

Characterization of food choice motives

All the results reported below are shown in Tables 4, 5 and 6.

- *Differences between genders*

In the Portuguese group, for both genders, the most important food choice motive reported was “food hygiene” while the least important was “allergy advice”.

“Nutritional information”, “my health status”, “contains no additives”, “weight control” and “cheers me up” were reported with higher importance for females than males.

Among these factors, “weight control” was the most important for females. The “price” was also more important for females than males.

In the English group, “food hygiene” and “price” were the most important food choice motives reported by males and females, respectively. The least important food choice motive was “allergy advice” for both genders. “Weight control” and “cheers me up” were significantly more important for females than males.

- *Changes after temporary translocation to London of Portuguese students, according to gender*

For both genders, the importance of the following motives significantly increased: “availability in shops close to my home or work”, “easy and quick preparation/cooking” and “price”. The importance of “nutritional information” for females and “weight control” for males increased after temporary translocation.

Between genders, in London, the motives “nutritional information”, “my health status”, “weight control” and “sensory characteristics” were still more important for females than males.

- *Differences between Portuguese and English students, according to gender*

There was a trend among Portuguese females for a higher importance of to be accorded to “weight control” and “my health status” in Portuguese females, whether in Portugal or in London, than English females. “Food hygiene” and “sensory characteristics” were also motives significantly more important to Portuguese females in Portugal or in London than to English females. The importance of the food choice motive “Cheers me up” was significantly higher for English females.

Between males the importance of “nutritional information” and “gives me energy/keeps me alert” was significantly higher in English than Portuguese males in Portugal. These results seemed to maintain in London but were not statistically significant.

Discussion

This study showed gender and cultural dependent differences in food habits and food choice motives among Portuguese and English university students.

With gender, the consumption frequencies of some foods differed significantly. The data suggests that, in Portugal, Portuguese males consumed more frequently semi-skimmed milk while Portuguese females preferred skimmed milk. This difference showed a preference toward low fat dairy products in females. It was noteworthy that women were more likely than men to report eating more vegetables, vegetable soup,

fresh fruit and wholemeal breakfast cereals. Cheese, dairy desserts, meat, hamburger, eggs, oily fish and chips were consumed more often by males.

These dietary differences between genders are similar to those reported by earlier studies. According to Colic Baric et al. (2003), among Croatian university students, red meat, other meat products, eggs, cereals and fast food were consumed more often by males than females. Females preferred low fat dairy products, whole grain products, breakfast cereals, fruits and vegetables (Colic Baric, Satalic, & Lukesic, 2003). More frequent consumption of low fat products and whole grain products among females was also reported in US students (Huang, Song, Schemmel, & Hoerr, 1994).

In the present study, the consumption frequency of soft and alcoholic drinks was higher in males than females. Carbonated soft drinks were also consumed significantly more often by Croatian university students males than females (Colic Baric et al., 2003).

Again s

Similar findings were observed in a cross-sectional study developed in a representative sample of Portuguese adults. The authors reported that there was a clear difference between men and women's food choices. Females consumed more milk, vegetable soup, vegetables and fruit and males consumed more bread, starchy foods, meat and alcoholic drinks. Fish consumption was similar in both genders (Moreira, & Padrão, 2005). In the current study, the oily fish was the only differently consumed between genders as reported above.

In the English group, males consumed more bacon, hamburger, meat, chips and beer than the female sample, while females reported consuming more vegetables and fresh fruit. This pattern was similar to the reported in the Portuguese group. Differently from the Portuguese female group, English females tended to consume more cheese than males. These findings are consistent with the data from a middle-aged English adult cohort in East Anglia that clearly suggested that dietary habits vary by gender. Women reported eating fruit and vegetables more frequently than men, whereas men reported drinking alcohol and eating potatoes, bread, meat, eggs, high sugar foods and milk more frequently than women (Fraser et al., 2000). Similar trends have been found in one British national survey, *The National Diet and Nutrition Survey* of adults aged 19 to 64 years (Hoare, Henderson, Bates, Prentice, Birch, Swan, & Farron, 2004).

