Food4Me study: Validity and reliability of Food Choice Questionnaire in 9 European countries


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Validity and Reliability of Food Choice Questionnaire in 9 European countries


ABSTRACT

This analysis has been conducted to explore the validity and reliability of the Food Choice Questionnaire (FCQ) across 9 European countries. Variation in the factor structure and the perceived importance of food choice motives have been compared cross-nationally. Volunteers (N=9381) were recruited from an existing panel of a social research agency to take part in the Food4Me survey in Germany, Greece, Ireland, Poland, Portugal, Spain, the Netherlands, the UK and Norway. The survey was administered on-line. Configural, metric and scalar invariance fell within acceptable limits and were consistent across the 9 countries. All reliability parameters were above acceptable levels. Factor analysis confirmed that all items loaded onto the same 9 factors established by Steptoe and colleagues (1995). There was highly significant agreement in the relative importance of food choice factors between countries. Price was ranked as most important food choice factor in five countries (Spain, Greece, Ireland, Portugal and the Netherlands), sensory appeal was ranked first for three countries (Norway, Germany and the UK) while natural content was ranked as the most important factor in Poland. Familiarity and ethical concern were consistently ranked as least important in all countries. These data suggest that the FCQ is a suitable tool for exploring food choice motives across different European populations. Differences in relative importance of factors within countries may need to be taken into account in dietary health intervention and food product development.

Key words: Food choice questionnaire; FCQ; survey; reliability; validity; Food4Me.
1. Introduction

Understanding food choice motives is needed to plan public policies aimed at improving dietary health and wellbeing, as well as informing food product innovation and food marketing. In increasingly globalised markets and economies, it is also important to understand variations in food choice motives across different countries and cultures. Country and/or culture-specific differences in food choice motives can be used to inform intervention to change food related behaviours in different populations. The Food Choice Questionnaire (FCQ) was originally developed and tested in the United Kingdom (UK) by Steptoe and colleagues in 1995 where it has been used extensively to assess food choice motives. In its original form, the FCQ comprises 36 items designed to assess underlying motives for food choice on 9 dimensions: health; mood; convenience; sensory appeal; natural content; price; weight control; familiarity; and, ethical concern. Among the goals of previous research has been to determine if the FCQ is cross-culturally reliable and valid. One of the first cross-cultural studies of food choice motives (Prescott et al., 2002) compared responses in Japan, Taiwan, Malaysia and New Zealand. Since then, the FCQ has been compared in Canada, Belgium and Italy (Eertmans et al. 2006) and in Belgium, Hungary, Romania and the Filipines (Januszewska et al. 2011). The FCQ has also been applied in South America (e.g. Ares and Gambaro, 2007), North America (e.g. Pula et al, 2014) and certain countries in Europe (Honkanen and Frewer, 2009; Fotopoulos et al, 2009; Milošević et al, 2012; Pieniak et al, 2013).

Some studies have used modified versions of the FCQ adapted to their research aims, local population and language. Ares and Gambaro (2007) applied a modified 22-item version of the FCQ in Uruguay. Fotopoulos et al (2009) explored the possibility of using an ad-hoc short version (excluding the ‘ethical concern’ factor) of the FCQ with respondents in Greece. Honkanen and Frewer (2009) used a modified FCQ with Russian respondents, which included
extra items on animal welfare, political values and religious items. More recently, a large pan-European survey of 4828 respondents in 6 European countries (Belgium, France, Italy, Norway, Poland and Spain) conducted by Pieniak et al (2013) excluded the mood factor. Table 1 summarises details of previous studies that have used the FCQ.

**Insert Table 1**

For the purpose of this study, the FCQ was administered as a part of the Food4Me Pan European Survey investigating public attitudes to personalised nutrition. This survey appears the largest (N=9381) and most extensive, having been conducted across 9 European states. Some of the countries (Germany, Ireland, the Netherlands, Portugal) included have not been a part of any previous studies of food choice motives which adds further value to results. The aim of this study, therefore, has been to understand food choice motives across the different European countries. The objectives have been threefold: firstly, to explore the cross-cultural validity and reliability of the Food Choice Questionnaire in 9 European countries; secondly, to determine any variation in the factor structure across different countries; and, thirdly, to compare the perceived importance of food choice motives across different countries.

