

Scotland's Rural College

## The effect of personality traits on consumers' preferences for extra virgin olive oil

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# 1 **The effect of personality traits on consumers' preferences for extra virgin olive oil**

2

## 3 **1. Introduction**

4 Olive oil is a food product consumed in most Mediterranean countries and is an  
5 essential component of the Mediterranean diet (Garcia-Closas et al., 2006). Its  
6 importance in the daily lives of consumers reflects its ancient traditions, its social and  
7 agro-environmental dimensions, as well as its health and nutritional benefits. The  
8 European Union produces 73 percent of the world's olive oil and consumes about 66  
9 per cent (International Olive Oil Council, 2013). As Figure 1 shows, the main olive oil  
10 producers and consumers are Spain and Italy. However, an important expansion of olive  
11 oil consumption may be observed outside the traditional Mediterranean countries  
12 (United States International Trade Commission, 2013). The Mintel Global New  
13 Products Database (GNPD) database reveals that 1,116 new olive oils were launched  
14 from 2011 to 2013 all around the world. Of these, stores in the USA stocked about 15  
15 percent, followed by Brazilian stores with about 13 percent (see Table 1).

16 Olive oil characteristics are regulated within the EU by Regulation (EEC) N°  
17 2568/91, which establishes a list of physical, chemical, and organoleptic characteristics,  
18 as well as methods for their measurement. However, continuous research and  
19 development (R&D) in this sector has produced a large variety of olive oil types and  
20 specifications, making consumers more dependent on displayed information to make  
21 their purchasing decisions. Olive oil quality attributes are mainly communicated on the  
22 product label, which builds pre-consumption confidence among consumers (Scarpa and  
23 Del Giudice, 2004). Olive oil labels typically fall within the category of “credence  
24 attributes,” including organic production certifications and protected denomination of  
25 origin (PDO), which consumers cannot directly value through consumption of the oil  
26 (Nocella et al., 2012).

27 Understanding oil consumption requires accounting for new olive oil varieties and  
28 trademarks developed worldwide and for the increasing public awareness of the health  
29 and environmental benefits associated with the Mediterranean diet and PDO products.  
30 However, different consumers may focus on different information cues, and therefore  
31 may develop specific behavioral criteria when making purchasing decisions (Menapace

32 et al., 2011; Philippidis et al., 2002). Hence, better understanding of how consumers  
33 evaluate olive oil is essential to help producers succeed in an increasingly competitive  
34 market.

35 More understanding of how consumers construct their evaluations and their  
36 consequent purchasing decisions with respect to marketed olive oils is also important to  
37 EU policy makers and regulators. It is extremely likely that olive oil consumption will  
38 increase at world level. The current orientation of EU olive oil policy, as stated in the  
39 European Commission web page,<sup>1</sup> is “to maintain and strengthen its position in world  
40 markets by encouraging production of a high quality product for the benefit of growers,  
41 processors, traders and consumers.” However, this is not an easy task, as an individual’s  
42 preferences depend not only on the extrinsic and intrinsic attributes of the products to be  
43 purchased but also on factors unrelated to food (Chen, 2007; Nocella et al., 2012).

44 This paper aims to identify the effect of consumers’ specific characteristics,  
45 namely the role of food-related personality traits, lifestyle orientations, and purchase  
46 habits in shaping their purchase intentions regarding olive oil. To achieve this objective,  
47 data from a survey carried out from a representative sample of Catalonian (north-eastern  
48 Spain) consumers have been employed. The methodological framework is based on a  
49 discrete-choice modeling approach, named the hybrid choice model (HCM). This model  
50 specifically accounts for preference heterogeneity in examining the effects of individual  
51 personality traits, lifestyles, and habits.

52 Traditionally, the HCM model has involved two steps.<sup>2</sup> In the first step, latent  
53 variables (i.e., food-related personality traits, lifestyles or purchase habits, among  
54 others) are derived from observed indicators via a “multiple-indicator, multiple cause”  
55 model (MIMIC), used to relate latent individual traits to observable determinants. In the  
56 second step, the predicted latent variables are incorporated into the discrete-choice  
57 model as explanatory variables to estimate a multinomial logit model.