All reported findings are consistent with the view that women generally show display slightly healthier food choices. Based on the work by Wardle et al. (2004), the healthier food choices observed in females were largely due to more pronounced health beliefs and a higher weight control concern (Wardle et al., 2004). Nutritional knowledge also appears to be an important factor. In the study on older UK adults, aged 55–64 years, men's poorer nutrition knowledge explained a significant part of their lower intake of fruit and vegetables (Baker & Wardle, 2003). In line with the above mentioned findings, in the Portuguese group, females attached more importance to nutritional information, health status and weight control than males. In the English group, the weight control involvement was also higher in females than males. These results could

explain the different patterns of food choice and healthy eating between genders found in this study.

This study WHICH ONE?? examined the factors underlying gender-specific patterns of food choice. Firstly, a greater proportion of the foods eaten more frequently by men are more energy dense. However, this preference may be physiological given their greater muscle mass and energy expenditure (Fraser et al., 2000). This fact must not be ignored when considering the gender differences in food choice but other important socio-cultural factors also play a part.

Based on the work by Wardle et al. (2004), the healthier food choices observed in females were largely due to more pronounced health beliefs and a higher weight control concern (Wardle et al., 2004). Nutritional knowledge also appears to be an important factor. In the study on older UK adults, aged 55–64 years, men's poorer nutrition knowledge explained a significant part of their lower intake of fruit and vegetables (Baker & Wardle, 2003).

In line with the above mentioned findings, in the Portuguese group, females attached more importance to nutritional information, health status and weight control than males. In the English group, the weight control involvement was also higher in females than males. These results could explain the different patterns of food choice and healthy eating between genders found in this study.

In the literature, some other explanations were proposed for the different preferences between genders. Men's food choices are very much influenced by assumptions about

what foods are appropriate for men and what are appropriate for women (Levi et al., 2006). The consumption of animal products and few fruits and vegetables may be considered “masculine” for some men (Fraser et al., 2000). Shepherd and Towler (2007) reported that women have more negative attitudes toward fatty foods than men (Shepherd & Towler, 2007). This could partly explain their preference for low fat products. The differences in alcohol consumption between males and females may be also socially and culturally determined (Fraser et al., 2000). CAN U GIVE AN EXAMPLE?

The present study also described theAmong the dietary changes that of affected Portuguese university students after their temporary translocation to London. There was a decline in red meat, fish, potatoes, rice and vegetable soup consumption. The intake of pastries, cakes and ice cream also decreased in both genders. The lower consumption of ice cream could be explained by the weather in London. More hamburger, tea and tea with milk were consumed by the Portuguese group in London. The increased consumption of tea with milk reflected an acculturation process which is in line with the postulations made by Wandel et al. (2007) (Wandel, Raberg, Kumar, & Holmboe-Ottesen, 2007). Despite these common changes, the effect of temporary translocation on food habits was different between genders. The lower correlation between the males’ eating habits before and after a short period of translocation showed that they were more likely to make dietary changes while they were abroad than their female counterparts. Women were more likely to maintain their traditional dietary

habits. The same results were found in a recent study with international students in Belgium (Perez-Cueto, Verbeke, Lachat, & Remaut-De Winter, 2009).

Despite these common changes, the effect of temporary translocation on food habits was different between genders. The lower correlation between the males' eating habits before and after temporary translocation showed that they were more likely to make dietary changes while they were abroad than their female counterparts. Women were more likely to maintain their traditional dietary habits. The same results were found in a recent study with international students in Belgium (Perez-Cueto, Verbeke, Lachat, & Remaut-De Winter, 2009).

Males increased skimmed milk and decreased semi-skimmed milk consumption. This fact tended to make these both consumptions similar between genders. Dairy products, eggs, smoked sausages, ham and sweet spreads were more likely to have a lower consumption in London. These changes may be the result of the higher weight concern reported in males after temporary translocation. Fresh fruit intake also decreased and, in London, was considerably lower than females' intake. Portuguese males also showed an increase of bacon consumption.

Portuguese Females did not report making many changes to their diets on moving to London. Nevertheless, there was a noticeable trend for females to have adopted a number of less desirable eating habits. This may not have been an issue of choice but of the influences of culture and structures eg shop location and what they sold. Their

consumption frequency of chips, chocolate, crisps and sweet spreads increased. In London, the intake of chocolate and sweet spreads was higher for females than males and there was a trend for the same consumption between genders of crisps and chips. It Both groups? was also shown reported a decrease in the frequency of consumption of vegetables.

As result of all these changes,D dietary habits between genders tended to become similar after temporary translocation. The correlation between males and females food habits in London was stronger than in Portugal. However, the gender dependent differences in food habits described above, were maintained. For example, mMen were still eating more meat, bacon, soft and alcoholic drinks while women were still eating more raw vegetables, vegetable soup and fresh fruit.

