# Sustainability cues on packaging: the influence of recognition on purchasing behavior

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1    **Sustainability cues on packaging: the influence of recognition on purchasing behavior**

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6    **Abstract**

7    The aim of this research was to examine United Kingdom (UK) consumers' recognition

8    levels, insinuated purchasing intention (IPI) and insinuated purchasing behavior (IPB)

9    associated with sustainability cues on packaging. Empirical research was conducted using an

10   online questionnaire (n=254) to determine the level of recognition and reported influence of 13

11   different sustainability cues. The data was analyzed using IBM SPSS Statistics version 24. The

12   conversion of sustainability cue recognition (24% to 97% of respondents depending on the cue)

13   to actual IPB was shown in this study to be cue specific and low at 10% or less except the

14   Fairtrade logo at 22%. Statistically significant differences within the sample population were

15   observed for recognition by age, income and education and for IPB by income and education

16   ($p < 0.05$) but again this was cue specific. Four distinct consumer clusters were identified with

17   income being a differentiating factor for the cluster with high awareness and high IPI.  The

18   research contributes to a wider understanding of the use of sustainability cues the level of

19   consumer recognition and the level of influence on purchasing behavior. The research

20   demonstrates the weak translation of recognition of sustainability cues through to intended

21   sustainable purchasing behavior.

22   **Highlights**

23  • Packaging cues are a means of communication to consumers.

24  • Study reflects on use and effectiveness of sustainability cues on packaging.

25  • Conversion of cue recognition to driving purchasing behavior is low.

26  **Keywords**   sustainability; cues; packaging; behavior; intention; ranking

27  **Research paper**

28

29

## 1. Introduction

The definition of sustainability differs depending on the context in which it is used. In its broadest sense, the Oxford Dictionary defines sustainability as "the ability to be maintained at a certain rate or level" (Oxford Dictionary, 2017). Some stakeholders use the term "sustainability" to describe environmental objectives only, whilst others incorporate the environment, economy and society into a construct that forms the 'three pillars of sustainability' (Strange and Bayley, 2008). Agri-food systems are the activities and socio-technical governance mechanisms that frame the way food is grown, produced, manufactured, retailed and eaten. These activities and governance structures interact and influence at multiple levels not only the methods that are used to produce food, but also the environmental and social impact of such production. Agri-food production is therefore influenced by internal supply chain factors such as production method, resource use and land quality and also by a range of external factors including production intensification, globalization, climate change and scarcity of natural resources and need to support the future demands of a growing global human population (Godfray and Garnett, 2014; Hubeau et al. 2017). Estimates suggest that agri-food systems contribute up to 30% of global greenhouse gas (GHG) emissions, and account for 70% of global freshwater use (Ridoutt et al. 2017) creating a moral obligation for food manufacturers and retailers to reduce these effects. However the absence of meaningful information about consumer perceptions of sustainable food in the literature, limits opportunities for market based policy levers via consumer purchasing behaviour, to reduce the impact of agri-food systems in practice (Lim, 2015). The aim of this research is to examine United Kingdom (UK) consumers' recognition levels, insinuated purchasing intention (IPI) and insinuated purchasing behavior (IPB) associated with sustainability cues on packaging. Three specific research questions are considered: firstly what is the level of consumer recognition of packaging sustainability cues and what factors influence the degree of

3

55  recognition; secondly how do sustainability cues influence purchasing intention and finally

56  what is the influence of sustainability cues on purchasing behaviour. In a context of climate

57  change and environmental depletion and degredation, influencing behavioural change that

58  reduces an individual's, community and global environmental impact of food consumption is

59  a critical topic. Our contribution in this research is to seek to identify the nuanced cognitive

60  process of recognition of sustainability cues through to declaring purchasing intention and

61  reported purchasing behaviour. The paper is structured as follows: section 1 is an introduction

62  to the topic; section 2 considers current literature on sustainable purchasing and the influence

63  of sustainability cues; section 3 outlines the materials and methods used; section 4 the results

64  and analysis; section 5 the discussion and section 6 the conclusion of the paper.

65  **2.  Literature Review**

66  **2.1 Extrinsic sustainability characteristics**

67  Extrinsic sustainability characteristics reflect the nature of the production standards and

68  systems employed to produce a food e.g. aspects of animal welfare, environmental impact or

69  worker welfare standards (Magnier et al. 2016). Social aspects such as food security and

70  affordability, environmental aspects of the negative externalities of food production that are

71  not addressed within the price paid by the consumer, and economic aspects of profitability and

72  economic resilience for individual businesses, and the supply chain as a whole, are also all of

73  importance (Grunert et al. 2014). Hubeau et al. (2017) notes that academic literature on food

74  sustainability mostly focuses on environmental impacts, while social dimensions receive less

75  attention. When sustainability is interpreted in a broader sense, as for example in an

76  organisation's mission statement, it is often communicated as delivering sustainable value for

77  all stakeholders. However, it becomes apparent that food products cannot be truly sustainable,

78  nor deliver value to consumers without providing health benefits too so when all production

79  aspects are considered, this rationale presents a challenge in that healthier, nutrient rich foods,

80  are not necessarily more environmentally sustainable than the energy dense alternatives. Fruit

81  and vegetables are more nutrient rich than processed foods, but because they are perishable,

82  they require cold-chain transportation and storage increasing the energy consumption and

83  environmental impact of their journey from field to retail shelf (Yang et al. 2017).    Thus

84  reducing environmental impact and maintaining the ecology and biodiversity of land is not

85  always integrated with the processes of managing the quality and nutritional value of foods that

86  are in turn resource intensive (Horton et al. 2016).  This creates a contested space when food

87  manufacturers and retailers then seek to promote the sustainable credentials of a given product.

88      **2.2 Perceptions of sustainability labeling**

89      Packaging enhances consumer perceptions of the sustainability and quality of the product

90  (Silva et al. 2017; Steenis et al. 2017) and a key element of that is consumer perception of

91  sustainability labeling. Sustainability labeling allows consumers to consider visual cues that

92  relate to environmental, social and ethical considerations, or alternatively indirectly inference

93  can be drawn from other extrinsic product characteristics such as country of origin, method of

94  production or provenance (Grunert et al. 2014). Third-party certification (TPC) provides

95  assurance that such cues are associated with a set of defined private standards that are routinely

96  verified at steps in the supply chain to ensure integrity of use (Deaton, 2004). This "green"

97  marketing approach seeks to drive consumer behavioral change via the use of pro-social signals

98  and cues to emphasize the societal and/or environmental benefit associated with a given

99  purchasing behavior (Lim, 2015).

100     Sustainability cues, when recognised, are strong drivers of purchase intention towards food

101  (Chekima et al. 2016). They can increase the perception of the environmental and social

102  benefits associated with a product (Lazzarini et al. 2017), quality, naturalness and freshness

103  (Magnier et al. 2016; Samant and Seo, 2016; Schaufele and Hamm, 2017; Steenis et al. 2017)

104    and a preference for national sourcing (Lazzarini et al. 2017). Indeed the value of such

105    sustainability cues is often limited without TPC (Chkanikova and Lehner, 2015). While

106    consumer purchasing behaviour is a major influence (Smith, 2007; Jansson et al. 2017; Hubeau

107    et al. 2017), some suggest that the adoption of sustainable practices is almost exclusively

108    dependent on the degree of enforcement of environmental standards by government and

109    regulators (Chkanikova and Mont, 2015; Mzembe et al. 2016; Rueda et al. 2017). In other

110    words, food manufacturers and retailers adopt 'green' practices not to win customers, but

111    instead as a means to deliver legal compliance. Nevertheless, the enhanced purchase intention

112    in environmentally conscious customer groups is a valuable 'side effect' of sustainable

113    production and an opportunity to capture value for the brand owner and/or retailer.

114    Sustainability is seen by some as being embodied in organic methods of food production,

115    but Tasca et al. (2017) suggest that this perception might be incorrect as when investigating

116    organic and conventional farming methods for endive, they found no significant difference in

117    overall environmental impact. Indeed, they suggest that the adoption of organic farming led to

118    greater acidification and terrestrial eutrophication. This work concurs with Tuomisto et al.

119    (2012) who assert that organic systems use 84% more land, and can result in higher ammonia

120    emissions and nitrogen leaching per product unit when compared to conventional agriculture.