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<sup>1</sup> [http://ec.europa.eu/agriculture/olive-oil/index\\_en.htm](http://ec.europa.eu/agriculture/olive-oil/index_en.htm)

<sup>2</sup> Alternatively, the HCM can be seen as resulting in both efficient and consistent estimates (Ben-Akiva et al., 2002; Kløjgaard and Hess, 2011; Rungie et al., 2012). However, this approach usually results in convergence and identification problems, as the number of latent variables increases (Ashok et al., 2002). In this study, due to the high number of latent variables introduced, the sequential estimation method of the HCM based on the mixed logit model is used.

58 Our paper extends the existing literature in at least two ways. First, it does not  
59 merely estimate latent variables from observed indicators, but also estimates the  
60 hierarchical relationships between latent variables using a structural equation model  
61 (SEM), providing better insight into the consumers' cognitive decision-making  
62 processes. Second, this study employs an HCM in a panel-data context constructed from  
63 the repeated-choice data set while considering sample heterogeneity. It estimates a  
64 random parameter logit (RPL) model, considering the latent variables as random  
65 parameters (Yáñez et al., 2010) and solving the HCM problem of integrating the  
66 variation of the latent variables within the basic framework of multinomial choice  
67 models (Ashok et al., 2002).

68 The paper is structured as follows. Section 2 outlines the methodological  
69 framework used—the HCM. The design of the empirical application is shown in  
70 Section 3. Specifically, we will concentrate on how the SEM model has been specified  
71 and how the choice experiment has been designed. The main results are outlined in  
72 Section 4. The final section contains some concluding remarks.

73

## 74 **2. Methodological framework: the HCM**

75 The discrete-choice model approach has received a significant amount of attention  
76 in recent literature (Campbell et al., 2010; Greene and Hensher, 2013). Moreover,  
77 evidence of preference heterogeneity in both revealed and stated preference data is  
78 increasing. Failure to account for preference heterogeneity may result in poor model  
79 performance, which could lead to reliability problems in the model results (Hynes et al.,  
80 2008). Different methodological approaches have been suggested in the literature: 1) the  
81 use of latent class models (McFadden, 1986; Boxall and Adamowicz, 2002); 2) the  
82 inclusion of interaction effects to explain sources of heterogeneity (Montgomery, 2001);  
83 3) the use of random parameter estimates, assuming preference coefficients to be  
84 randomly distributed across individuals (Revelt and Train, 1998; Walker and Ben-  
85 Akiva, 2002); and 4) the combination of interaction effects and random parameters  
86 (Hensher and Greene, 2003) or latent class and random parameters (Bujosa et al., 2010;  
87 Greene and Hensher, 2013). In all cases, individuals' utilities and the heterogeneity of  
88 their preferences are assumed to be a function of the observed variables. However, these

89 observable product attributes and covariates can only explain part of the utility, and fail  
90 to capture the true inner process of a decision maker.

91 Ben-Akiva et al. (2002) extended the traditional discrete-choice model by  
92 introducing the HCM. The HCM model defines an individual's utility as a function of  
93 observed explanatory variables, such as product attributes and respondents' socio-  
94 economic characteristics, while including latent variables that can reflect consumers'  
95 psychological factors, personality traits, or attitudes. Previous empirical applications of  
96 the HCM have been mainly in the field of transport economics (Bolduc et al., 2008;  
97 Yáñez et al., 2010), and recently in sociology (Rungie et al., 2011, 2012) and health  
98 economics (Kløjgaard and Hess, 2011). They have shown that: 1) the inclusion of latent  
99 variables significantly improves the goodness-of-fit of the model; and 2) psychological  
100 factors better contribute to capturing a consumer's preference heterogeneity. One of the  
101 main contributions of this study is that it constitutes one of the first attempts to apply  
102 the HCM approach to food marketing.

103 The application of the HCM implies the design of a choice experiment, which is  
104 based on both random utility theory (RUT) (McFadden, 1974) and Lancaster consumer  
105 theory (Lancaster, 1966). The RUT assumes that the utility provided by alternative  $j$   
106 ( $j=1, \dots, J$ ) from choice set  $s$  ( $s=1, \dots, S$ ) to individual  $i$  ( $i=1, \dots, N$ ) is given by the  
107 following:

$$108 \quad U_{ijs} = V_{ijs} + \varepsilon_{ijs} \quad (1)$$

109 where  $V_{ijs}$  is a deterministic component and  $\varepsilon_{ijs}$  is the stochastic or non-observed  
110 component. In a traditional model, the deterministic component,  $V_{ijs}$ , can be represented  
111 as a function of alternative attributes as follows:

$$112 \quad V_{ijs} = \beta_{ikjs} * X_{kjs} \quad (2)$$

113 where  $X_{kjs}$  is the vector of attributes related to alternative  $j$ ;  $\beta_{ikjs}$  is the vector of  
114 marginal utilities of the individual  $i$  related to the  $k$  attributes in alternative  $j$  from the  
115 choice set  $s$ .