The food choice profile followed the same trend WHAT IS THIS PROFILE? HOW WAS IT CONSTRUCTED? . Taking into account the correlations, women were more likely to maintain their judgments about the importance of a number of motives for food choice while men were more likely to change with temporary translocation. For both genders, the food availability in shops close to home/work, the price and the easy and quick preparation/cooking of foods became more important. According to the correlation values, the food choice profile was also more similar between genders in London. Nutritional concerns, health status and weight control were still more important to females than males.

However, the dietary changes reported above might not have been only the result of temporary translocation to a foreign country. The majority of Portuguese students had lived in family home in Portugal. So, it is possible that these changes were partly the result of students having left the family home and taking on responsibility for food purchasing and preparation possibly for the first time. A question asking if it was the first time that participants left the family home should have been included in order to allow a better explanation of the results. Papadaki and Scott (2002) had already suggested that the dietary changes observed in international students could have been induced by student life and by moving away from the family home (Papadaki & Scott, 2002). However, we contend that the changes in the food habits of Portuguese students were, to some extent, related to their temporary translocation from Portugal to London. A rapid dietary acculturation could be appointed the as reason.

The present study also found important differences between English and Portuguese university students. The intakes of both groups in their countries of origin were used for this comparison. English university students were more likely to consume more bacon, sausages, crisps, chips, chocolate, cooked vegetables, fresh fruit juice and sport drinks while Portuguese university students (IN LONDON?) were more likely to consume more smoked sausages, ham, rice, red meat, fish and vegetable soup. The English females consumed more alcoholic and soft drinks than Portuguese females whereas the Portuguese males consumed more soft drinks and wine and less beer than English males. The temporary translocation decreased the consumption of wine and increased the consumption of beer. These results didn't allow us to determine which nationality group ate more healthy food.

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Differences in the importance of some food choice motives between nationalities were also observed. Portuguese females attached more importance to weight control concerns, health status and food hygiene and sensory characteristics than English females. The choice of foods for mood was more associated with English rather than Portuguese. Between males, nutritional information and the capacity of foods to give them energy and keep them alert were motives also more important to English than Portuguese. This fact could explain the higher consumption of sport drinks by this group.

I THINK SOME OF THE ABOVE BIT COULD BE CUT SOME OF IT IS A REPEAT AND SOME IS IN THE CONCLUSIONS

Examining the correlation values important findings appear. There was a trend for eating habits of English and Portuguese university students to be similar in London.

The exposure to the same environment and an acculturation process perhaps had approached these habits. Nevertheless, there were more differences in eating habits between the individuals of same gender/different nationality than between the individuals of different gender/same nationality. This trend was unclear in food choice behaviours.

A small proportion (7% and 4% of Portuguese and English participants, respectively) was attending a course related to nutrition and food sciences. So, the results reported above were not attenuated by a higher nutritional or food knowledge. However, there are a number of other limitations to this study. Firstly, the sample size was relatively small, which was due to the survey being carried out during students' examination period. Most of the students were either away from campus or busy studying. As Portuguese participants were initially approached by email, this limitation was more evident in English participants' recruitment.

Portuguese participants had to recall their eating habits in Portugal. All of them were in London for more than one month and for less than 10 years. Inaccurate self-reporting of data might have occurred as a result of memory problems. Nevertheless, some studies suggested reasonable reliability in a recall period of 3–10 years (Ambrosini, van Roosbroeck, Mackerras, Fritschi, de Klerk, & Musk, 2003; Willet, 1998).

This study examined only qualitative changes in eating habits. The inclusion of portion sizes would have allowed a more quantitative examination of dietary changes. This lack of information didn't allow the comparison of nutrient content of students' diets.

Lastly, the assumption that “times” were equal to “portions” could be appointed also as limitation. If participants consumed more than one “portion” each “time” the dietary intake may be underestimated. However, this error is likely to have been consistent across both groups of students and in the case of Portuguese students both recording periods (prior and after translocation). So, it is unlikely to have influenced the results.

All the limitations above described limit the generalisability of the results, which should be interpreted with caution.