121    However other studies identified respectively that organic production of olives and beef

122    produced lower GHG emissions when compared to conventional agriculture (Casey and

123    Holden, 2006; Kaltsas et al. 2007). Traditionally, intrinsic quality characteristics define the

124    size, shape, color, taste, smell, length, freshness, and the inherent nature of a food (Luning et

125    al. 2002; Manning and Luning, 2018). Heavy metal content or pesticide residues, for example,

126    are negative intrinsic characteristics, representing weak social sustainability aspects around the

127    safety of the food, and also poor environmental sustainability aspects in terms of the

128    custodianship of the planet. Some studies suggest that intrinsically, organic food is more

129  nutritionally beneficial (Worthington, 1988; Rosetto et al. 2013), but others have suggested

130  that genotype can influence the variation in phytochemical content in organically and

131  conventionally grown (Picchi et al. 2012; Manning and Monaghan, 2019). This contradictory

132  discourse on organic production (D'Evoli et al. 2016; Średnicka-Tober et al. 2016; Stevenson

133  et al. 2018), if consumers are aware of it, could lead to a confused attitudinal and behavioral

134  purchasing response.

135      Thus, there can be multiple meanings of sustainability creating the potential for opacity

136  or ambiguity in terms of messaging on packaging. Indeed, Yates-Doerr (2015) identifies this

137  as "*the opacity of reduction*" i.e. the pretence of simplicity that ultimately leads to greater

138  consumer confusion. Opacity weakens product value especially if a reductionist methodology

139  takes multiple sustainability datasets and subsumes them into a single metric or cue (Roos et

140  al 2015). In this context, the use of sustainability cues is worthy of wider exploration to

141  determine its efficacy in practice and what factors influence pro-social consumer intentions

142  and purchasing behavior. Indeed, the binary nature of the characteristics of sustainability: good

143  versus bad; tangible or abstract aspects; or quantifiable or non-quantifiable aspects can allow a

144  multiplicity of consumer perceptions and decisions. Further decisions with regard to

145  sustainable purchasing can be based on both objective (factual) and subjective (emotions and

146  feelings) viewpoints. Thus if the individual's cognitive decision process from recognition, to

147  intention through to intended behaviour is to be more widely understood then research such as

148  that described in this paper will provide a valuable contribution.

### 2.3 Factors influencing perception of sustainability cues

150      Perception of sustainability cues is affected by ***consumers' lack of knowledge***

151  (McCarthy et al. 2016). In one study, 56% of participants failed to judge accurately the

152  packaging's recyclability, whilst still being willing to choose the more sustainable food option

153  (Lindh et al. 2016). Further, customer perception of sustainability is strongly affected by

154    graphical packaging cues, even if the standards they relate to do not actually reduce

155    environmental impact (Steenis et al. 2017). Another variable that can affect the influence of

156    consumer perception on sustainability cues is *general informational context*. Exposure to

157    environmental advertising positively predicts the purchasing intention for sustainable food

158    products, while actual environmental knowledge does not produce such an effect (Chekima et

159    al. 2015). Positive consumer perception of sustainability cues is reinforced by social media

160    (Stevens et al. 2016). Indeed experiencing social pressure from peers can explain intentions to

161    purchase, despite individuals exhibiting negative personal attitudes (Vermeir and Verbeke,

162    2008).

163          The literature on the *recognition of sustainability cues* varies. A large body of research

164    conducted across multiple countries including the UK, Greece, Belgium and Canada focuses

165    on organic cue recognition and throughout these studies recognition was low (Campbell et al.

166    2010; Loo et al. 2013; Gerrard et al. 2013; Anastasiou et al. 2017). Low recognition was shown

167    too by Ellis et al. (2009) and more recently, Soon and Wallace (2018) showed low recognition

168    levels with RSPCA Assured (formerly Freedom Foods) having the highest recognition (41.5%

169    of respondents), Rainforest Alliance (38.2%), Red Tractor (37.2%) and Soil Association

170    (32.1%). However, in this study, the names of the standards were given to respondents, rather

171    than the visual packaging cue (logo).

172          *Demographic factors* influence consumer attitudinal and behavioral response to

173    sustainability cues. Females' purchase intention positively correlates with responsiveness to

174    'green' advertising (Meyer-Hofer et al. 2015; Chekima et al. 2016). However, there was also

175    evidence that male customers are more likely to buy 'green' products, while females prefer to

176    purchase organic food (McCarthy et al. 2016). These studies established a geographic influence

177    too. In Germany and Malaysia there was a prevalence of females being sustainable customers,

178    while in China the opposite was the case. In their study in the Netherlands, Verain et al. (2016)

179 concluded that being a sustainable consumer was not influenced by gender, age income or

180 education. Considering this contested evidence, investigating the impact of ***gender*** on

181 sustainable food consumption specifically in the UK context would therefore be useful. The

182 term "sustainable food consumer" is also difficult to draw out as many sources focus on the

183 purchasing behaviour rather than the individual. A sustainable consumer has been described as

184 an individual who recognises the reasons for specific behaviours that can benefit society and

185 the environment (Wróblewski & Dacko-Pikiewicz, 2018). Thus an individual who is a

186 sustainable consumer should recognise and then attitudinally and behaviorally respond to

187 sustainability cues. The impact of ***income*** on responsiveness to sustainability cues is

188 inconsistent across studies (Chekima et al. 2016; McCarthy et al. 2016), while the positive

189 impact of higher **education levels** is reported more frequently. A comprehensive approach to

190 constructing the demographic profile of a dedicated sustainable food consumer was taken by

191 Meyer-Hofer et al. (2015). The researchers concluded:

192 *"**Convinced sustainable consumers** [CSC] are more often female than male and perceive*

193 *that their personal purchase decision has an impact on overall sustainable development.*

194 *They show a higher willingness to increase sustainability through their consumption*

195 *behavior. They are very much interested in high food quality and are not as much influenced*

196 *by advertisements and offers in their purchase decision making as convinced conventional*

197 *consumers."* (Meyer-Hofer et al. 2015, p.1082).

198 The implications of this finding for food marketers are twofold. Firstly, CSC are strongly

199 interested in food quality in its totality as well as sustainability. Secondly, CSC are less

200 responsive to advertising (Meyer-Hofer et al. 2015), which means that other factors may play

201 a stronger role. In summary, the topic of the influence of sustainability cues is an important,

202 contested and complex issue. Consumer behavior towards sustainability cues is influenced by

203 many factors such as age, income, education and gender, knowledge, information and

204    recognition levels. While there is evidence that consumers can misinterpret sustainability cues

205    (Lindh et al. 2016), other studies demonstrate that higher levels of knowledge do not alter

206    consumer perceptions significantly (Chekima et al. 2015; Samant and Seo, 2016) i.e. that there

207    is a weak relationship between recognition and its effect on purchasing behavior. Therefore,

208    further research is required to understand UK consumers' recognition, purchasing intention

209    and purchasing behavior towards sustainability cues, to understand the cognitive process more

210    clearly and the moderating effect of demographic variables such as gender, age and education

211    and income levels.

212

213    **2    Materials and Methods**

214    An explorative, mono-method collected quantitative data via an on-line questionnaire

215    (Bristol Online Survey), with a non-probability convenience sampling approach to distribute

216    the link via online forums and networks. The reason for choosing this method was that the

217    variables identified in the literature could be re-examined in the UK context and that a

218    deductive approach could then be assured through the design of the questions in the survey.

219    Ten hard copy versions were also distributed to recipients above the age of 75 to extend the

220    demographic profile. The questionnaire was live for one month in March 2018 and received

221    254 responses. The questionnaire consisted of 18 closed questions divided between three parts;

222    1) Cue motivations; 2) Cue importance; and 3) Demographics (four questions to determine

223    gender, age, education and income) and one aspect of the overall research is presented here

224    (Parts 1 and 3). Part 1, via the question "In the next week, how likely are you to purchase a

225    food product with one of the following labels on the packaging? Please click the statement that

226    best reflects your answer" asked respondents to consider a range of visual cues with no

227    accompanying text or explanation. The visual cues themselves were used as this approach

228    meant that visual recognition could be determined. Part 1 contained the visual cues (Figure 1)

229 and ranking questions with a seven-point Likert-style rating scale from do not recognize ("No

230 recognition") through to level of intention to purchase from low ("Would not use") to

231 extremely likely to purchase ("Would use " representing SCS). There was no neutral response

232 to reduce a neutral bias and to reduce the potential for cognitive dissonance and social

233 desirability bias, the term 'sustainability' was not used in the questionnaire.