116 In the HCM, latent variables are incorporated in the deterministic component of an  
117 individual's utility  $V_{ijs}$  as follows:

$$118 \quad V_{ijs} = \beta_{ikjs} * X_{kjs} + \beta_{lijs} * \eta_{lijs} + \beta_{qijs} * \xi_{qijs} \quad (3)$$

119 where  $\eta_{lijs}$  is the vector of endogenous latent characteristics ( $l=1,\dots,L$ ),  $\xi_{qijs}$  is the  
 120 corresponding vector of exogenous latent characteristics ( $q=1,\dots,Q$ ); and  $\beta_{lijs}$  and  $\beta_{qijs}$   
 121 are the vectors of the marginal effects of  $\eta_{lijs}$  and  $\xi_{qijs}$  on the utility function of the  $i$ -th  
 122 individual when choosing alternative  $j$  from the choice set  $s$ .

123 However, these latent variables are immaterial constructs that cannot be directly  
 124 observed: the usual approaches to identifying them rely on MIMIC or SEM models.  
 125 Both require additional information about these latent variables (i.e. personality traits,  
 126 purchase habits, or lifestyles). The MIMIC model considers only a group of latent  
 127 variables that are explained by a set of observable determinants. The SEM also takes  
 128 into account the structural relationships that can exist among latent variables.

129 The SEM consists of two sets of equations. The first, a set of *measurement*  
 130 *equations*, describes the relationship between latent (exogenous  $\xi_{qijs}$  and  
 131 endogenous  $\eta_{lijs}$ )<sup>3</sup> and observed variables ( $w_{pijs}$  and  $x_{mij}$ ), after performing a  
 132 confirmatory factor analysis (Equations 4 and 5) (Jöreskov and Sörbomm, 1996). The  
 133 second, a set of structural equations, describes the relationship between endogenous and  
 134 exogenous latent variables, and permits the evaluation of the causal effects among these  
 135 variables (Equation 6) (Jöreskov and Sörbomm, 1996).

$$136 \quad x_{mij} = \Lambda_{mqijs}\xi_{qijs} + \delta_{mij} \quad (4)$$

$$137 \quad w_{pijs} = \Lambda_{plijs}\eta_{lijs} + \Gamma_{pijs} \quad (5)$$

$$138 \quad \eta_{lijs} = \alpha_{lijs}\eta_{lijs} + \theta_{lijs}\xi_{qijs} + \zeta_{lijs} \quad (6)$$

139 where the indices  $m, p, l, q, i, j$ , and  $s$  refer to indicators that describe exogenous latent  
 140 variables, indicators that describe endogenous latent variables, endogenous latent  
 141 variables, exogenous latent variables, respondents, alternatives, and choice sets,  
 142 respectively.  $\Lambda_{mij}$ ,  $\Lambda_{pijs}$ ,  $\alpha_{lijs}$ , and  $\theta_{lijs}$  are the parameters to be jointly estimated.  
 143  $\delta_{mij}$ ,  $\Gamma_{pijs}$ , and  $\zeta_{lijs}$  represent the error terms that are typically considered normally  
 144 distributed with mean zero and standard deviation to be estimated, and assumed to be

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<sup>3</sup> The term “exogenous latent variable” means that it is not dependent on any other variable in the model. Usually one or more variables in the model are dependent on this variable. Endogenous latent variables refer to latent variables that are dependent on one or more variables in the model. Note that an endogenous variable may be dependent on another endogenous variable.

145 uncorrelated with  $\xi_{qijs}$ ,  $\eta_{lijs}$ , and both  $\xi_{qijs}$  and  $\eta_{lijs}$ , in Equations 4, 5, and 6,  
 146 respectively. The Full SEM model is estimated with Robust Maximum Likelihood  
 147 (RML), due to a potential lack of normality.

148 Now, the probability of consumer  $i$  choosing the alternative  $j$  from the choice set  $s$ ,  
 149 assuming that the stochastic component  $\varepsilon_{ijs}$  follows the type I Extreme Value  
 150 distribution, is defined as follows:

$$151 \quad P_{ijs} = \frac{\exp(\mu V_{ijs})}{\sum_{t=1}^J \exp(\mu V_{its})} \quad (7)$$

152 The sequential estimation method of the HCM requires integrating over the  
 153 variation of latent variables within the basic framework of multinomial choice models  
 154 (Ashok et al., 2002). Yañez et al. (2010) showed that this integration could be attained  
 155 by estimating an RPL model that considers the latent variables as random parameters.