Conclusions

The present study clearly indicates that there are differences in food habits and food choice motives between genders. In general, women have healthier food choices than men. The impact on eating habits of temporary translocation from Portugal to London was also different among males and females. Males were more likely to change their dietary habits in line with those of the host country. However, females were more likely to adopt a number of less desirable eating habits. Despite all of this, the reported differences in food habits between nationalities were higher than between genders. This may indicate that food habits are strongly shaped by culture.

Health and nutrition professionals should take gender and cultural differences into account when developing nutrition education and intervention programs for university students and other young adults. More attention should be given to the diets of international students and to the main determinants of their dietary habits in the new country. Specific strategies to inform about the availability of healthy foods in this different dietary environment and to educate these students should be developed to improve their diets, during their temporal stay abroad.

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Table 1 - Mean weekly consumption of selected foods for Portuguese students (servings/week)

FOOD ITEM	PORTUGUESE STUDENTS (n=55)									
	In Portugal					In London				
	Females		ρ	Males		Females		ρ	Males	
	Mean	SD		Mean	SD	Mean	SD		Mean	SD
Semi-skimmed milk	4.05	5.51	0.037	6.79	5.52	4.14	6.77	0.722	5.33	6.81
Skimmed milk	3.17	4.15	0.001	0.19	0.62	2.76	3.38	0.188	1.29	2.33
Flavoured milk	0	0	0.611	0.22	1.10	0	0	0.153	0.15	0.61
Cheese	2.96	3.57	0.014	5.22	4.45	2.36	2.43	0.101	3.74	3.70
Yogurt	5.43	6.15	0.364	4.44	4.77	4.07	3.69	0.178	3.12	3.79
Ice cream	0.80	1.52	0.455	0.85	1.11	0.32	0.64	0.295	0.32	0.30
Dairy Desserts	0.35	0.60	0.004	1.46	1.95	0.22	0.32	0.191	0.60	0.95
Eggs	1.07	0.87	0.002	2.10	1.30	1.04	0.76	0.428	1.46	1.18
Beef, pork, mutton, kid goat	3.15	3.54	0.014	4.02	1.34	1.40	1.67	0.001	3.02	1.70
Chicken, Turkey, rabbit	2.33	1.62	0.056	3.35	1.94	3.04	3.30	0.084	3.60	2.03
Bacon	0.14	0.30	0.456	0.27	0.62	0.55	1.44	0.006	1.02	1.16
Sausages	0.29	0.40	0.239	0.54	0.80	0.68	1.42	0.239	0.65	0.80
Smoked sausages, ham	1.62	1.78	0.087	2.42	1.78	1.72	1.99	0.960	1.58	1.59
Hamburger	0.36	0.38	0.048	0.56	0.36	0.73	1.12	0.071	1.21	1.15
White fish	2.25	1.48	0.904	2.31	1.79	0.50	0.78	0.985	0.60	0.95
Oily fish	0.93	1.04	0.049	1.52	1.38	0.66	0.91	0.428	0.92	1.12
Cod fish	1.40	1.13	0.406	1.34	1.40	0.29	0.35	0.457	0.22	0.32
Shellfish	0.70	0.57	0.933	0.69	0.58	0.14	0.27	0.812	0.17	0.31
White bread/Toasts	4.94	4.53	0.399	4.85	6.70	4.33	4.62	0.928	4.48	4.65
Wholemeal breakfast cereals	2.61	2.98	0.046	1.08	2.27	2.72	3.00	0.145	1.65	2.65
Rice	4.32	3.23	0.489	4.35	1.91	3.54	3.33	0.879	3.13	2.37
Chips	0.25	0.35	0.029	0.63	0.79	0.78	1.20	0.368	1.04	1.16
Fried Potatoes homemade	0.82	1.07	0.061	1.08	1.01	0.21	0.60	0.252	0.48	0.96
Potatoes (roasted/boiled/stewed)	1.80	1.35	0.361	2.35	1.79	1.25	1.28	0.529	1.12	1.10
Crisps	0.23	0.35	0.187	0.50	0.80	0.70	1.22	0.505	0.79	1.03
Croissant/pastries/homemade cake	1.95	2.07	0.669	1.96	1.69	0.73	1.38	0.355	1.35	3.39
Chocolate	1.38	2.02	0.173	1.71	1.74	2.27	2.38	0.337	1.40	1.51
Marmalade/honey/jam/jellies	1.04	1.22	0.663	0.90	1.33	1.80	2.03	<0.001	0.29	0.64
Cooked vegetables	5.69	5.57	0.654	4.27	3.61	3.13	3.83	0.993	3.31	4.60
Raw vegetables	6.43	5.74	0.023	3.10	2.56	4.50	5.24	0.053	2.58	3.69
Vegetable soup	5.36	4.10	0.016	3.19	3.70	2.04	2.23	0.009	0.85	1.59
Fresh fruit	12.8	8.51	0.114	9.54	9.13	11.1	8.39	0.001	5.54	6.87
Fresh fruit juice	3.07	6.03	0.621	2.08	1.86	1.84	2.45	0.661	1.60	2.12
Wine	0.57	1.14	0.102	2.02	6.10	0.70	1.23	0.097	0.94	1.21
Beer	0.77	1.01	0.152	1.52	1.94	1.32	1.63	0.064	1.86	1.56
Spirits and Liqueurs	0.33	0.60	0.001	1.17	1.18	0.22	0.35	<0.001	1.29	1.39
Soft drinks	0.46	0.63	0.001	4.50	6.08	0.96	1.71	0.010	4.19	6.05
Sport drinks	0	0	0.072	0.15	0.60	0	0	0.004	0.17	0.31
Tea	3.15	3.66	0.021	1.60	2.02	6.44	7.63	0.207	3.62	4.80
Tea with milk	0.96	3.51	0.739	0.36	1.20	2.02	3.99	0.241	2.50	4.09