234 **Take in Figure 1**

235 The questionnaire was piloted (n=10) and Part 1 adjusted to the question above based on

236 the feedback provided. Figure 1 shows the visual cues used in the study, but text has been

237 provided therein as a means to underpin the rationale as to why the range of cues and specific

238 cues were chosen. This was not provided to the respondents. The research reported here sought

239 to address the following three research questions:

240 **RQ1: What is the level of consumer recognition of sustainability cues on packaging**

241 **and what factors may influence this?**

242 **RQ2: What is the insinuated influence of sustainability cues on insinuated purchasing**

243 **intention (IPI)?**

244 **RQ3: What is the influence of sustainability cues on insinuated purchasing behavior**

245 **(IPB), are there CSC and if so which cues are of interest to them?**

246 The data collected from the questionnaire was analyzed using SPSS v24. Descriptive

247 analysis via frequencies and cross-tabulation tests were supported by the $\chi^2$ test, Spearman rank

248 correlation and Mann Whitney tests. In order to classify the sample into different respondent

249 segments, a two-step cluster analysis was then conducted. The use of a convenience sampling

250 method is a major limitation of this study. Therefore care has been taken to ensure that the

251 results are not over generalized. In this study, as with many approaches that use this type of

252 methodology, no actual behavioral observations were made therefore any conclusions drawn

253 reflect insinuated rather than actual behavior of the respondents.

254 **3 Results and analysis**

255 **4.1 Demographic profile**

256 The demographic profile of the questionnaire participants (n=254) has been collated

257 (Table 1) and shows a large female skew (70.1%) compared to males (29.9%) whereas the UK

258 population is 50.8% and 49.2% male (ONS, 2017). Participants aged 18-24 formed the largest

259 group within the sample population (36.6%) followed by the 45-54 group (19.3%) with only

260 3.1% of the sample representing >65 years. Previous research has demonstrated that using

261 online questionnaires as a research methodology limits reach to the older age demographic

262 (Wright, 2005). Over 66% of the participants had a bachelor's degree or higher indicating that

263 the sample population of this study were educated, with 79.5% of participants having a personal

264 annual income of less than £40,000 which just over one quarter earning less than £10,000 per

265 annum. The median income category for this study was £20,000 - £29,999 and correlates with

266 the median UK household income for 2017 of £27,200 (ONS, 2018).

267 **Take in Table 1**

268 **4.2 RQ1: What is the level of consumer recognition of sustainability cues on packaging**

269 **and what factors may influence this?**

270 The level of cue recognition was assessed for all participants (Table 2). The Fairtrade

271 cue was the most recognized cue (99.6%), with the "5-a-day" cue (94.9%) and then the Red

272 Tractor cue (91.3%). The UTZ cue was the cue least recognized by the participants (23.6%).

273 The results are then differentiated by gender (Table 2). Males showed full recognition of the

274 Fairtrade cue, Red Tractor and "5-a-day" cue (93.4%) and the Rainforest Alliance (90.8%) with

275     the UTZ cue the least recognized at (27.6%). Female responses were similar in that recognition

276     of the Fairtrade cue was (99.4%), "5-a-day" cue (95.5%), Red Tractor (90.4%) with the UTZ

277     cue the least recognized at (21.9%).

278     **Take in Table 2**

279     All respondents had lowest recognition of the same three cues; UTZ, Best Aquacultural

280     Practices (BAP) and Tesco Nurture. Males had greater recognition of two cues: the Carbon

281     Trust (11% higher) and Rainforest Alliance (7% higher) when compared to female participants.

282     The degree, strength and direction of the association between the degree of recognition and

283     demographic factors (gender H1; age H2; income H3; education H4) was tested using $\chi^2$ and

284     Spearman rank analyzes (rho value) see Table 3.

285     **Take in Table 3**

286     A significant association was identified between **age** and the recognition of the Scotch

287     beef (p=0.006), Rainforest Alliance (p=0.019), and Soil Association (p=0.000) cues. No

288     significant associations were found between age and the recognition of the other nine cues.

289     Using Spearman's rank correlation, the relation between age of participants and the recognition

290     of the Scotch Beef cue has a significant weak, positive correlation (rho=0.211) i.e. as age

291     increases, the level of recognition also increases (but this difference can only be explained by

292     age (4.5%) and the rest of the relationship is explained by other factors. The relationship

293     between age of participants and recognition of the Rainforest Alliance cue has a significant

294     weak, negative correlation (rho=-0.172). Therefore, as age increases, the level of recognition

295     of this cue decreases. Variance in the recognition of this cue is explained by change in age

296     (2.9%), leaving 97.1% of the relationship explained by other factors. Age and recognition of

297     the Soil Association cue has a significant weak, positive correlation (rho=0.271) i.e. as age

298   increases the level of recognition increases. Therefore, changes in the recognition by age is

299   weak leaving the majority of the relationship found explained by other factors.

300        A significant association was only identified between **level of income** and recognition

301   of the Soil Association cue (p= 0.006). However a trend was present with Scotch Beef

302   (*p*=0.089) and Red Tractor (*p*=0.071) cues, although these were not statistically significant at

303   *p*<0.05. A significant weak, positive correlation (rho=0.214) was shown between income levels

304   and recognition of the Soil Association cue i.e. as level of income increases, the level of

305   recognition also increases, but variance in recognition could only be explained by 4.5% for

306   income meaning other factors had more influence.

307        A significant association was only identified between **education level** and the

308   recognition of the Rainforest Alliance (*p*= 0.040), Tesco Nurture (*p*= 0.013) and the LEAF

309   Marque (*p*= 0.029) cues.  A significant weak, negative correlation (rho=-0.186) was shown

310   between education level and recognition of the Tesco Nurture cue i.e. as education level

311   increases, the level of recognition decreases, but 96.6% of the factors that affect recognition

312   here are explained by other factors. The recognition levels shown in this study were higher than

313   previous studies (Ellis et al. 2009; Soon and Wallace 2018) and this should be considered when

314   results on buying intention and purchasing behavior are now analyzed.

315   **4.3 RQ2: What is the insinuated influence of sustainability cues on IPI?**

316        Respondents were asked to confirm the influence of the cues on IPI. The results are

317   presented in Table 4. Female participants reported to be more influenced than the males in

318   terms of IPI by nine of the thirteen sustainability cues. The Red Tractor cue has the highest

319   level of reported IPI (80.3%). Female participants IPI for the RSPCA cue (60.7%) was higher

320   than males (40.8%). Male participants IPI was influenced more by the Carbon Trust and BAP

321   cues, but although 46.1% of males recognized the Carbon Trust cue only 14.5% stated IPI

322  based on the presence on the cue on a food label. Indeed, 93.4% of males stated they recognized

323  the 5-a-day cue but only 53.9% reported it would influence IPI. Interestingly, the BAP cue had

324  the closest recognition and IPI levels for males (recognition 35.5%; IPI 25.0%) and females

325  (recognition 33.7%; IPI 19.1%). This shows that for many cues the translation from recognition

326  to IPI was limited. Sustainability cues have been suggested as strong drivers of purchasing

327  intention towards food (Chekima et al. 2016) especially if they are linked to TPC (Chkanikova

328  and Lehner, 2015). Xiao et al. (2019) suggests that perceived emotional value affects

329  purchasing intention and "green" practices have been said to influence consumer emotional

330  attachment to a brand (Jang et al. 2015) and it could be argued here to a specific cue. Thus

331  perceived emotional value and personal emotional attachment could be of influence here in

332  how some cues were favored over others.