2. **Method**  

*Sampling and Procedure*

Ethical approval for research procedures was granted by the lead academic institutions. Data were collected in February and March 2013, for a full account of which please refer to Poínhos et al., (2014). The questionnaire, which was developed in English, was translated into the various languages by each partner centre. These translations were then back-translated
into English, then reviewed and compared with the original by 2 reviewers acting independently of one another. Queries arising from this process were then discussed by these adjudicators and referred back to the translating team to ensure 'meaning' was being appropriately conveyed. Where appropriate, changes were made to the translation. Potential volunteers were drawn from an existing panel of a social research agency (GfK-NOP). Nationally representative samples (n=1000 per country) were drawn using quotas for age-group (18-29, 30-39, 40-54, 55-65 years), gender and highest level of education completed aggregated from the International Standard Classification of Education (ISCED)(ISCED 0-2, ISCED 3-4, ISCED 5-6) and region. Because of low penetration in the 55-65 years old age category in Ireland, an additional panel were recruited through another research agency (Toluna). A total of 29,450 individuals were contacted and the overall response rate was 31.9%. The resultant sample comprised 9381 participants from 9 EU countries (Germany, Greece, Ireland, Poland, Portugal, Spain, the Netherlands, the UK and Norway). Respondents were quota sampled to be nationally representative for each country, on sex, age (18-29, 30-39, 40-54, 55-65 years) and education level (highest level of education completed based on International Standard Classification of Education levels ISCED 0-2, ISCED 3-4, ISCED 5-6). Sample characteristics are summarised by country in Table 2. Data were collected in February and March 2013 using on-line survey methodology. A participant information sheet was displayed and participants provided informed consent prior to completing the questionnaire.

Food Choice Questionnaire (FCQ)

The Food Choice Questionnaire (Steptoe et al. 1995) contained 36 statements each preceded by “It is important to me that the food I eat on a typical day”. A full list of items can be seen in Table 4. Although the original scale was scored on a 4-point Likert scale ranging from 1 =
‘Not at all important’ to 4 = ‘Very important’, more recent studies have used either a 7-point (Dowd & Burke, 2013; Pieniak et al. 2009) or 5-point scale (Milošević et al. 2012). As responses to the other scales included within the questionnaire were on a 5-point Likert scale, the FCQ was adapted to obtain responses on a 5-point Likert scale ranging from 1 = ‘Not at all important’ to 5 = ‘Extremely important’.

**Data Analysis**

Statistical analysis was conducted using SPSS Statistical Package for the Social Sciences, (Version 21.0; SPSS UK Ltd; Chersey, UK), and MPlus (Version 7.3). Multi-Group Confirmatory Factor Analysis (MG-CFA) (Steenkamp & Baumgartner, 1998) was employed to test for metric and scalar measurement invariance across samples. Strict measurement invariance was alleviated as necessary to ensure that constructs were measured in an equivalent way in all countries. In the final stage, to examine cross-cultural differences, configural, metric and scalar invariances were interpreted as indicative of differences between countries. Satorra-Bentler scaled test statistics (Satorra & Bentler, 1988; 1994) were used to accommodate non-normal distributions of the scores on a number of items. To allow for potential cross-factor loadings, the 9 food choice motives (Health, Mood, Convenience, Sensory Appeal, Natural Content, Price, Weight Control, Familiarity, and Ethical concern) were analysed in one combined Multi-Group MG-CFA. In a step-wise process, configural, metric and scalar measurement invariance (Steenkamp & Ter Hofstede, 2002; Steenkamp & Baumgartner, 1998) was tested using maximum likelihood estimation with robust standard errors (MLR). Modifications (e.g. relaxing the equalities on country specific factor-loadings or intercepts) were added to the model, based on large modification indices until model fit indices were acceptable. Model fit indices presented include: Chi-square ($\chi^2$); Degrees of Freedom (df); Root Mean Square Error of Approximation (RMSEA); the Standardized Root
Mean square Residual (SRMR); the Tucker-Lewis Index (TLI); and, the Comparative Fit Index (CFI). Values <0.07 for RMSEA and <0.08 SRMR and >0.95 for TLI and CFI suggest an acceptable model fit (Hair et al. 2010; Hu & Bentler, 1999). Internal consistency of the FCQ scale and food choice factors was assessed by calculating Cronbach alpha coefficients for the entire sample and by each country. Differences in the rank order of the mean importance ratings of factors between countries were tested using the non-parametric Kendall’s coefficient of concordance test.

Insert table 2 here

3. Results

Measurement invariance of the FCQ

Multi group confirmatory factor analysis (MG-CFA) (Steenkamp & Baumgartner, 1998) was used to verify the original 9-factor structure of the FCQ proposed by Steptoe et al (1995). Goodness-of-fit parameters MG-CFA for the total sample (N=9381) are shown in Table 3. All the indicators for configural invariance fell within acceptable limits implying consistent measurement of constructs across all 9 countries. Goodness-of-fit indicators indicated that metric invariance was also consistent across countries. Results of multi-group CFA indicated also scalar invariance of measurement on the total sample of 9 countries.

Insert table 3 here

Construct validity and reliability of the FCQ

Standardised factor loadings and internal consistency coefficients for the entire sample are shown in Table 4. The factor loadings were statistically significant with values in the range from 0.541 to 0.923. Only three items loaded below the 0.6 mark: “helps me control my
weight” (0.541); “tastes good” (0.561); and, “comes from a country I approve of politically” (0.584). No items had factor loadings below 0.4, therefore, all 36 items were considered in the interpretation of factors. Intercorrelations between factors are shown in Table 5 (total sample data). All correlations were statistically significant at the 0.01 level. Cronbach alpha values ranged from 0.781 for the familiarity factor to 0.918 for the natural content factor (health=0.901; mood=0.897; convenience=0.886; sensory appeal=0.821; natural content=0.918; price=0.838; weight control=0.905; familiarity=0.781; and, ethical concern=0.808). All reliability parameters were above acceptable levels (Hair et al., 2010). Table 6 shows reliability of food choice factors by country. Reliability estimates for all factors (except for the ethical concern factor in Greece with a value of 0.65), showed values within the acceptable range from 0.7 to 0.9.