* calculated to assess the association of food habits

ρ – Levels of significance were assessed with the use of the Mann-Whitney Test

SD – Standard Deviation

Table 1 - Mean weekly consumption of selected foods for Portuguese students
(servings/week)

Table 2 - Mean weekly consumption of selected foods for English students (servings/week)

FOOD ITEM	ENGLISH STUDENTS (n=46)				
	Females		ρ	Males	
	Mean	SD		Mean	SD
Semi-skimmed milk	6.81	8.93	0.447	6.13	5.34
Skimmed milk	1.63	3.52	0.689	1.60	2.90
Flavoured milk	0.23	0.60	0.765	0.13	0.30
Cheese	5.22	5.20	0.078	3.43	4.31
Yogurt	2.56	2.30	0.773	2.30	2.02
Dairy Desserts	1.22	1.31	0.517	0.87	0.97
Beef, pork, mutton, kid goat	1.42	1.53	0.066	2.87	2.43
Chicken, Turkey, rabbit	2.16	1.74	0.115	5.63	10.3
Bacon	0.56	0.74	0.013	1.43	1.52
Sausages	0.88	1.20	0.144	1.23	1.15
Smoked sausages, ham	0.90	1.27	0.320	1.47	2.10
Hamburger	0.27	0.56	0.016	0.60	0.74
White fish	1.05	1.53	0.469	0.53	0.74
Oily fish	0.87	1.29	0.741	0.80	0.98
Cod fish	1.00	1.49	0.100	0.43	0.78
Shellfish	0.58	0.99	0.179	0.17	0.31
White bread/Toasts	2.26	3.51	0.118	4.67	5.70
Wholemeal breakfast cereals	2.66	2.56	0.278	3.43	2.64
Rice	1.94	1.45	0.862	2.23	1.98
Chips	0.60	0.72	0.031	1.40	1.54
Crisps	1.42	1.59	0.507	1.13	1.53
Chocolate	3.37	3.44	0.933	3.87	4.47
Marmalade/honey/jam/ jellies	1.03	1.44	0.743	1.67	2.18
Cooked vegetables	9.00	7.52	0.277	6.07	4.91
Raw vegetables	5.98	5.76	0.322	4.03	4.34
Vegetable soup	1.37	1.68	0.310	1.07	1.57
Fresh fruit	13.6	10.3	0.073	7.13	5.70
Fresh fruit juice	6.06	5.66	0.402	4.53	4.59
Wine	1.76	1.56	0.304	1.43	1.89
Beer	0.60	1.11	0.001	1.80	1.88
Spirits and Liqueurs	1.21	1.39	0.690	1.13	1.01
Soft drinks	3.64	5.17	0.803	2.13	1.75
Sport drinks	0.97	3.41	0.408	3.27	10.8
Tea with milk	11.6	12.1	0.358	7.53	9.36
Spearman's correlation coefficient^a			0.851		

Table 3 - Levels of significance for the comparison of food habits assessed with the use of the Wilcoxon Signed Ranks Test (before/after temporary translocation) and the Mann Whitney Test (before temporary translocation and after temporary translocation)