333  **4.4 RQ3: What is the influence of sustainability cues on IPB, are there CSC and if so**

334  **which cues are of interest to them?**

335  The influence of sustainability cues on IPB (Table 5) shows the dynamic between

336  recognition, IPI and IPB where IPB reflects those individuals who report as CSC. Females

337  reported more IPB based on sustainability cues than males for seven of the thirteen cues, but it

338  should be noted that this was a small sample population and for six of the thirteen cues where

339  IPB was reported it was by 1.3% of respondents or less. Whilst some found no gender influence

340  on sustainable purchasing behavior (Verain et al. 2016) others state that females are more likely

341  than males to be CSC (Meyer-Hofer et al. 2015). McCarthy et al. (2016) found that females

342  more likely to purchase certified organic foods ($p=0.03$) and male customers are more likely to

343  purchase 'green' products ($p=0.02$), so the gender influence might be cue specific. Only three

344  of the sustainability cues considered in this study had IPB reported from more than 10% of

345  respondents, Fairtrade, "5-a-day" and Red Tractor. Males expressed a higher IPB towards

346     Rainforest Alliance, MSC and the "5-a-day" cues, whilst females showed higher IPB towards

347     organic, RSPCA assured, LEAF Marque, Carbon Trust and BAP cues albeit that some positive

348     responses were for a very low proportion of respondents. Due to the small sample size of this

349     study these results are limited in terms of generalizing to the whole population but the

350     differentiation of reported behavior associated with sustainability cues by gender is an area

351     worthy of further research.

352     **Take in Tables 4 and 5**

353     Considering the cue with the greatest IPB, Fairtrade, whilst, 100% of males reported

354     recognition of the Fairtrade cue, IPI was reported at 80.3% but IPB was only 21.1%. This

355     compared with females with recognition (99.4%), IPI (80.3%) and IPB at 23.6%. Interestingly

356     the "5-a-day" cue showed similar recognition and IPI levels but a much lower IPB (males

357     13.2%: females 9.0%). The degree, strength and direction of the association between the degree

358     of recognition and IPB and demographic factors (gender H5; age H6; income H7; education

359     H8). This was tested using $\chi^2$ and Spearman rank analyzes (rho value) see Table 6.

360     **Take in Table 6**

361     A significant relationship was identified between **education level** and IPB related to the "5-

362     a-day" cue (p= .001) only and this was a significant weak, negative correlation (rho=-0.20) i.e.

363     as education increases, IPB associated with this cue decreases. A significant association was

364     identified between the **income level** and IPB associated with the Carbon Trust (*p*= 0.004) and

365     LEAF Marque (p=0.006) cues only. The Spearman's correlation test showed no correlation

366     between demographic factors (gender, income, age) and IPB for these cues. However, a trend

367     was present between income level and IPB associated with the UTZ cue (p= 0.085) although

368     this was not statistically significant at *p*<0.05. Chekima et al. (2016) in their work found no

16

369      relationship between income level and IPB. No significant association was identified in this

370      study between the gender or age and IPB.

371      **4.5 Factors that influence being a CSC**

372      The questionnaire responses were reassessed using three criteria: "Do not recognize it", "Do

373      not use it", "use it". Splitting the responses into these three factors and using $\chi^2$ to assess

374      responses gave rise to some interesting results. The results show a statistically significant

375      association between men and women and the cues ($p < 0.001$) whereby females are more likely

376      to use the RSPCA Assured cue (77.7% of females would use) than male (22.3% would use).

377      Indeed females are more likely to use the cue (60.7%) than not use it (18.0%) or not recognize

378      it (21.3%). This compares with men who are more likely not to use the cue (43.4%) than to use

379      (40.8%) or not to recognize (15.8%). With the Rainforest Alliance cue again people who use it

380      are more likely to be female (73.1% of females would use) than male (26.9% of males would

381      use) and this is statistically significant ($p = 0.032$). Both males and females are more likely to

382      use the cue than not to recognize it or use it (Table 7).

383      **Take in Table 7**

384      With regard to age, there was a statistically significant association by age with regard

385      to those people who use Scotch Beef as a sustainability cue ($p = 0.04$) see Table 8. People who

386      used Scotch Beef as a sustainability cue were statistically more likely to be in the age group

387      18-34 (37.6%) than the 35-54 age group (36.5%) than over 55 years (25.9%). The age group

388      18-34 were more likely not to recognize the cue (46.5%) than to recognize the cue or use

389      (25.2%), or not use it (28.3%). The age group 35-54 were more likely to report that they

390      recognized and used the cue (39.2%) than to not recognize it (24.1%), or to recognize it and

391      not use it (36.7%). The group over 55 were more likely to use the cue (45.8%) than to not use

392      it (29.2%) or not recognize it (25%). Age also influenced the reported use of the Soil

393　Association cue (p < 0.0001) where those more likely to use the cue are 18-34 year olds

394　(37.7%), compared with 35-54 year olds (34.9%) and over 55 (27.4%). However, within the

395　18-34 age group they were more likely not to recognize the cue (40.9%) than to recognize and

396　not use it (27.6%) or recognize and use it (31.5%). Recognition was much stronger in the 35-

397　54 age group with recognition but not using the cue (43%) being lower than those who would

398　recognize and use the cue (46.8%) compared to no recognition (10.1%). Again recognition was

399　high in the over 55 age group with use of the cue (60.4%) being higher than recognition but

400　not using (25%) and no recognition being (14.6%). For the BAP cue those who are more

401　statistically likely to use the product to inform purchase (p = 0.041) are in the 18-34 age group

402　(47.2%) compared to the 33-54 age group (22.6%) and over 55 group (30.2%). However in the

403　18-34 age group recognition is low with 29.9% of respondents recognising the cue and less

404　than a fifth (19.7%) stating they would use it. This trend is found in all age groups and as Table

405　2 shows overall only around one third of respondents recognized the cue.

406　　**Take in Table 8**

407　　Income was not shown to be an influencing factor for most cues (Tables 9). However,

408　with the Soil Association cue people who were in the £20,000 - £39,000 personal income

409　bracket were more likely to use this cue (40.6% of those who would buy it) than other income

410　groups (p = 0.022) although in that income category 28.6% of respondents stated they did not

411　recognize the cue.

412　　**Take in Table 9**

413　　Using the Kruskal-Wallis test and considering the demographic influencing factors of

414　age, personal income and education (Tables 10-15) the following sustainability cues showed

415　some interesting results.

416 **Take in Tables 10-15**

417 **4.5.1 Soil Association**

418 **Age**: There is a statistically significant difference (p = 0.012) by age between those people who

419 do not recognize the cue and those who do not use it when purchasing food i.e. people who do

420 not use the cue (Mean rank = 129.02) who are older (35-44) compared to those who do not

421 recognize it (mean rank = 95.40) who are younger (18-24). As well there is a statistically

422 significant difference (p = 0.000) by age between those people who do not recognize the cue

423 (mean rank = 95.40) and those CSC who use it (mean rank = 146.63) when purchasing food

424 i.e. people who do not recognize the cue are younger than those who use it. This means that

425 people who use the cue are older (45-54) than those who do not recognize it (18-24).

426 **Income**: There is a statistically significant difference (p = 0.004) by income between those

427 people who do not recognize the cue (mean rank = 104.53) and those who use it when

428 purchasing food (mean rank = 139.74) i.e. people who do not recognize the cue have a lower

429 income (£20,000-£39,999) compared to those who recognize it and use it (£40,000-£74,999).

430 **4.5.2 Red Tractor**

431 **Age**: There is a statistically significant difference (p = 0.044) by age between those people who

432 do not recognize the cue (mean rank = 91.48) and those who use it (mean rank = 130.40) when

433 purchasing food i.e. people who do not recognize the cue are younger (18-24) than those who

434 recognize and use the cue (35-44).

435 **Income:** There is a statistically significant difference by income (p = 0.028) between those

436 who do not recognize the cue (mean rank = 106.48) who are on a lower income (£20,000-

437 £39,999) than those who recognize it but do not use it (mean rank = 148.66) who are of higher

438 income (£40,000-£74,999).

439 **Education**: There was a statistically significant difference (p = 0.008) between those who do

440 not recognize the cue, who have a lower educational level (mean rank = 105.64), compared to

441 those who recognize the cue but would not use it (mean rank = 163.96). Further, a statistically

442 significant difference (p= 0.013) was identified between people who would use the cue as a

443 cue (mean rank = 124.85) and those who recognize the cue but would not use it (mean rank =

444 163.96). Results showed that people who would use the cue have a lower education level

445 compared to those who recognize it but would not use it.

446    **4.5.3 Scotch Beef**

447 **Age**: There is a statistically significant difference (p = 0.001) by age between those people who

448 do not recognize the cue (mean rank = 107.31) and those CSC who use it when purchasing

449 food (mean rank = 147.68) i.e. people who use the cue are older (45-54) compared to those

450 who do not recognize it who are younger (25-34).

