

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

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Abstract

The aim of this research was to examine United Kingdom (UK) consumers' recognition levels, insinuated purchasing intention (IPI) and insinuated purchasing behavior (IPB) associated with sustainability cues on packaging. Empirical research was conducted using an online questionnaire (n=254) to determine the level of recognition and reported influence of 13 different sustainability cues. The data was analyzed using IBM SPSS Statistics version 24. The conversion of sustainability cue recognition (24% to 97% of respondents depending on the cue) to actual IPB was shown in this study to be cue specific and low at 10% or less except the Fairtrade logo at 22%. Statistically significant differences within the sample population were observed for recognition by age, income and education and for IPB by income and education ($p < 0.05$) but again this was cue specific. Four distinct consumer clusters were identified with income being a differentiating factor for the cluster with high awareness and high IPI. The research contributes to a wider understanding of the use of sustainability cues the level of consumer recognition and the level of influence on purchasing behavior. The research demonstrates the weak translation of recognition of sustainability cues through to intended sustainable purchasing behavior.

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**

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29

30 **1. Introduction**

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

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 degradation, 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.

149 **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 χ^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 χ^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 χ^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 ($\text{rho}=-0.20$) 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

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 χ^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).

464 **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.

472 **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

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.

534 **4.6.3 Cluster 3: Mixed recognition but where recognized high IPI “Less aware**
535 **CSC”**

536 Cluster 3 (n=69) contained respondents with the following cue recognition levels Fairtrade
537 (100%), 5-a-Day (92.8%), Red Tractor (88.4%), MSC (84.1%), Rainforest Alliance (82.6%),
538 Soil Association (82.6%), RSPCA Assured (79.7%) and Scotch Beef (69.6%). Respondents
539 exhibited low levels of recognition for the LEAF Marque cue at 33.3%, BAP (21.7%), Tesco
540 Nurture (17.4%), UTZ (7.3%) and Carbon Footprint (2.9%). IPI proved to be high for the cues
541 that the respondents recognized. Specifically, respondents in cluster 3 would use the Fair-Trade
542 cue (92.8%), Red Tractor (84.1%), MSC (79.7%), RSPCA Assured (76.8%), Rainforest
543 Alliance (73.9%), 5-a-Day (63.8%), Soil Association (59.4%) and Scotch Beef (50.7%). Lower
544 intention to purchase a product based on the cues was observed for LEAF Marque (27.5%),
545 BAP (20.3%) and Tesco Nurture (10.1%); UTZ (1.45%) and Carbon Footprint (0.0%).

546 Cluster 3 is predominantly composed of female consumers (91.3%) who belong to the
547 age group 18-34 (36.2%). Moreover, these consumers have an undergraduate educational level
548 (47.8%) and belong to the income scale of £20,000-£39,999 (52.17%).

549 **4.6.4 Cluster 4: Aware - Low IPI “Unconvinced purchasers”**

550 Cluster 4 consists of 56 respondents (22% of the sample population). The main
551 characteristic of this cluster is that respondents who belong to this group are aware of
552 sustainability cues but have low IPI for the cues assessed here. Specifically, respondents
553 showed 100% recognition of the following cues: FairTrade, Red Tractor, MSC, and 5-a-Day.
554 Moreover, they reported high levels of recognition for the RSPCA Assured cue (98.2%), Soil
555 Association (96.6%), Scotch Beef (96.4%), Rainforest Alliance (96.4%), LEAF Marque
556 (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 here. 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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Table 1. Demographic information of questionnaire participants

	Sample Number	Valid Percentage (%)
<i>Total Response</i>	254	100
<i>Gender</i>		
Male	76	29.9
Female	178	70.1
<i>Age</i>		
<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
<i>Education</i>		
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
<i>Income</i>		
<£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

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

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

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**

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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	Do not use it	Use it		
	Mean rank	Mean rank	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	Do not use it	Use it	P< 0.05	Significant difference
	Mean rank	Mean rank	Mean rank		
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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872 **Table 14. Kruskal-Wallis test on education and cues**

Logos	Do not recognize it	Do not use it	Use it	P< 0.05	Significant difference
	Mean rank	Mean rank	Mean rank		
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

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874 **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

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

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