² calculated to assess the association of food habits

p – Levels of significance were assessed with the use of the Mann-Whitney Test

SD – Standard Deviation

³ calculated to assess the association of food habits

⁴ Comparison between Portuguese students in Portugal and English students

⁵ Comparison between Portuguese students in London and English students

FOOD ITEM	BEFORE/AFTER TEMPORARY		BEFORE TEMPORARY TRANSLOCATION ^b		AFTER TEMPORARY TRANSLOCATION ^c	
	Portuguese	Portuguese	Between Females	Between males	Between	Between
	Females	Males	Females	males	Females	males
	ρ	ρ	ρ	ρ	ρ	ρ
Semi-skimmed milk	0.874	0.034	0.203	0.847	0.179	0.193
Skimmed milk	0.609	0.033	0.117	0.248	0.252	0.857
Cheese	0.831	0.033	0.026	0.077	0.009	0.554
Yogurt	0.200	0.050	0.007	0.212	0.081	0.762
Ice cream	0.021	0.015	0.802	0.530	0.045	0.197
Dairy Desserts	0.417	0.003	<0.001	0.605	<0.001	0.165
Eggs	0.904	0.032	0.927	0.690	0.993	0.417
Beef, pork, mutton, kid goat	0.002	0.007	0.017	0.064	0.587	0.593
Chicken, Turkey, rabbit	0.569	0.474	0.569	0.920	0.287	0.667
Bacon	0.093	0.004	0.001	<0.001	0.031	0.247
Sausages	0.114	0.503	0.006	0.015	0.065	0.086
Smoked sausages, ham	0.874	0.005	0.042	0.050	0.128	0.657
Hamburger	0.017	0.008	0.150	0.497	0.006	0.067
White fish	<0.001	<0.001	<0.001	<0.001	0.194	0.652
Oily fish	0.283	0.057	0.394	0.053	0.732	0.942
Cod fish	<0.001	<0.001	0.017	0.004	0.031	0.460
Shellfish	<0.001	<0.001	0.010	<0.001	0.064	0.972
White bread/Toasts	0.463	0.836	0.003	0.880	0.038	0.762
Wholemeal breakfast cereals	0.593	0.176	0.713	0.001	0.936	0.011
Rice	0.094	0.009	<0.001	0.002	0.022	0.235
Chips	0.005	0.103	0.014	0.061	0.868	0.387
Fried Potatoes homemade	0.004	0.010	0.031	0.135	0.157	0.293
Potatoes (roasted/boiled/stewed)	0.089	0.002	0.561	0.203	0.230	0.202
Crisps	0.065	0.126	<0.001	0.065	0.025	0.438
Croissant/pastries/homemade cake	0.002	0.003	0.071	0.166	0.075	0.320
Chocolate	0.025	0.376	0.002	0.080	0.146	0.046
Marmalade/honey/jam/jellies	0.093	0.007	0.844	0.362	0.168	0.004
Cooked vegetables	0.012	0.103	0.065	0.290	<0.001	0.004
Raw vegetables	0.002	0.140	0.666	0.591	0.331	0.072
Vegetable soup	<0.001	0.001	<0.001	0.004	0.340	0.332
Fresh fruit	0.197	0.011	0.928	0.741	0.567	0.147
Fresh fruit juice	0.315	0.115	0.002	0.084	<0.001	0.009
Wine	0.524	0.693	<0.001	0.485	0.001	0.594
Beer	0.135	0.189	0.116	0.462	0.012	0.594
Spirits and Liqueurs	0.206	0.403	0.003	0.726	0.001	0.788
Soft drinks	0.137	0.779	0.005	0.923	0.028	0.923
Sport drinks	1.000	0.438	0.028	0.166	0.028	0.664
Tea	0.016	0.024	0.004	0.038	0.054	0.283
Tea with milk	0.026	0.001	<0.001	<0.001	<0.001	0.056
Spearman's correlation coefficient^a	0.870	0.776	0.691	0.601	0.791	0.802

Table 4 – Mean degree of importance of food choice motives for Portuguese students (0-extremely unimportant to 6-extremely important)