451    **4.5.4 Rainforest Alliance**

452 **Age**: There is a statistically significant difference (p = 0.013) by age between those people who

453 do not recognize the cue (mean rank = 157.58) and those who do not use it (mean rank =

454 116.22) when purchasing food i.e. people who do not use the cue are younger (25-34) whereas

455 those who do not recognize it are older (45-54). As well there is a statistically significant

456 difference (p = 0.048) by age between those people who do recognize the cue (mean rank =

457 157.58) and those who use it when purchasing food (mean rank = 125.71) i.e. CSC are younger

458 (25-34) whereas those who do not recognize it are older (45-54).

459    **4.5.5 Tesco Nurture**

460 **Education:** the data shows that there is a statistically significant difference (p = 0.053) between

461 those people who recognize the cue and do not use it (mean rank = 112.56) who have a lower

462 educational level compared to those respondents who do not recognize the cue (mean rank =

463 136.78).

### 4.5.6 "5'A'Day"

465 **Education:** there is a statistically significant difference (p = 0.005) in terms of education

466 between those people in the sample that recognized but would not use the cue (mean rank =

467 146.98) who had a higher education level compared to those respondents who recognized the

468 cue and would use it (mean rank = 117.83). This finding suggests that people with higher

469 education may have not felt it necessary to use the cue when purchasing food, or alternatively

470 felt that the cue was not demonstrating healthy eating on the products on which it is present.

471 This finding is worthy of further research.

### 4.6 Cluster analysis

473 In order to classify the sample into different segments, a two-step cluster analysis was

474 conducted (Table 16). The distance was measured through the Log-Likelihood in order to

475 determine the similarity between the clusters. The clustering algorithm determined the optimal

476 number of clusters based on the Akaike Information Criterion (AIC). Four clusters were

477 identified through the two-step algorithm based on the level of consumer recognition of

478 sustainability cues on packaging and the demographics questions including age, gender,

479 education and income. Cluster 1 constitutes the biggest cluster created and included 71

480 respondents (28% of the total sample) who can be characterized as individuals with low

481 recognition and low IPI level. Cluster 3 included 69 respondents (27.2% of the sample) who

482 showed mixed cue recognition but where cues were recognized respondents exhibited high IPI.

483 Cluster 4 consisted of 56 consumers (22.8%) who showed higher levels of recognition but

484 presented low IPI. Conversely, Cluster 2 included 58 consumers (22%) who showed both high

485 awareness and high levels of IPI. The most important cues which contributed most to the

486  prediction of these clusters are by level of importance: the Soil Association cue (1.00), the

487  LEAF MARQUE cue (0.95), Carbon Footprint cue (0.87), Scotch Beef (0.80), RSPCA Assured

488  (0.72), BAP (0.70) and Tesco Nurture (0.61). This may well be because of the differentiated

489  rate of response already identified when analysing the results of this study i.e. cues that had a

490  high level of recognition across the board such as Fairtrade had less influence on the prediction

491  of clusters.

492  **Take in Table 16**

493   The clusters are now considered in more detail.

494  **4.6.1 Cluster 1: Low recognition – Low IPI "Less knowledgeable cue-relative**

495  **consumers"**

496          In Cluster 1, results reflect a low level of recognition of most of the sustainability cues.

497  The cluster includes respondents with the lowest degree of recognition to cues such as BAP by

498  95.8%, the UTZ cue (93.0 %), the Tesco Nurture (91.5%) and LEAF Marque cue (91.5%).

499  Moreover, these respondents do not recognize the Scotch Beef (83.1%), the Carbon Footprint

500  (80.3%) or the Soil Association cue (73.2%). Noteworthy here is the fact that in this cluster

501  there are no respondents who would use the Tesco Nurture or LEAF Marque cues to influence

502  IPB. This might reflect their usual food retailer of choice. Regarding the levels of recognition

503  for the RSPCA cue, results are mixed with 49.3% of the respondents not recognizing the cue

504  and 50.7% recognize it. Respondents that did indeed recognize the cue would either use it

505  (28.2%) or would not choose to use it (22.5%). The highest level of recognition along with the

506  highest IPIs in this cluster were observed for the Fairtrade and the 5-a-Day cues, where

507  respondents would predominantly use them by 70.4% and 64.8% respectively. The same

508  respondents would use Red Tractor (63.6%) and the MSC cue (45.1%) leaving 20% and 36.6%

509  of the sample respectively who not to recognize the cues. The RainForest Alliance cue is highly

22

510 recognized by these respondents but has the lowest IPI since 36.6% of these respondents would

511 not use it.

512 The demographics of the respondents who compose cluster 1, show that 61% are

513 women (men 39%). The educational level of this cluster is mainly undergraduate (57.7%) then

514 secondary (29.5%) and to a lesser extent postgraduate (12.8%). Additionally, cluster 1 has a

515 high proportion of consumers who belong in the age group of 18-25 (78.9%) while the income

516 of the consumers is between £0-19,999 (45.1%) and £20,000-£39,999 (35.2%).

517 **4.6.2 Cluster 2: High recognition and high IPI "Convinced sustainable consumers**

518 **(CSC)"**

519 Cluster 2 is composed of 58 respondents (22.8%) out of the total number in the survey.

520 These consumers can be characterized as CSC since the level of awareness in this group is very

521 high as well as the IPI for a given cue. The highest level of recognition/was for the RSPCA,

522 MSC, Soil Association, Red Tractor, Fairtrade and 5-a-Day cues at 100%. Moreover,

523 consumers in Cluster 2 recognized at a high level the following cues -arranged in descending

524 order from the highest recognition to the lowest level of recognition: Rainforest Alliance

525 (96.6%), Scotch Beef (86.2%), Carbon Footprint (84.5%), LEAF Marque (84.5%), BAP

526 (62.1%), Tesco Nurture (58.6%) and UTZ by (39.7%). As for the reported IPI based on the

527 cues, results showed that in this cluster respondents would use the cues as follows: Fairtrade

528 (98.3%), the MSC cue (93.1%), Red Tractor (91.4%), Rainforest Alliance (91.4%), RSPCA

529 Assured (84.5%), Soil Association (79.3%), 5-a-Day (65.5%), LEAF Marque (62.1%), Scotch

530 Beef (55.2%), BAP (51.7%) and Carbon Footprint (44.8%).The CSC cluster is mainly

531 represented by female at 60.3% who belong to the age group 35-54 and primarily have a

532 postgraduate educational level (36.2%). Regarding the income of this group, consumers are

533 mainly of the highest income level of £75,000 and over.

**4.6.3 Cluster 3: Mixed recognition but where recognized high IPI "Less aware CSC"**

Cluster 3 (n=69) contained respondents with the following cue recognition levels Fairtrade (100%), 5-a-Day (92.8%), Red Tractor (88.4%), MSC (84.1%), Rainforest Alliance (82.6%), Soil Association (82.6%), RSPCA Assured (79.7%) and Scotch Beef (69.6%). Respondents exhibited low levels of recognition for the LEAF Marque cue at 33.3%, BAP (21.7%), Tesco Nurture (17.4%), UTZ (7.3%) and Carbon Footprint (2.9%). IPI proved to be high for the cues that the respondents recognized. Specifically, respondents in cluster 3 would use the Fair-Trade cue (92.8%), Red Tractor (84.1%), MSC (79.7%), RSPCA Assured (76.8%), Rainforest Alliance (73.9%), 5-a-Day (63.8%), Soil Association (59.4%) and Scotch Beef (50.7%). Lower intention to purchase a product based on the cues was observed for LEAF Marque (27.5%), BAP (20.3%) and Tesco Nurture (10.1%); UTZ (1.45%) and Carbon Footprint (0.0%).

Cluster 3 is predominantly composed of female consumers (91.3%) who belong to the age group 18-34 (36.2%). Moreover, these consumers have an undergraduate educational level (47.8%) and belong to the income scale of £20,000-£39,999 (52.17%).