156 Under the RPL model, the probability that individual “ $i$ ” chooses alternative “ $j$ ”  
 157 from a particular choice set  $s$  is given by the following:

$$158 \quad P_{ijs} = \int L_{ijs}(\beta_{ijs}) f(\beta_i | \theta) d\beta_i \quad (8)$$

159 where  $f(\beta_i | \theta)$  is the density function of the  $\beta_i$  coefficients, and  $\theta$  refers to the moments  
 160 of the parameter distributions, which can take any specified form, such as normal,  
 161 lognormal, triangular, uniform, etc. Moreover,

$$162 \quad L_{ijs}(\beta_{ijs}) = \frac{\exp(v_{ijs}(X_{ijs}, \eta_{lijs}, \xi_{qijs}, \beta_i))}{\sum_{t=1}^J \exp(v_{its}(X_{its}, \eta_{lits}, \xi_{qits}, \beta_i))} \quad (9)$$

163 The parameter estimates  $\beta_{ijs}$ , are defined to capture additional non-observed  
 164 variations and to better explain preference heterogeneity between individuals, as follows  
 165 (Hensher et al., 2005):

$$166 \quad \beta_{ijs} = \beta_{js} + \delta_{js} Z_i + \sigma_{js} \vartheta_{ijs} \quad (10)$$

167 where  $\beta_{js}$  is the sample-mean for the alternative  $j$  from the choice set  $s$ ;  $\vartheta_{ijs}$  is the  
 168 individual specific heterogeneity, with mean zero and standard deviation equal to 1  
 169 (Hensher and Greene, 2003); and  $Z_i$  is a set of choice invariant characteristics that  
 170 produce individual heterogeneity in the means of the randomly distributed coefficients,  
 171 such as individual specific characteristics.

172 Because the resulting model is specified to include both fixed and random  
 173 coefficients, the simulated maximum likelihood (SML) technique provides a faster and  
 174 easier way to estimate the individual choice probabilities (Ben-Akiva et al., 2002).  
 175 According to Train (2003), the simulation proceeds in three steps for any given value of  
 176  $\theta$ . First, a value of  $\beta_i$  is drawn from  $f(\beta_i|\theta)$  ( $\beta_i^r$  with  $r = 1 \dots R^4$ ). Second, the logit  
 177  $L_{ijs}(\beta_i^r)$ , is calculated from this draw. Finally, Steps 1 and 2 are repeated, and the  
 178 obtained results are averaged. This average is the simulated probability:

$$179 \widehat{P}_{ijs} = \frac{1}{R} \sum_{r=1}^R L_{ijs}(\beta_i^r) \quad (11)$$

180 where R is the number of draws. The simulated probabilities are inserted into the log-  
 181 likelihood function to give a simulated log-likelihood (SLL):

$$182 SLL = \sum_{i=1}^I \sum_{j=1}^J d_{ijs} \ln \widehat{P}_{ijs} \quad (12)$$

183 where  $d_{ijs}=1$  if i chooses j from the choice set s and  $d_{ijs}=0$  otherwise. The maximum  
 184 simulated likelihood estimator, (MSLE), is the value of  $\theta$  that maximizes SLL.

185

### 186 3. The experiment design

#### 187 3.1. The survey

188 The data used in this study were obtained from a survey carried out on a  
 189 representative sample of the Catalonian (north-east Spain) population with quotas by  
 190 postal code. The survey was addressed to those responsible for shopping within the  
 191 household. The Spanish market was selected because Spain is top-ranked together with  
 192 Italy among those countries producing and exporting olive oil, in terms of both quantity  
 193 and value (International Olive Oil Council, 2013). Additionally, olive oil constitutes a  
 194 fundamental component of the Spanish diet.

195 As a consequence, many Spanish consumers are knowledgeable about this product,  
 196 and most of them are aware of market prices and product characteristics. In Spain, the  
 197 market value for organic olive oil was 5.4 million Euros in 2012 (MAGRAMA, 2013).

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<sup>4</sup>Halton draws were used because they have been shown to provide more efficient distributions for numerical integration compared to random draws (Bhat, 2003).