PORTUGUESE STUDENTS (n=55)										
FOOD CHOICE MOTIVE	In Portugal					In London				
	Females		ρ	Males		Females		ρ	Males	
	Mean	SD		Mean	SD	Mean	SD		Mean	SD
Nutritional information	4.31	1.54	<0.001	2.56	1.56	4.81	1.10	<0.001	3.22	1.68
Allergy advice	2.36	1.98	0.285	1.74	1.63	2.36	1.99	0.285	1.74	1.63
My Health status	3.54	1.82	0.017	2.35	1.61	3.50	1.84	0.043	2.48	1.68
Contains no additives	3.54	1.50	0.033	2.70	1.55	3.64	1.59	0.073	2.96	1.46
Weight control	4.63	1.18	<0.001	2.83	1.53	4.63	1.21	0.022	3.52	1.73
Food Hygiene	5.21	0.96	0.103	4.78	1.08	5.11	0.96	0.648	5.09	0.67
Sensory characteristics	4.89	1.23	0.213	4.30	1.58	5.04	1.07	0.048	4.22	1.54
Gives me energy/keeps me alert	4.04	1.09	0.452	3.80	1.41	3.92	1.20	0.992	3.91	1.60
Cheers me up	3.93	1.12	0.049	3.21	1.44	4.04	1.17	0.107	3.38	1.53
Easy and quick preparation/cooking	3.61	1.31	0.758	3.44	1.44	4.61	1.06	0.215	4.96	0.89
Availability in shops close to my home/work	3.64	1.62	0.913	3.72	1.65	4.96	1.00	0.550	5.04	1.21
Price	4.39	1.45	0.030	3.72	1.24	5.18	0.77	0.194	4.68	1.31
Spearman's correlation coefficient⁶	0.567					0.816				

⁶ calculated to assess the association of food choice behaviours

ρ – Levels of significance were assessed with the use of the Mann-Whitney Test

SD – Standard Deviation

Table 5 – Mean degree of importance of food choice motives for English students
(0-extremely unimportant to 6-extremely important)

FOOD CHOICE MOTIVE	ENGLISH STUDENTS (n=46)				
	Females		ρ	Males	
	Mean	SD		Mean	SD
Nutritional information	4.40	1.28	0.207	3.73	1.71
Allergy advice	1.23	1.59	0.900	1.33	1.84
My Health status	2.52	1.91	0.296	3.21	1.89
Weight control	3.87	1.50	0.016	2.67	1.84
Food Hygiene	4.45	1.00	0.189	4.87	1.06
Sensory characteristics	3.87	1.52	0.764	3.60	1.72
Gives me energy/keeps me alert	4.39	1.14	0.490	4.67	0.82
Cheers me up	4.61	0.95	0.031	3.60	1.72
Price	4.94	1.03	0.853	4.73	1.49
Spearman's correlation coefficient^a	0.823				

Table 6 – Levels of significance for the comparison of food choice motives assessed with the

⁷ calculated to assess the association of food choice behaviours

ρ – Levels of significance were assessed with the use of the Mann-Whitney Test

SD – Standard Deviation

use of the Wilcoxon Signed Ranks Test (before/after temporary translocation) and the Mann Whitney Test (before temporary translocation and after temporary translocation)

FOOD CHOICE MOTIVE	BEFORE/AFTER TEMPORARY TRANSLOCATION		BEFORE TEMPORARY TRANSLOCATION ^b		AFTER TEMPORARY TRANSLOCATION ^c	
	Portuguese Females	Portuguese Males	Between Females	Between males	Between Females	Between males
	ρ	ρ	ρ	ρ	P	ρ
Nutritional information	0.024	0.074	0.959	0.042	0.210	0.329
My Health status	0.655	0.180	0.052	0.153	0.058	0.237
Weight control	1.000	0.037	0.062	0.703	0.055	0.125
Food Hygiene	0.180	0.059	0.002	0.849	0.010	0.653
Sensory characteristics	0.180	0.317	0.007	0.159	0.002	0.246
Gives me energy/keeps me alert	0.317	0.107	0.225	0.029	0.368	0.168
Cheers me up	0.083	0.157	0.014	0.236	0.042	0.484
Easy and quick preparation/cooking	0.002	<0.001	0.010	0.127	0.710	0.098
Availability in shops close to my home/work	0.001	0.001	0.094	0.659	0.035	0.004
Price	0.009	0.001	0.140	0.004	0.414	0.825
Spearman's correlation coefficient^a	0.806	0.632	0.683	0.600	0.838	0.741

⁸ calculated to assess the association of food choice behaviours

⁹ Comparison between Portuguese students in Portugal and English students

¹⁰ Comparison between Portuguese students in London and English students