**Insert tables 4, 5 and 6 here**

*Relative importance of food choice motives*

Taking the whole sample (N=9381) price, sensory appeal and natural content were ranked as most important. The health factor was ranked as 4th, followed by convenience, mood and weight control. Least important were the factors of ethical concern and familiarity. Kendall’s coefficient of concordance indicated highly significant agreement in the relative importance of food choice factors between countries (Kendall’s W=0.885; df=8; p<0.01). The relative importance (mean and standard deviation) of items on each food choice factor are shown on Table 7. Based on these ratings, Table 8 shows rank order of food choice factors for each country in order from the most important to least important. Mean ranks of food choice factors across 9 countries are shown in Table 9. Results show that the price factor was ranked
as most important in five countries (Spain, Greece, Ireland, Portugal and the Netherlands),
sensory appeal factor came first for three countries (Norway, Germany and the UK) while
natural content was ranked as the most important factor in Poland. Familiarity and ethical
concern were consistently ranked as least important in all countries.

Insert tables 7, 8 and 9 here

4. Discussion
Among the objectives of this study has been to determine the validity and reliability of the
Food Choice Questionnaire across 9 European countries (Norway, Germany, Spain, Greece,
Poland, the United Kingdom, Ireland, the Netherlands and Portugal) (N=9381). Internal
consistency coefficients of reliability were high in the total sample and within all countries.
Reliability indicators also appeared higher than those reported in previous research
(Januszewksa et al, 2011; Pieniak et al, 2009; Eertmans et al 2006). The larger sample size
employed in our study compared to sample sizes in previous surveys, however, may go some
way toward explaining any apparent disparities in reliability and consistency. It is also
possible that on-line, web-based administration of the survey might have influenced the
results. Previous studies (Pula et al. 2014; Pieniak et al. 2013) that have also been
administered on-line as a part of larger studies, however, have not reported any bias related to
web-based interviewing. That indicators of configural, metric and scalar invariance were
satisfactory, suggests that food choice constructs had similar meaning for respondents from
different countries and that any differences found in subsequent analyses have probably not
been influenced by cultural or country-specific factors. Metric and scalar invariance could
also imply that respondents in all countries understood the measurement scale similarly.

A second objective of this analysis has been to determine any variation in the factor
structure across different countries. Factor analysis confirmed that all items loaded onto the
same 9 factors already established by Steptoe et al (1995). These results also agree with those of Januszewska et al (2011) who found the 9-factor structure of the FCQ to be invariant across four countries (Belgium, Hungary, Romania and Philippines). Previous studies that have used the FCQ on cross-national samples, however, have not always found the 9-factor structure (Steptoe et al., 1995) or indeed, any consistent factor structure across different countries. For example, Eertmans et al (2006) found differences in construct connotations between urban populations residing in Belgium, Italy and Canada. Health and natural content were included in the same single factor in all three countries and there were cross-loadings for several items in all three samples (Eertmans et al., 2006). A study by Milošević et al (2012) conducted in 6 Western Balkan countries (Croatia, Serbia, Montenegro, Slovenia, Macedonia and Bosnia-Herzegovina), similarly, found that an 8-factor structure best described the FCQ, with health and natural content loading onto one factor in all countries included in the sample. The original 9-factor structure was also not confirmed in the study of Fotopoulos et al (2009) in Greece, where the ethical concern factor was excluded owing to low reliability. More recently, Pula et al (2014) failed to confirm a 9-factor structure in a sample of respondents in the United States. They found an 8-factor structure on the basis of which excluded the weight control factor and modified the ethical concern factor to reflect environmental issues (Pula et al., 2014). We observed relatively high intercorrelations between health and mood (0.797), health and natural content (0.668) and between natural content and ethical concern (0.649). Such intercorrelations between factors (higher than 0.6, but below the 0.8 mark) could indicate a problem of multi-collinearity (Tabachnick & Fidell, 2001). Similar intercorrelations were found in the Pan European study conducted by Pieniak et al. (2009). High composite reliability (>0.80) and large sample size (N=9381) in this current study, however, should have protected against effects of multi-collinearity (Grewal, Cote & Baumgartner, 2004). High intercorrelations observed in our sample could also point to how the respondents’ understood
certain constructs. Health appears related to the perceived natural content of the food and associated with mood. Ethical concern may also be related to the natural content of the foods.

A third objective of this analysis was to compare the perceived relative importance of food choice motives within and across different countries. There was a high level of agreement across countries in the rankings of importance of food choice factors. Consistent with previous studies (Prescott et al., 2002; Januszewska et al., 2011), price sensory appeal and natural content were consistently ranked as the most important food choice factors (Table 8). More surprising was that the health factor was ranked relatively low (4th). This could be explained by the high intercorrelation with the natural content factor which may indicate that respondents do not differentiate between these two constructs. That ethical concern and familiarity were consistently ranked lowest is also in accordance with previous studies (Prescott et al., 2002; Januszewska et al., 2011). Familiarity was ranked as the least important factor in Taiwan, Malaysia, New Zealand, Belgium, Hungary, Romania and Filipes. Japanese people appeared different, however, in that they ranked ethical concern highly (Prescott et al., 2002).