198 Catalonia is second among Spanish regions in terms of total olive oil consumption,  
199 with a per capita consumption of 9.93 liters in 2011. It also occupies the second position  
200 in relation to the consumption of organic olive oil (13 percent of the Spanish total  
201 consumption in value) after Madrid. The population in Catalonia is quite heterogeneous,  
202 with a combination of urban (Barcelona is the second-largest city in Spain) and rural  
203 environments.

204 Information was gathered from 401 persons. Participants were recruited using two  
205 filters: 1) they had to have bought extra-virgin olive oil in the last three months; and 2)  
206 they were responsible for shopping within the household. Face-to-face interviews were  
207 conducted in September 2009 at different shopping hours and different types of food  
208 retail stores. The questionnaire consisted of four major blocks. The first block was  
209 designed to elicit information on respondents' purchasing and consumption habits with  
210 regard to different types of olive oil. The second and third blocks were reserved to  
211 obtain the latent variables and to collect information about socio-demographic  
212 characteristics and consumers' personality traits and lifestyles. All indicators were  
213 measured using eleven-point Likert scales (from 0 to 10, where 0 indicates total  
214 disagreement and 10 is total agreement).<sup>5</sup> The last block included the choice experiment  
215 task.

216

### 217 **3.2. A conceptual model for organic olive oil purchasing intention**

218 The first step in the HCM consists of defining the latent variables that will be  
219 introduced later in the discrete-choice model. In this paper, latent variables have been  
220 measured through a set of observable indicators, and the hierarchical relationships  
221 between the latent variables have been estimated using an SEM. In this section, the  
222 conceptual model on which the SEM is based is presented. Based on previous literature,  
223 we will define the main latent variables used for the purpose of this paper as well as the  
224 expected relationships between them.

---

<sup>5</sup> Respondents can easily understand this scale, as the grading system at Spanish schools is based on a similar system.

225 Previous studies have highlighted the importance of attitudes and perceptions in  
226 understanding the decision-making process during purchase (Ajzen, 2005; Ben-Akiva et  
227 al., 2002; Eertmans et al., 2005; Johansson et al., 2006; Scarpa and Thiene, 2011).  
228 Several studies have found that a relationship exists between an individual's personality  
229 traits, psychological characteristics, or attitudes to nutrition (Chen, 2007; Nocella et al.,  
230 2012).

231 In view of these results, the conceptual model we use draws on the Theory of  
232 Planned Behavior (TPB) (Jöreskov and Sörbomm, 1996) to define the behavioral latent  
233 variables to be introduced in the discrete-choice model (Ashok et al., 2002). As Ajzen  
234 (1991) has stated, the TPB was designed to predict and explain human behavior in  
235 specific contexts based on the relation between intention and behavior, so that intentions  
236 to perform a behavior (such as purchasing olive oil) are assumed to capture the  
237 motivational factors that influence such behavior. The TPB considers that human  
238 intentions to perform a behavior are guided by three types of consideration: 1) the  
239 "attitude" toward the behavior, or to what extent a person evaluates, either positively or  
240 negatively, the behavior in question; in the case of organic food, a positive attitude  
241 toward organic food is believed to be positively related to the intention to purchase  
242 organic food (Chen, 2007); 2) "subjective norms" or perceived social pressure, such as  
243 from family, friends, etc. to perform or not to perform the behavior (Ajzen, 1991, Al-  
244 Swidi et al. 2014); and 3) beliefs about the presence of factors that may facilitate or  
245 impede the performance of the behavior. The power of these control beliefs determines  
246 the "Perceived Behavioral Control" or perceived ease or difficulty of performing the  
247 behavior. In the framework of organic food, perceived control would include the effects  
248 of both external (such as time spent, availability, recognition by labeling, confidence,  
249 etc.) and internal variables (such as skills, knowledge, abilities, habits, etc.) that  
250 consumers believe can influence their judgment of risks and benefits associated with  
251 these products (Ajzen, 2005; Chen, 2007).

252 In the specific case of purchasing organic olive oil we can test the hypothesis that  
253 attitudes toward organic olive oil, subjective norms regarding olive oil, and the  
254 Perceived Behavioral Control in purchasing olive oil lead to the formation of a final  
255 behavioral intention to purchase. Figure 2 shows the conceptual model used in this  
256 study. Our model extends the TPB in two ways: identifying which personality traits

257 have an effect on shaping individuals' attitudes toward the behavior; and testing if  
258 extrinsic product features, such as available information, quality evaluation, and price  
259 can have an effect on facilitating the perception of control toward the behavior.