**4.6.4 Cluster 4: Aware - Low IPI "Unconvinced purchasers"**

Cluster 4 consists of 56 respondents (22% of the sample population). The main characteristic of this cluster is that respondents who belong to this group are aware of sustainability cues but have low IPI for the cues assessed here. Specifically, respondents showed 100% recognition of the following cues: FairTrade, Red Tractor, MSC, and 5-a-Day. Moreover, they reported high levels of recognition for the RSPCA Assured cue (98.2%), Soil Association (96.6%), Scotch Beef (96.4%), Rainforest Alliance (96.4%), LEAF Marque (73.2%), Tesco Nurture (66.1%), BAP (58.9%) and Carbon Footprint (58.9%). The lowest

557     level of recognition was for the UTZ cue where 51.8% of respondents did not recognize it. The

558     lowest IPI for these respondents was for the UTZ cue (0%), Carbon Footprint (1.8%), Tesco

559     Nurture (3.6%), LEAF Marque (7.1%), BAP (12.5%), Soil Association (21.4%), Scotch Beef

560     (26.8%), Rainforest Alliance (28.57%), and RSPCA Assured (37.5%). On the contrary, the

561     highest IPI in descending order was the Red Tractor cue (85.7%), FairTrade (58.9%), and the

562     MSC and 5-a-Day cues both 51.8% respectively. Cluster 4 is composed mainly of female

563     (66.07%) and the age group that dominates is the 18-34 (42.85%). Respondents are primarily

564     of secondary education (42.85%) and the income they represent is that of £0-19,999 (35.7%).

565   **4   Discussion**

566         This research examined the cognitive process of recognition or not of particular

567     sustainability cues through to IPI and then IPB. The study found a high level of recognition

568     of the sustainability cues examined with eight of the thirteen cues being recognized by more

569     than 50% of respondents and the Fairtrade, 5-a-Day and Red Tractor cues being recognized

570     by more than 90% of correspondents. This finding does not agree with the literature (Ellis

571     et al. 2009; Campbell et al. 2010; Loo et al. 2013; Gerrard et al. 2013; Anastasiou et al.

572     2017; Soon and Wallace, 2019) that found low recognition. The reasons for this are

573     unclear, but the high levels of recognition in this study did mean that the cognitive process

574     of recognition through to IPB is explored in detail. This study did find four clusters within

575     the respondents where the levels of recognition have been characterised as "low", "aware",

576     "mixed" and "high" showing as expected that a key primary element of nudging sustainable

577     purchasing behavior is recognition. However this work has shown as with other previous

578     work that higher levels of knowledge have a weak relationship with purchasing behaviour

579     (Chekima et al. 2015; Samant and Seo, 2016) so other factors are also of influence.

580    Demographic factors were found to have an influence with some cues with the Soil

581    Association cue being recognized by older and higher income respondents; Scotch Beef as

582    a cue being recognized by older respondents; Rainforest Alliance being recognized by

583    younger respondents and Tesco Nurture as a cue being recognized less as education level

584    increases. However, where relationships were identified between demographics and

585    recognition the rho value was weak showing a low level of association so there are other

586    factors not tested here that may also have a stronger influence on the findings.

587    With regard to IPI, female participants reported higher IPI than males for nine of the

588    thirteen sustainability cues. The Fairtrade cue has the highest level of reported IPI (80.3%)

589    compared to a recognition response by 99.6% of all adults. However, the influence of

590    recognition of sustainability cues on IPB is limited. For example, 64.6% of participants

591    recognize the Scotch Beef cue but less than 5.2% show IPB with regard to this cue.  This

592    research isolated sustainability cues as individual cues and excluded price as a mediating

593    factor so further research using the same cues and introducing the influence of price would

594    potentially provide more insight into the results identified her. Further the nutrition cue "5-

595    a-day" only showed limited IPB and this is worthy of further investigation considering the

596    global challenges of non-communicable diseases and the need for a healthy diet.

597    The study also provides additional insight into reported intentions and behavior with

598    regard to sustainability cues as it identified four distinct clusters within the respondents.

599    These clusters show the role of income whereby those respondents with a high level of

600    recognition and high IPI came from the highest income group and conversely those with a

601    high level of recognition and low IPI came from the low income group in the study. The

602    relationship between recognition of sustainability cues, IPI and IPB has been shown in this

603    study to be nuanced and cue specific.  The research was designed to provide insight for

604     food businesses and packaging designers who seek to increase the purchasing of

605     "sustainable products".

606   **5**   **Conclusion**

607     The aim of this research is to examine United Kingdom (UK) consumers' recognition

608     levels, insinuated purchasing intention (IPI) and insinuated purchasing behavior (IPB)

609     associated with sustainability cues on packaging. The level of consumer recognition of

610     packaging sustainability cues and the factors that influence the degree of recognition and the

611     degree of translation to IPI and IPB were determined. As a result this study makes a

612     contribution to the consideration of the efficacy of sustainability cues to encourage consumers

613     to be convinced sustainable consumers. Aside from the Fairtrade cue, where the IPB was

614     suggested for one in five of respondents in the study, all other cues showed very low IPB

615     despite high levels of recognition. This study has implications in terms of academic theory and

616     practice. Firstly in terms of academic theory, the limited translation from recognition to IPI to

617     IPB means further qualitative research should be undertaken to contextualize this cognitive

618     process in more detail. The selective nature too of which cues stimulate IPI and which do not

619     could be critiqued in more detail especially the role of single issue cues versus the development

620     of more holistic cues that cover environmental and social aspects of the triple bottom line more

621     fully. This research has practical implications for governments and private organisations using

622     sustainability cues that in the current context in which they are used there is limited impact in

623     terms of insinuated behaviour change.

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798    **Table 1. Demographic information of questionnaire participants**

|  | **Sample Number** | **Valid Percentage (%)** |
|---|---|---|
| *Total Response* | 254 | 100 |
| *Gender* | | |
| Male | 76 | 29.9 |
| Female | 178 | 70.1 |
| *Age* | | |
| <18 | 0 | 0.0 |
| 18-24 | 93 | 36.6 |
| 25-34 | 34 | 13.4 |
| 35-44 | 30 | 11.8 |
| 45-54 | 49 | 19.3 |
| 55-65 | 40 | 15.7 |
| >65 | 8 | 3.1 |
| *Education* | | |
| No education | 3 | 1.2 |
| GCSE | 17 | 6.7 |
| Alevel | 65 | 25.6 |
| Bachelors | 114 | 44.9 |
| Masters | 43 | 16.9 |
| Doctoral | 12 | 4.7 |
| *Income* | | |
| <£10,000 | 72 | 28.3 |
| £10,000 - £19,999 | 49 | 19.3 |
| £20,000 - £29,999 | 49 | 19.3 |
| £30,000 - £39,999 | 32 | 12.6 |
| £40,000 - £49,999 | 26 | 10.2 |
| £50,000 - £74,999 | 15 | 5.9 |
| £75,000 - £99,999 | 4 | 1.6 |
| >£100,000 | 7 | 2.8 |

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800 **Table 2. Sustainability cue recognition**

| All participants | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (n= 254) | Fairtrade | 5-a-day | Red Tractor | Rainforest Alliance | Marine Stewardship Council (MSC) | Royal Society for the Prevention of Cruelty to Animals (RSPCA) | Soil Association | Scotch Beef | Linking Environment and Farming (LEAF) Marque | Carbon Trust | Tesco Nurture | Best Aquaculture Practices (BAP) | UTZ |
| Percentage that do recognize (%) | 99.6 | 94.9 | 91.3 | 85.8 | 85.4 | 80.3 | 73.6 | 64.6 | 46.9 | 38.6 | 35.0 | 34.3 | 23.6 |
| Percentage that do not recognize (%) | 0.4 | 5.1 | 8.7 | 14.2 | 14.6 | 19.7 | 26.4 | 35.4 | 53.1 | 61.4 | 65.0 | 65.7 | 76.4 |
| **Male respondents (n=76)** | | | | | | | | | | | | | |
| Percentage that do recognize (%) | 100.0 | 93.4 | 93.4 | 90.8 | 86.8 | 84.2 | 73.7 | 63.2 | 51.3 | 46.1 | 36.8 | 35.5 | 27.6 |
| Percentage that do not recognize (%) | 0.0 | 6.6 | 6.6 | 9.2 | 13.2 | 15.8 | 26.3 | 36.8 | 48.7 | 53.9 | 63.2 | 64.5 | 72.4 |
| **Female respondents (n=178)** | | | | | | | | | | | | | |
| Percentage that do recognize (%) | 99.4 | 95.5 | 90.4 | 84.8 | 83.7 | 78.7 | 73.6 | 65.2 | 44.9 | 35.4 | 34.3 | 33.7 | 21.9 |
| Percentage that do not recognize (%) | 0.6 | 4.5 | 9.6 | 15.2 | 16.3 | 21.3 | 26.4 | 34.8 | 55.1 | 64.6 | 65.7 | 66.3 | 78.1 |