Of the nine European countries that we surveyed, Spain, Greece, Portugal, Ireland and the Netherlands, ranked price the most important motive for food choice. This could reflect differing priorities among the public residing in what could be considered the relatively weaker European economies. Figures just prior to the time of sampling indicated that Greece had a recession of 4.4 percent of GDP, Portugal (3.3%), Italy (1.3%) and Spain (1%) (Pop, 2012). Sensory appeal, in contrast, was ranked first in what could be assumed to be those countries with relatively stronger economies. That Poland was the only Eastern European country surveyed may explain its uniqueness in selecting natural content as the most important motive for food choice. Only one previous study has considered some of the European countries included in the present analysis. Pieniak Perez-Cueto & Verbeke (2013) also
investigated responses to the FCQ in Poland, Spain and Norway as part of a pan-European survey. They researched associations between traditional food consumption and food choice motives but did not make comparison between countries. Their study used a modified version of the FCQ, which makes comparison with the results of this study difficult.

One of the potential limitations of this study is that the Food Choice Questionnaire was administered as a part of a larger research study about personalised nutrition. The context of the larger research project might have influenced attitudes in a way that would not have been present if the food choice motives were tested independently. That previous studies have also used the FCQ in studies of a variety of outcomes and produced similar findings, however, suggests that any influence of other survey items is likely to have been minimal.

For the purpose of this study, participants were recruited from existing consumer panels who agreed to take part in future studies. The response rate was 31.9% which although lower than some other survey data collection methods, is typical for web-based social research (Manfreda et al., 2008) the limitations of such a recruitment procedure, however, may be that given the volunteers consisted of those more highly motivated to take part in a health study and although representative of the on-line community, they might not have been entirely representative of the general population. Two previous studies, Pula et al (2014) and Pieniak et al (2013), also employed web-based methods. Whereas Pula et al (2014) reported that age, gender and education fell into the range of general population of the USA, the sample employed by Pieniak et al (2013), was slightly skewed toward those who were younger and had spent longer in education. A further strength of our study is that quotas were sampled to be representative of the on-line communicates in the countries surveyed (Poínhos et al., 2014).
5. Conclusion

This study appears to be the first pan-European study of food choice motives across 9 European countries. The degree to which we can draw conclusions is strengthened by the large sample size. Whereas some other studies (Pula et al., 2014; Pieniak et al., 2013; Honkanen and Frewer, 2009; Ares and Gambaro, 2007) have used modified versions of the FCQ, this study has used the original 36-item FCQ. Differences in outcomes of studies validating the FCQ, therefore, could be accounted for by differences in versions of the questionnaire that were used. Based on the results of this validation study, therefore, it is recommended that future research into food motives in European populations use the original 36-item version developed by Steptoe et al (1995). Satisfactory indicators of validity and reliability in 9 European countries imply that the Food Choice Questionnaire is a suitable tool for exploring food choice motives across different European populations. That the factor structure of food choice motives is similar across different countries implies that the results have potential to be interpreted and translated into a ‘one-size-fits-all’ dietary health and food innovation policies across European countries.