260 Chen (2007) showed that food-related personality traits, defined as food  
261 involvement or the level of importance that food has in a person's life (and  
262 operationalized as the extent to which people enjoy talking about food, entertain  
263 thoughts about food during the day, and engage in food-related activities: Goody, 1982),  
264 exert a positive effect on a consumer's attitude toward organic food. Bell and Marshall  
265 (2003) argued that the level of food involvement was a significant discriminating factor  
266 between food items in sensory evaluations. Eertmans et al. (2005) argued that both food  
267 intake and following a healthy diet appeared to vary with level of food involvement.  
268 Therefore, the following hypothesis is proposed:

269 ***Hypothesis 1a.*** Consumers who show a higher level of food involvement are  
270 expected to have a more positive attitude toward organic olive oil than consumers who  
271 give less importance to food.

272 Food-related personality traits link people to food-related activities, such as food  
273 procurement, preparation, cooking, etc. (Goody, 1982). The recent literature shows that  
274 cooking skills play a significant role in dietary changes to promote healthy eating (Van  
275 den Horsk et al., 2010). Due to the importance of olive oil in the Mediterranean diet,  
276 cooking skills are hypothesized to affect the attitude toward organic olive oil positively.  
277 Thus, the following hypothesis is proposed:

278 ***Hypothesis 1b.*** Consumers with better cooking skills are expected to have a more  
279 positive attitude toward organic olive oil than consumers with fewer cooking skills.

280 Another factor that has been emphasized as an important psychological variable in  
281 describing consumer food choice is lifestyle. Different lifestyles sort individuals into  
282 groups on the basis of the things they like to do, how they like to spend their leisure  
283 time, and how they choose to spend their disposable income (Moore, 1963; Krishnan,  
284 2011). Lifestyle describes how people seek to express their identity in many areas, such  
285 as activities, interests, and opinions (Wells and Tigert, 1971). In a consumption  
286 environment, a person chooses a product or brand that seems to match with his/her life  
287 style/identity (Krishnan, 2011). An individual's lifestyle is reflected in his/her

288 personality and self-concepts, which are determined by his/her interests, opinions,  
289 activities, etc.

290 Moreover, attitudes, behavioral tendencies, and habits are derived from differences  
291 in lifestyles across consumers (Chen, 2009). Shaharudin et al. (2010) showed that  
292 consumers' lifestyles were related to their attitude toward the purchasing of organic  
293 food. Krishnan (2011) confirmed that consumers' lifestyles were strongly related to  
294 their purchased brands. Our model aims to identify two types of consumer lifestyle:  
295 healthy lifestyle and orderly lifestyle. The former emphasizes physical health-related  
296 activities, such as natural food consumption, health care, etc. (Gil et al., 2000).  
297 Eertmans et al (2005) argue that a healthy lifestyle should be advocated to render the  
298 consumer's attitude toward organic foods more positive. The orderly and methodical  
299 lifestyle can be expressed through activities such as disposing garbage in different  
300 containers, reducing stress, keeping equilibrium between working and personal life, et  
301 cetera. Therefore, the following hypothesis is proposed:

302 ***Hypothesis 1c:*** Consumers with orderly lifestyles can more easily follow  
303 environmentally friendly behaviors and therefore have a more positive attitude toward  
304 organic food than consumers who have less orderly lifestyles.

305 Over the last decade, food scares (BSE, dioxins, foot-and-mouth disease, etc.) have  
306 reshaped consumer behavior to a certain extent. Consumers are now more concerned  
307 about food safety issues (Chen, 2007). Moreover, according to Chen (2009), a healthy  
308 consumption lifestyle, attitudes toward organic food, and the intention to purchase  
309 organic food appear to correlate significantly. Therefore, the following hypothesis is  
310 proposed:

311 ***Hypothesis 1d.*** The healthier the consumers' lifestyle, the more positive their  
312 attitudes toward organic foods will be.

313 As stated before, extrinsic product features, such as available information, and  
314 purchasing habits such as quality and price valuation, can have an effect on facilitating  
315 the perception of control toward behavior. Indeed, Ajzen (2005) stated that the more  
316 resources and opportunities individuals believe they possess, and the fewer obstacles or  
317 impediments they anticipate, the greater should be their perceived control over the  
318 behavior. Therefore, the following hypothesis can be proposed:

319 **Hypothesis 2a.** With more information that consumers have regarding a product,  
320 such as its certification (labels), the greater should be the control they perceive to have  
321 regarding the specific acquisition.