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802  **Table 3. The relationship between demographic factors and sustainability cue recognition.**

| Sustainability cue and overall percentage recognition (n=254) | p value | | | |
|---|---|---|---|---|
| | **Gender (H1)** | **Age (H2)** | **Income (H3)** | **Education (H4)** |
| Fairtrade (99.6%) | 0.513 | 0.884 | 0.496 | 0.540 |
| 5-a-day (94.9%) | 0.490 | 0.608 | 0.113 | 0.348 |
| Red Tractor (91.3%) | 0.441 | 0.183 | 0.071 | 0.125 |
| Rainforest Alliance (85.8%) | 0.138 | 0.019* | 0.134 | 0.040* |
| MSC (85.4%) | 0.677 | 0.838 | 0.448 | 0.453 |
| RSPCA (80.3%) | 0.308 | 0.374 | 0.134 | 0.244 |
| Soil Association (73.6%) | 0.988 | 0.000*** | 0.006** | 0.163 |
| Scotch Beef (64.6%) | 0.759 | 0.006* | 0.089 | 0.132 |
| LEAF Marque (46.9%) | 0.351 | 0.052 | 0.409 | 0.029* |
| Carbon Trust (38.6%) | 0.110 | 0.175 | 0.251 | 0.294 |
| Tesco Nurture (35%) | 0.694 | 0.008 | 0.651 | 0.013* |
| BAP (34.3%) | 0.780 | 0.087 | 0.690 | 0.379 |
| UTZ (23.6) | 0.326 | 0.311 | 0.559 | 0.120 |

803  $*p<0.05; **p<0.01; ***p<0.001$

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811     **Table 4. The influence of sustainability cues on IPI**

| | Fairtrade | 5-a-day | Red Tractor | Rainforest Alliance | Marine Stewardship Council (MSC) | Royal Society for the Prevention of Cruelty to Animals (RSPCA) | Soil Association | Scotch Beef | Linking Environment and Farming (LEAF) Marque | Carbon Trust | Tesco Nurture | Best Aquaculture Practices (BAP) | UTZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male percentage (%) (n=76) | 80.3 | 76.3 | 60.5 | 53.9 | 51.3 | 40.8 | 39.5 | 35.5 | 25.0 | 22.4 | 14.5 | 10.5 | 3.9 |
| Female Percentage (%) (n=178) | 80.3 | 82.0 | 69.7 | 65.2 | 59.6 | 60.7 | 42.7 | 32.6 | 19.1 | 23.6 | 11.2 | 11.2 | 6.2 |

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814    **Table 5. The influence of sustainability cues that relate to IPB**

| | Fairtrade | 5-a-day | Red Tractor | Rainforest Alliance | Marine Stewardship Council (MSC) | Royal Society for the Prevention of Cruelty to Animals (RSPCA) | Soil Association | Scotch Beef | Linking Environment and Farming (LEAF) Marque | Carbon Trust | Tesco Nurture | Best Aquaculture Practices (BAP) | UTZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male percentage (%) (n=76) | 21.1% | 13.2% | 13.2% | 9.2% | 7.9% | 5.3% | 3.9% | 1.3% | 1.3% | 1.3% | 0.0% | 0.0% | 0.0% |
| Female Percentage (%) (n = 178) | 23.6% | 9.0% | 10.1% | 8.4% | 2.8% | 3.9% | 5.6% | 0.6% | 3.9% | 3.4% | 1.1% | 1.1% | 0.6% |

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818   **Table 6. The relationship between demographic factors and IPB.**

| Sustainability cue and overall percentage recognition | Gender (H1) | Age (H2) | Income (H3) | Education (H4) |
|---|---|---|---|---|
| Fairtrade (99.6%) | 0.315 | 0.754 | 0.580 | 0.155 |
| 5-a-day (94.9%) | 0.839 | 0.694 | 0.438 | 0.001*** |
| Red Tractor (91.3%) | 0.658 | 0.480 | 0.713 | 0.319 |
| Rainforest Alliance (85.8%) | 0.633 | 0.225 | 0.469 | 0.483 |
| MSC (85.4%) | 0.478 | 0.855 | 0.321 | 0.815 |
| RSPCA (80.3%) | 0.580 | 0.937 | 0.168 | 0.596 |
| Soil Association (73.6%) | 0.068 | 0.303 | 0.945 | 0.392 |
| Scotch Beef (64.6%) | 0.274 | 0.069 | 0.226 | 0.486 |
| LEAF Marque (46.9%) | 0.360 | 0.114 | 0.006** | 0.373 |
| Carbon Trust (38.6%) | 0.534 | 0.107 | 0.004** | 0.488 |
| Tesco Nurture (35%) | 0.354 | 0.107 | 0.382 | 0.403 |
| BAP (34.3%) | 0.354 | 0.321 | 0.382 | 0.403 |
| UTZ (23.6) | 0.513 | 0.329 | 0.085 | 0.163 |

819   *p<0.05; **p<0.01; ***p<0.001

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828    **Table 7. Chi- square test on gender groups and recognition, non-usage & usage of cues**

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| Logos | Gender | | |
|-------|--------|---|---|
| | **Pearson chi-square** | **Asympt. sig.** | **% cells - exp. Count less than 5** |
| Fairtrade | 1.728 | 0.422 | 33.3% |
| 5-a-day | 2.882 | 0.237 | 16.7% |
| Red Tractor | 0.991 | 0.609 | 0.0% |
| Rainforest Alliance | 6.864 | 0.032** | 0.0% |
| MSC | 4.389 | 0.111 | 0.0% |
| RSPCA | 18.158 | 0.000*** | 0.0% |
| Soil Association | 0.316 | 0.854 | 0.0% |
| Scotch Beef | 0.619 | 0.734 | 0.0% |
| LEAF Marque | 1.743 | 0.418 | 0.0% |
| Carbon Trust | 2.555 | 0.279 | 0.0% |
| Tesco Nurture | 0.317 | 0.853 | 0.0% |
| BAP | 1.577 | 0.454 | 0.0% |
| UTZ | 2.570 | 0.277 | 16.7% |

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838    **Table 8. Chi- square test on age groups and recognition, non-usage & usage of cues**

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| Logos | Age | | |
|---|---|---|---|
| | Pearson chi-square | Asympt. sig. | % cells - exp. Count less than 5 |
| Fairtrade | 1.901 | 0.754 | 33.3% |
| 5-a-day | 5.557 | 0.235 | 22.2% |
| Red Tractor | 7.332 | 0.119 | 11.1% |
| Rainforest Alliance | 8.788 | 0.067 | 0.0% |
| MSC | 4.394 | 0.355 | 0.0% |
| RSPCA | 3.280 | 0.512 | 0.0% |
| Soil Association | 32.895 | 0.000*** | 0.0% |
| Scotch Beef | 15.461 | 0.004*** | 0.0% |
| LEAF Marque | 5.025 | 0.285 | 0.0% |
| Carbon Trust | 7.937 | 0.094 | 0.0% |
| Tesco Nurture | 2.953 | 0.566 | 0.0% |
| BAP | 9.959 | 0.041** | 0.0% |
| UTZ | 7.588 | 0.108 | 22.2% |

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848 **Table 9. Chi- square test on income groups and recognition, non-usage & usage of cues**

| Logos | Income | | |
|---|---|---|---|
| | **Pearson chi-square** | **Asympt. sig.** | **% cells - exp. Count less than 5** |
| Fairtrade | 3.042 | 0.804 | 33.3% |
| 5-a-day | 12.759 | 0.047 | 33.3% |
| Red Tractor | 12.094 | 0.060 | 33.3% |
| Rainforest Alliance | 7.692 | 0.262 | 8.3% |
| MSC | 5.843 | 0.441 | 8.3% |
| RSPCA | 4.793 | 0.571 | 0.0% |
| Soil Association | 14.801 | 0.022** | 0.0% |
| Scotch Beef | 7.494 | 0.278 | 0.0% |
| LEAF Marque | 3.151 | 0.790 | 0.0% |
| Carbon Trust | 4.793 | 0.571 | 8.3% |
| Tesco Nurture | 3.425 | 0.754 | 16.7% |
| BAP | 4.377 | 0.626 | 8.3% |
| UTZ | 2.989 | 0.810 | 25.0% |