6. Acknowledgements

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7. References


Table 1 Overview of previous validation studies of FCQ

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Countries</th>
<th>Sample size and composition</th>
<th>FCQ version and methodology</th>
<th>FCQ Factor Structure</th>
<th>Variables in the study</th>
</tr>
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<tbody>
<tr>
<td>Pula et al (2014)</td>
<td>USA</td>
<td>N=408 Male 32.4% Female 68.6% Mean age 35.8</td>
<td>Adapted FCQ (additional 29 items) Web-based survey</td>
<td>8- factor structure New “impression management” factor – opinion of others</td>
<td>Relation of regulatory focus and food choice motives</td>
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<tr>
<td>Pieniak, Verbeke (2013)</td>
<td>Belgium, France, Italy, Norway, Poland, Spain</td>
<td>N=4828 Male 50.8% Female 49.2% Mean age 41.5</td>
<td>Adapted 24-item FCQ Web-based survey</td>
<td>8- factor structure assumed Mood factor excluded</td>
<td>Subjective health Attitude and consumption of traditional food</td>
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<td>Milošević et al (2012)</td>
<td>Croatia, Bosnia, Macedonia, Slovenia, Serbia, Montenegro</td>
<td>N=3085 Male 48.2% Female 51.8% Mean age 45.9</td>
<td>Original 36-item FCQ Face-to-face interviews</td>
<td>8- factor structure</td>
<td>Health and Natural content loading as a single factor Factors underlying food choice Clusters of consumers depending on food choice motives</td>
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<td>Januszewska et al (2011)</td>
<td>Belgium, Hungary, Romania, Philippines</td>
<td>N=1420 Male 36% Female 64% Mean age 32.3</td>
<td>Original 36-item FCQ on-screen computer application</td>
<td>Confirmed original 9-factor structure</td>
<td>Factor invariance across four countries Mean importance and rank for food choice factors</td>
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<tr>
<td>Fotopoulos et al (2009)</td>
<td>Greece</td>
<td>N=997 Male 17.3% Female 82.7% Mean age 36</td>
<td>Original 36-item FCQ Self-administered in households</td>
<td>8- factor structure (exclusion of ethical concern factor)</td>
<td>Ad-hoc measure proposed Hierarchical Cluster Analysis – consumer typology</td>
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<td>Honkanen, Frewer (2009)</td>
<td>Russia</td>
<td>N=1081 Male 49.4% Female 50.6% Mean age 31.5</td>
<td>Adapted 22-item FCQ Face-to-face interviews</td>
<td>8- factor structure assumed (adding animal welfare, political values and religion items)</td>
<td>Identifying consumer segments on food choice motives</td>
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<td>Ares, Gambaro (2007)</td>
<td>Uruguay</td>
<td>N=200 Male 48.5% Female 51.5% Mean age 32.5</td>
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<td>7- factor structure (Health and nutritional value; price and convenience; Feeling good and safety)</td>
<td>Food choice motives, age and gender influence on willingness to try functional foods</td>
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<td>Eertmans et al (2006)</td>
<td>Canada, Belgium, Italy</td>
<td>N=502 Male 33% Female 67% Mean age 32 (students)</td>
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<td>8- factor structure Health and Natural content loading as a single factor</td>
<td>Fit of Steptoe 9 factor model Country-specific factor structuress</td>
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<tr>
<td>Prescott et al (2002)</td>
<td>Japan, Taiwan, Malaysia, New Zealand</td>
<td>N=654 Only female sample Mean age 31</td>
<td>Original 36-item FCQ On screen and paper application</td>
<td>Assumed original 9-factor structure (not checked)</td>
<td>Food choice factors differences by country, age, food neophobia</td>
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### Table 2 Sample description

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<th></th>
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<th>Norway (n=1022)</th>
<th>Germany (n=1020)</th>
<th>Spain (n=1025)</th>
<th>Greece (n=1020)</th>
<th>Poland (n=1045)</th>
<th>U.K. (n=1061)</th>
<th>Ireland (n=1020)</th>
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<td>17.5</td>
<td>24.5</td>
<td>33.3</td>
<td>27.5</td>
<td>35.6</td>
<td>50.4</td>
<td>35.6</td>
<td>37.2</td>
<td></td>
</tr>
</tbody>
</table>

UK = United Kingdom, NL = the Netherlands
Statistical significance for comparison between groups by Chi-square

* Denotes significance p<0.05
Table 3. Fit measures for measurement invariance of the Food Choice Questionnaire

<table>
<thead>
<tr>
<th>Invariance</th>
<th>Chi-square</th>
<th>Df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA Value</th>
<th>90% LB</th>
<th>90% UB</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configural</td>
<td>10712.57</td>
<td>4464</td>
<td>0.963</td>
<td>0.953</td>
<td>0.037</td>
<td>0.036</td>
<td>0.038</td>
<td>0.042</td>
</tr>
<tr>
<td>Metric</td>
<td>11163.84</td>
<td>4673</td>
<td>0.961</td>
<td>0.953</td>
<td>0.037</td>
<td>0.036</td>
<td>0.037</td>
<td>0.045</td>
</tr>
<tr>
<td>Scalar</td>
<td>11663.12</td>
<td>4807</td>
<td>0.959</td>
<td>0.952</td>
<td>0.037</td>
<td>0.036</td>
<td>0.038</td>
<td>0.046</td>
</tr>
</tbody>
</table>
### Table 4 Standardised factor loadings for Food Choice Questionnaire