322 Repetitive purchasing habits can simplify behavior, as many decisions become  
323 routine and can be adopted with minimal conscious control. In other words, individuals  
324 tend to persist in doing what they have are accustomed to doing. In this study, we have  
325 assessed the effect of “purchasing habits” by considering two latent variables, “Price  
326 Involvement” and “Quality Involvement,” which have been considered by other authors  
327 to be relevant in explaining consumer buying behavior (Mann et al., 2012; Menapace et  
328 al., 2011). The first variable involves the relevance of price and price promotions in a  
329 specific purchasing decision. As shown by Avitia et al. (2015) the price has a highly  
330 relevant role in defining consumers’ willingness to purchase sustainable food, and it can  
331 be considered as a limit for current consumption of sustainable food. Their work  
332 indicated that consumers value sustainable attributes and are willing to pay a premium  
333 for them, but this premium is still lower than the market price for such products. The  
334 same can be said in relation to quality standards. Therefore, the following hypotheses  
335 can be proposed:

336 **Hypothesis 2b.** As consumers become less sensitive to price and price promotions,  
337 their perceived behavioral control increases.

338 **Hypothesis 2c.** As food quality plays a more important role in consumers’ food  
339 habits, their perceived behavioral control increases.

340

### 341 **3.3. The choice experiment**

342 Four attributes (price, production system, the origin of the product, and the origin  
343 of the brand) with three levels each were used in the experiment design (Table 2). The  
344 attribute and attribute levels were selected based on a three-step qualitative study: 1) a  
345 literature review of consumer behavior relating to organic and/or extra virgin olive oil;  
346 2) four focus groups of eight people each were conducted to identify the main  
347 consumption patterns and attitudes toward extra virgin olive oil, with special attention  
348 to the organic attribute; and 3) observation in retail outlets to identify real prices and

349 informal interviews in the same retail outlets about reasons for choosing a specific  
350 product.

351       Considering the number of attributes and their levels in Table 2, a full factorial  
352 design of 81 ( $3*3*3*3 = 3^4$ ) combinations was generated. Presenting respondents with  
353 one-liter bottles of olive oil with 81 combinations of attributes, however, could place a  
354 high level of cognitive burden on respondents. To reduce the number of combinations  
355 that participants had to evaluate, we followed Street and Burgess (2007) and generated  
356 an orthogonal fractional factorial design of nine combinations. These nine combinations  
357 were considered as the first option in each choice set. Since participants were provided  
358 with choice sets of three options each (plus a no-choice option), the other two options  
359 were obtained using the following generators (1212) and (2121) (Street and Burgess,  
360 2007). This resulted in a 100 percent efficient main-effects design.

361

## 362       **4. Results and discussion**

### 363           **4.1. Sample characteristics**

364       As mentioned above, a total of 401 respondents completed the survey. About 80  
365 percent were women, consistent with statistics reported by the Spanish ministry about  
366 shopping responsibility within the household (MAGRAMA, 2008). Approximately 70  
367 percent of the respondents were married, and their average age was 49 years (with a  
368 standard deviation of 15.39). The average household size was three. Furthermore, 35  
369 percent were households with one or more members younger than 18 years old, and  
370 only 14 percent had children under six years old. Regarding education level, 27.3  
371 percent of respondents had only completed primary school, while 46.8 percent had  
372 completed secondary studies or professional education. Finally, regarding the  
373 geographic distribution of the sample, 40 percent came from Barcelona (the Catalanian  
374 capital), while 60 percent came from the rest of the Catalanian region.

375       Consistent with Jiménez-Guerrero et al. (2012), results from the survey suggest  
376 that most respondents usually purchase extra virgin olive oil, but only 9.25 percent of  
377 the respondents search for PDO extra virgin olive oil. Olive oil is normally purchased  
378 weekly or every two weeks, although a significant percentage of respondents (nearly 30  
379 percent) purchase it monthly or quarterly (in many cases directly from a

380 farmer/producer or a cooperative). The consumption of organic olive oil is marginal  
381 (less than 0.6 percent of respondents buy it regularly). Respondent's reasons for not  
382 buying organic olive oil included the high price, the lack of availability in the  
383 supermarket where they buy food, or lack of information about organic food.