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858 **Table 10. Kruskal-Wallis test on age and cues**

| Logos | Do not recognize it Mean rank | Do not use it Mean rank | Use it Mean rank | p< 0.05 | Significant difference |
|---|---|---|---|---|---|
| Soil Association | 95.40 | 129.02 | 146.63 | 0.000 | YES |
| Carbon Footprint | 121.72 | 142.31 | 124.56 | 0.136 | NO |
| UTZ | 127.16 | 132.01 | 117.39 | 0.789 | NO |
| Scotch Beef | 107.31 | 128.80 | 147.68 | 0.001 | YES |
| RSPCA | 118.38 | 128.15 | 130.47 | 0.585 | NO |
| Rainforest Alliance | 157.58 | 116.22 | 125.71 | 0.015 | YES |
| MSC | 121.03 | 120.60 | 130.82 | 0.571 | NO |
| Red Tractor | 91.48 | 134.68 | 130.40 | 0.043 | YES |
| Tesco Nurture | 124.67 | 132.08 | 134.18 | 0.683 | NO |
| 5-a-Day | 129.73 | 136.83 | 122.32 | 0.317 | NO |
| LEAF Marque | 123.43 | 128.58 | 135.70 | 0.537 | NO |
| Fair Trade | 47.00 | 127.66 | 127.86 | 0.525 | NO |
| BAP | 123.79 | 134.40 | 134.76 | 0.515 | NO |

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860 **Table 11. Pairwise tests on age and cues**

| Logos | Group | Mean rank | Group | Mean rank | P<0.05 |
|---|---|---|---|---|---|
| Soil Association | Do not recognize | 95.40 | Do not use it | 129.02 | 0.012 |
| | | | Use it | 146.63 | 0.000 |
| Scotch | Do not recognize | 107.31 | Use it | 147.68 | 0.001 |
| Rainforest Alliance | Do not recognize | 157.58 | Do not use it | 116.22 | 0.013 |
| | | | Use it | 125.71 | 0.048 |
| Red Tractor | Do not recognize | 91.48 | Use it | 130.40 | 0.044 |

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864　**Table 12. Kruskal Wallis test on personal income and cues**

| Logos | Do not recognize it Mean rank | Do not use it Mean rank | Use it Mean rank | P< 0.05 | Significant difference |
|---|---|---|---|---|---|
| Soil Association | 104.53 | 130.49 | 139.74 | 0.005 | YES |
| Carbon Footprint | 120.56 | 140.56 | 134.21 | 0.126 | NO |
| UTZ | 127.06 | 126.43 | 137.07 | 0.870 | NO |
| Scotch Beef | 116.12 | 128.79 | 138.35 | 0.109 | NO |
| RSPCA | 114.52 | 137.25 | 127.61 | 0.226 | NO |
| Rainforest Alliance | 152.64 | 122.40 | 123.82 | 0.066 | NO |
| MSC | 112.53 | 123.20 | 131.95 | 0.279 | NO |
| Red Tractor | 106.48 | 148.66 | 126.86 | 0.056 | YES |
| Tesco Nurture | 130.46 | 122.12 | 121.79 | 0.657 | NO |
| 5-a-Day | 139.96 | 133.74 | 123.13 | 0.430 | NO |
| LEAF Marque | 124.49 | 130.67 | 131.18 | 0.765 | NO |
| Fair Trade | 36.50 | 129.21 | 127.53 | 0.424 | NO |
| BAP | 127.15 | 126.24 | 129.41 | 0.973 | NO |

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866　**Table 13. Pairwise tests on income and cues**

| Logos | Group | Mean rank | Group | Mean rank | P<0.05 |
|---|---|---|---|---|---|
| Soil Association | Do not recognize | 104.53 | Use it | 139.74 | 0.004 |
| Red Tractor | Do not recognize | 106.48 | Do not use it | 148.66 | 0.028 |

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**Table 14. Kruskal-Wallis test on education and cues**

| Logos | Do not recognize it Mean rank | Do not use it Mean rank | Use it Mean rank | P< 0.05 | Significant difference |
|---|---|---|---|---|---|
| Soil Association | 116.72 | 126.70 | 134.92 | 0.230 | NO |
| Carbon Footprint | 129.22 | 125.33 | 123.55 | 0.873 | NO |
| UTZ | 128.20 | 119.45 | 144.25 | 0.471 | NO |
| Scotch Beef | 128.78 | 132.91 | 121.12 | 0.530 | NO |
| RSPCA | 137.21 | 129.85 | 122.91 | 0.423 | NO |
| Rainforest Alliance | 127.01 | 119.38 | 131.71 | 0.452 | NO |
| MSC | 126.62 | 126.29 | 128.03 | 0.985 | NO |
| Red Tractor | 105.64 | 163.96 | 124.85 | 0.005 | YES |
| Tesco Nurture | 136.78 | 112.56 | 105.36 | 0.011 | YES |
| 5-a-Day | 118.38 | 146.98 | 117.83 | 0.006 | YES |
| LEAF Marque | 128.04 | 123.82 | 130.00 | 0.877 | NO |
| Fair Trade | 142.50 | 137.71 | 124.97 | 0.490 | NO |
| BAP | 130.84 | 123.86 | 119.58 | 0.540 | NO |

**Table 15. Pairwise tests on education and cues**

| Logos | Group | Mean rank | Group | Mean rank | P<0.05 |
|---|---|---|---|---|---|
| Red Tractor | Do not recognize | 105.64 | Do not use it | 163.96 | 0.008 |
|  | Use it | 124.85 |  |  | 0.013 |
| Nurture | Do not recognize | 136.78 | Do not use it | 112.56 | 0.053 |
| 5-a-Day | Do not use it | 146.98 | Use it | 117.83 | 0.005 |

879    **Table 16. Demographic profiles of the four clusters**

880                        Increased recognition – generated by degree of recognition

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| Cluster | 1 | 3 | 4 | 2 |
|---|---|---|---|---|
| | Low recognition, low IPI | Mixed recognition – but where recognized high IPI | Aware but low IPI | Aware, with high IPI |
| n = 254 | 71 (28%) | 69 (27.2%) | 56 (22.8%) | 58 (22%) |
| **Gender** | | | | |
| Male | 28 | 6 | 19 | 23 |
| Female | 43 | 63 | 37 | 35 |
| **Age** | | | | |
| 18-34 | 56 | 25 | 24 | 22 |
| 35-54 | 12 | 20 | 22 | 25 |
| >55 | 3 | 24 | 10 | 11 |
| **Education** | | | | |
| Secondary | 21 | 21 | 24 | 19 |
| Undergraduate | 41 | 33 | 22 | 18 |
| Postgraduate | 9 | 15 | 10 | 21 |
| **Income** | | | | |
| £0 – 19,999 | 32 | 10 | 20 | 10 |
| £20,000 - £39,999 | 10 | 36 | 18 | 19 |
| £40,000 - £74,999 | 10 | 13 | 6 | 8 |
| £75,000 | 20 | 10 | 12 | 21 |

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|---|---|
| | Carbon Trust<br>(Carbon Footprint) |
| | Fairtrade<br>(Fairness, communities and people welfare standard) |
| | Marine Stewardship Council (MSC)<br>(Aquaculture standard) |
| | Soil Association<br>(Organic farm management standard) |
| | Rainforest Alliance<br>(Forest, landscape and communities standard) |
| | Linking Environment and Farming<br>(Farm management standard) |
| | Red Tractor<br>(Farm management standard and also designates British provenance) |
| | RSPCA Assured<br>(Farm animal welfare standard) |
| | Scotch Beef<br>(Protected Geographic Indication (PGI) mark identifying sourcing in Scotland, and farm management standards) |
| | "5-A-Day"<br>(UK Government healthy eating logo representing a portion of 5 x 80g portions of fruit and vegetables per day) |
| | Best Aquaculture Practices<br>(Aquaculture standard) |
| | UTZ<br>(Fair trade, community and human welfare standard) |
| | Tesco Nurture<br>(Tesco plc cue for fresh produce good agricultural practice) |

884 **Figure 1. Visual cues used to test RQ1-3**

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