<table>
<thead>
<tr>
<th>Food Choice Motive</th>
<th>Questionnaire Item</th>
<th>Factor Loading</th>
<th>Internal consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Contains a lot of vitamins and minerals</td>
<td>0.759</td>
<td>0.901</td>
</tr>
<tr>
<td></td>
<td>Keeps me healthy</td>
<td>0.737</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is nutritious</td>
<td>0.758</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is high in protein</td>
<td>0.722</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is good for my skin/teeth/hair/nails etc.</td>
<td>0.802</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is high in fibre and roughage</td>
<td>0.814</td>
<td></td>
</tr>
<tr>
<td>Mood</td>
<td>Helps me cope with stress</td>
<td>0.763</td>
<td>0.897</td>
</tr>
<tr>
<td></td>
<td>Helps me to cope with life</td>
<td>0.722</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Helps me relax</td>
<td>0.711</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Keeps me awake/alert</td>
<td>0.719</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cheers me up</td>
<td>0.683</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Makes me feel good</td>
<td>0.752</td>
<td></td>
</tr>
<tr>
<td>Convenience</td>
<td>Is easy to prepare</td>
<td>0.675</td>
<td>0.886</td>
</tr>
<tr>
<td></td>
<td>Can be cooked very simply</td>
<td>0.692</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Takes no time to prepare</td>
<td>0.697</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can be bought in shops close to where I live or work</td>
<td>0.717</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is easily available in shops and supermarkets</td>
<td>0.711</td>
<td></td>
</tr>
<tr>
<td>Sensory Appeal</td>
<td>Smells nice</td>
<td>0.758</td>
<td>0.821</td>
</tr>
<tr>
<td></td>
<td>Looks nice</td>
<td>0.682</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has a pleasant texture</td>
<td>0.749</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tastes good</td>
<td>0.561</td>
<td></td>
</tr>
<tr>
<td>Natural Content</td>
<td>Contains no additives</td>
<td>0.862</td>
<td>0.918</td>
</tr>
<tr>
<td></td>
<td>Contains natural ingredients</td>
<td>0.923</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contains no artificial ingredients</td>
<td>0.859</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>Is not expensive</td>
<td>0.921</td>
<td>0.838</td>
</tr>
<tr>
<td></td>
<td>Is cheap</td>
<td>0.620</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is good value for money</td>
<td>0.783</td>
<td></td>
</tr>
<tr>
<td>Weight Control</td>
<td>Is low in calories</td>
<td>0.759</td>
<td>0.905</td>
</tr>
<tr>
<td></td>
<td>Helps me control my weight</td>
<td>0.541</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is low in fat</td>
<td>0.814</td>
<td></td>
</tr>
<tr>
<td>Familiarity</td>
<td>Is what I normally eat</td>
<td>0.782</td>
<td>0.781</td>
</tr>
<tr>
<td></td>
<td>Is well-known</td>
<td>0.741</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is like the food I ate when I was a child</td>
<td>0.628</td>
<td></td>
</tr>
<tr>
<td>Ethical Concern</td>
<td>Comes from countries I approve of politically</td>
<td>0.584</td>
<td>0.808</td>
</tr>
<tr>
<td></td>
<td>Has the country of origin clearly marked</td>
<td>0.745</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is packaged in an environmentally friendly way</td>
<td>0.842</td>
<td></td>
</tr>
</tbody>
</table>
Table 5. Correlations among food choice factors

<table>
<thead>
<tr>
<th>Construct</th>
<th>Health</th>
<th>Mood</th>
<th>Convenience</th>
<th>Sensory Appeal</th>
<th>Natural Content</th>
<th>Price</th>
<th>Weight Control</th>
<th>Familiarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>0.797</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mood</td>
<td>0.359</td>
<td>0.523</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convenience</td>
<td>0.475</td>
<td>0.599</td>
<td>0.590</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensory Appeal</td>
<td>0.668</td>
<td>0.573</td>
<td>0.280</td>
<td>0.464</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Content</td>
<td>0.248</td>
<td>0.312</td>
<td>0.464</td>
<td>0.395</td>
<td>0.289</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>0.550</td>
<td>0.509</td>
<td>0.399</td>
<td>0.389</td>
<td>0.486</td>
<td>0.264</td>
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<td></td>
</tr>
<tr>
<td>Weight Control</td>
<td>0.452</td>
<td>0.485</td>
<td>0.495</td>
<td>0.489</td>
<td>0.406</td>
<td>0.294</td>
<td>0.595</td>
<td></td>
</tr>
<tr>
<td>Familiarity</td>
<td>0.539</td>
<td>0.499</td>
<td>0.281</td>
<td>0.406</td>
<td>0.649</td>
<td>0.237</td>
<td>0.488</td>
<td>0.475</td>
</tr>
</tbody>
</table>

All correlations significant at $p < 0.001$
<table>
<thead>
<tr>
<th>Factor</th>
<th>Country</th>
<th>Norway</th>
<th>Germany</th>
<th>Spain</th>
<th>Greece</th>
<th>Poland</th>
<th>UK</th>
<th>Ireland</th>
<th>Netherlands</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td></td>
<td>0.902</td>
<td>0.880</td>
<td>0.880</td>
<td>0.883</td>
<td>0.902</td>
<td>0.924</td>
<td>0.908</td>
<td>0.881</td>
<td>0.914</td>
</tr>
<tr>
<td>Mood</td>
<td></td>
<td>0.909</td>
<td>0.872</td>
<td>0.890</td>
<td>0.858</td>
<td>0.897</td>
<td>0.912</td>
<td>0.892</td>
<td>0.914</td>
<td>0.887</td>
</tr>
<tr>
<td>Convenience</td>
<td></td>
<td>0.896</td>
<td>0.873</td>
<td>0.900</td>
<td>0.886</td>
<td>0.887</td>
<td>0.897</td>
<td>0.873</td>
<td>0.903</td>
<td>0.883</td>
</tr>
<tr>
<td>Sensory Appeal</td>
<td></td>
<td>0.807</td>
<td>0.803</td>
<td>0.868</td>
<td>0.799</td>
<td>0.792</td>
<td>0.825</td>
<td>0.818</td>
<td>0.803</td>
<td>0.851</td>
</tr>
<tr>
<td>Natural Content</td>
<td></td>
<td>0.927</td>
<td>0.917</td>
<td>0.890</td>
<td>0.859</td>
<td>0.898</td>
<td>0.942</td>
<td>0.922</td>
<td>0.911</td>
<td>0.881</td>
</tr>
<tr>
<td>Price</td>
<td></td>
<td>0.847</td>
<td>0.853</td>
<td>0.868</td>
<td>0.743</td>
<td>0.798</td>
<td>0.816</td>
<td>0.826</td>
<td>0.806</td>
<td>0.855</td>
</tr>
<tr>
<td>Weight Control</td>
<td></td>
<td>0.765</td>
<td>0.928</td>
<td>0.923</td>
<td>0.904</td>
<td>0.918</td>
<td>0.924</td>
<td>0.915</td>
<td>0.910</td>
<td>0.897</td>
</tr>
<tr>
<td>Familiarity</td>
<td></td>
<td>0.781</td>
<td>0.824</td>
<td>0.757</td>
<td>0.701</td>
<td>0.841</td>
<td>0.785</td>
<td>0.762</td>
<td>0.774</td>
<td>0.793</td>
</tr>
<tr>
<td>Ethical Concern</td>
<td></td>
<td>0.799</td>
<td>0.816</td>
<td>0.769</td>
<td>0.655</td>
<td>0.757</td>
<td>0.867</td>
<td>0.810</td>
<td>0.880</td>
<td>0.768</td>
</tr>
</tbody>
</table>
Table 7: Mean ratings (scale 1-5) of the importance of each food choice factor by consumers in 9 countries

<table>
<thead>
<tr>
<th>Factor</th>
<th>Total (N=9381)</th>
<th>Norway (n=1022)</th>
<th>Germany (n=1020)</th>
<th>Spain (n=1025)</th>
<th>Greece (n=1020)</th>
<th>Poland (n=1045)</th>
<th>UK (n=1061)</th>
<th>Ireland (n=1020)</th>
<th>NL (n=1020)</th>
<th>Portugal (n=1148)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>3.49 (0.74)</td>
<td>3.31 (0.80)</td>
<td>3.61 (0.71)</td>
<td>3.47 (0.67)</td>
<td>3.68 (0.67)</td>
<td>3.64 (0.66)</td>
<td>3.33 (0.83)</td>
<td>3.48 (0.78)</td>
<td>3.30 (0.67)</td>
<td>3.56 (0.72)</td>
</tr>
<tr>
<td>M</td>
<td>3.36 (0.83)</td>
<td>3.10 (0.91)</td>
<td>3.34 (0.80)</td>
<td>3.43 (0.72)</td>
<td>3.75 (0.67)</td>
<td>3.65 (0.70)</td>
<td>3.09 (0.91)</td>
<td>3.29 (0.85)</td>
<td>3.15 (0.81)</td>
<td>3.44 (0.76)</td>
</tr>
<tr>
<td>C</td>
<td>3.44 (0.84)</td>
<td>3.43 (0.87)</td>
<td>3.56 (0.79)</td>
<td>3.48 (0.78)</td>
<td>3.63 (0.84)</td>
<td>3.68 (0.72)</td>
<td>3.21 (0.90)</td>
<td>3.33 (0.86)</td>
<td>3.28 (0.79)</td>
<td>3.37 (0.85)</td>
</tr>
<tr>
<td>SA</td>
<td>3.67 (0.71)</td>
<td>3.53 (0.72)</td>
<td>3.84 (0.69)</td>
<td>3.77 (0.69)</td>
<td>3.79 (0.67)</td>
<td>3.68 (0.63)</td>
<td>3.59 (0.76)</td>
<td>3.53 (0.76)</td>
<td>3.43 (0.64)</td>
<td>3.83 (0.66)</td>
</tr>
<tr>
<td>NC</td>
<td>3.57 (0.96)</td>
<td>3.20 (1.02)</td>
<td>3.74 (0.89)</td>
<td>3.63 (0.82)</td>
<td>4.00 (0.79)</td>
<td>3.89 (0.78)</td>
<td>3.27 (1.05)</td>
<td>3.40 (1.01)</td>
<td>3.15 (0.95)</td>
<td>3.80 (0.82)</td>
</tr>
<tr>
<td>P</td>
<td>3.72 (0.82)</td>
<td>3.23 (0.90)</td>
<td>3.83 (0.77)</td>
<td>3.87 (0.75)</td>
<td>4.03 (0.69)</td>
<td>3.85 (0.68)</td>
<td>3.50 (0.86)</td>
<td>3.56 (0.87)</td>
<td>3.55 (0.75)</td>
<td>4.02 (0.74)</td>
</tr>
<tr>
<td>WC</td>
<td>3.18 (0.99)</td>
<td>2.65 (0.91)</td>
<td>3.17 (1.02)</td>
<td>3.39 (0.86)</td>
<td>3.52 (0.88)</td>
<td>3.39 (0.91)</td>
<td>3.03 (1.06)</td>
<td>3.15 (1.02)</td>
<td>2.83 (0.94)</td>
<td>3.48 (0.91)</td>
</tr>
<tr>
<td>F</td>
<td>2.85 (0.89)</td>
<td>2.50 (0.88)</td>
<td>2.90 (0.88)</td>
<td>3.06 (0.80)</td>
<td>2.96 (0.82)</td>
<td>3.26 (0.80)</td>
<td>2.60 (0.94)</td>
<td>2.72 (0.91)</td>
<td>2.59 (0.83)</td>
<td>3.02 (0.83)</td>
</tr>
<tr>
<td>EC</td>
<td>2.91 (1.01)</td>
<td>2.56 (1.03)</td>
<td>3.06 (0.96)</td>
<td>3.04 (0.91)</td>
<td>3.35 (0.87)</td>
<td>3.08 (0.87)</td>
<td>2.67 (1.09)</td>
<td>2.90 (1.03)</td>
<td>2.41 (0.99)</td>
<td>3.10 (0.95)</td>
</tr>
</tbody>
</table>

U.K. = United Kingdom, NL = the Netherlands,
H = Health, M = Mood, C = Convenience, SA = Sensory Appeal, NC = Natural Content, P = Price, WC = Weight Control, F = Familiarity, EC = Ethical Concern
Data expressed as Mean (SD)
Significance at p < 0.05
Table 8 Rank order of most to least important food choice factor for each country

<table>
<thead>
<tr>
<th>Most important</th>
<th>Norway</th>
<th>Germany</th>
<th>Spain</th>
<th>Greece</th>
<th>Poland</th>
<th>U.K.</th>
<th>Ireland</th>
<th>Netherlands</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory Appeal</td>
<td>Sensory Appeal</td>
<td>Price</td>
<td>Price</td>
<td>Natural Content</td>
<td>Sensory Appeal</td>
<td>Price</td>
<td>Price</td>
<td>Price</td>
<td>Price</td>
</tr>
<tr>
<td>2</td>
<td>Convenience</td>
<td>Price</td>
<td>Sensory Appeal</td>
<td>Natural Content</td>
<td>Price</td>
<td>Price</td>
<td>Sensory Appeal</td>
<td>Sensory Appeal</td>
<td>Sensory Appeal</td>
</tr>
<tr>
<td>3</td>
<td>Health</td>
<td>Natural Content</td>
<td>Natural Content</td>
<td>Sensory Appeal</td>
<td>Sensory Appeal</td>
<td>Health</td>
<td>Health</td>
<td>Health</td>
<td>Natural Content</td>
</tr>
<tr>
<td>4</td>
<td>Price</td>
<td>Health</td>
<td>Convenience</td>
<td>Mood</td>
<td>Convenience</td>
<td>Natural Content</td>
<td>Natural Content</td>
<td>Convenience</td>
<td>Health</td>
</tr>
<tr>
<td>5</td>
<td>Natural Content</td>
<td>Convenience</td>
<td>Health</td>
<td>Health</td>
<td>Mood</td>
<td>Convenience</td>
<td>Convenience</td>
<td>Natural Content</td>
<td>Weight Control</td>
</tr>
<tr>
<td>6</td>
<td>Mood</td>
<td>Mood</td>
<td>Mood</td>
<td>Convenience</td>
<td>Health</td>
<td>Mood</td>
<td>Mood</td>
<td>Mood</td>
<td>Convenience</td>
</tr>
<tr>
<td>7</td>
<td>Weight Control</td>
<td>Weight Control</td>
<td>Weight Control</td>
<td>Weight Control</td>
<td>Weight Control</td>
<td>Weight Control</td>
<td>Weight Control</td>
<td>Weight Control</td>
<td>Mood</td>
</tr>
<tr>
<td>8</td>
<td>Ethical Concern</td>
<td>Ethical Concern</td>
<td>Familiarity</td>
<td>Ethical Concern</td>
<td>Familiarity</td>
<td>Ethical Concern</td>
<td>Ethical Concern</td>
<td>Familiarity</td>
<td>Ethical Concern</td>
</tr>
<tr>
<td>Least important</td>
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<td>Familiarity</td>
<td>Ethical Concern</td>
<td>Familiarity</td>
<td>Ethical Concern</td>
<td>Familiarity</td>
<td>Ethical Concern</td>
<td>Familiarity</td>
<td>Familiarity</td>
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</table>
Table 9 Mean importance rankings for food choice motives in 9 countries

<table>
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<tr>
<th>Factor</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>1.67</td>
</tr>
<tr>
<td>Sensory Appeal</td>
<td>1.89</td>
</tr>
<tr>
<td>Natural Content</td>
<td>3.33</td>
</tr>
<tr>
<td>Health</td>
<td>4.00</td>
</tr>
<tr>
<td>Convenience</td>
<td>4.56</td>
</tr>
<tr>
<td>Mood</td>
<td>5.78</td>
</tr>
<tr>
<td>Weight Control</td>
<td>6.78</td>
</tr>
<tr>
<td>Ethical Concern</td>
<td>8.33</td>
</tr>
<tr>
<td>Familiarity</td>
<td>8.67</td>
</tr>
</tbody>
</table>