#### 384 **4.2. The SEM: Consumer's purchasing intentions**

385 Following the traditional procedure for estimating the SEM (Kline, 2005), a  
386 confirmatory factor analysis (CFA) was first carried out for the entire set of constructs.  
387 Six "personality latent variables" (orderly life style, healthy life style, price  
388 involvement, food quality involvement, food involvement, and cooking skills) and five  
389 "behavioral latent factors" (attitude, behavioral control perception, purchase intention,  
390 knowledge, and subjective norms) were obtained (Tables A1 and A2, in the Annex).  
391 Standardized factor loading estimates were all significant and above the recommended  
392 value of 0.7 (Hair et al., 1999). The main parameters to test the robustness of the  
393 construct, following Kline (2005), appear to show good results for almost all constructs.  
394 The internal consistency of reliability of each construct reached an acceptable Cronbach  
395 alpha of over 0.7, and the composite reliabilities were greater than 0.7, except for the  
396 factor "Healthy Life Style", which was 0.6. Nevertheless, we chose to retain this factor  
397 in our model.

398 The SEM was estimated in the second step. Table 3 summarizes the estimation  
399 results and the main goodness-of-fit measures. The model meets the accepted goodness-  
400 of-fit criteria according to Hair et al. (1999) and Kline (2005): 1) the normed Chi-  
401 squared (NC) is less than 3; 2) the value for the root mean square error of  
402 approximation (RMSEA) is 0.065 (less than 0.8); 3) regarding the incremental fit-index,  
403 the comparative-fit-index (CFI) is 0.952, which exceeds the value guidelines in the  
404 literature (0.90); 4) the normed-fit-index (NFI), non-normed-fit-index (NNFI) and  
405 relative fit-index (RFI) are all above 0.9, indicating that the conceptual model  
406 adequately fits the data; and 5) the adjusted  $R^2$  values are reasonably high for this type  
407 of model.

408 Results from Table 3 indicate that both consumers' social pressure (subjective  
409 norms) and their Perceived Behavior Control positively affect consumers' intentions to  
410 purchase organic olive oil, consistent with Chen (2007). However attitudes toward  
411 organic olive oil are negatively related to organic olive oil purchasing intention. This

412 result is not surprising. There are two arguments supporting it. First, Avitia et al. (2015)  
413 showed that although Spanish consumers valued the sustainable food attribute they were  
414 not willing to pay a premium for this attribute. Second, in the specific case of olive oil,  
415 Spanish consumers do associate extra virgin olive oil with health and sustainable  
416 characteristic irrespective of the type of production system (organic or conventional)  
417 (Calatrava, 2002 and Vega-Zamora et al., 2011), making differentiation between the  
418 two types of olive oil more difficult.

419 Furthermore, only the variables “Food Involvement” and “Orderly Lifestyle”  
420 positively affect attitudes, which supports Hypotheses 1a and 1c., corroborating Chen  
421 (2007) and Bell and Marshall (2003), who state that consumers with higher food  
422 involvement personality traits have a more positive attitude toward organic food and are  
423 better able to discern healthier foods. Additionally, results reveal that an orderly  
424 lifestyle seems to enhance an individual’s attitude toward organic olive oil. Gracia and  
425 Magistris (2008) obtained similar results, suggesting that consumers trying to follow an  
426 orderly life are more likely to develop environmentally friendly attitudes and follow a  
427 healthier diet in which olive oil plays an important role.

428 On the other hand, the relationships between attitudes, cooking skills, and healthy  
429 lifestyles are not significant (Hypotheses 1b and 1d are not supported). In both cases,  
430 this result is related to the perception of conventional olive oil as a healthy product,  
431 which already plays an important role in the Mediterranean diet. Organic olive oil is not  
432 perceived as healthier than its conventional counterpart, as mentioned above.

433 “Knowledge,” “Food Quality Involvement,” and “Price Involvement”  
434 significantly and positively affect consumer’s Perceived Behavioral Control, which  
435 supports Hypotheses 2a and 2c but rejects Hypothesis 2b. Although the standardized  
436 factor loading of “Price Involvement” was significantly different from zero, its positive  
437 coefficient led us to reject its associated hypothesis (2b). This finding is consistent with  
438 Eertmans et al. (2005), who stated that price was negatively related to healthy diet.

### 439 **4.3. The choice model: consumer’s preferences for olive oil attributes**

440 The second step in the HCM consists of estimating an RPL model that incorporates  
441 latent variables (LV) obtained from the SEM. The estimated utility function includes all  
442 attribute levels defined as effect-coded, except the price attribute, which is introduced as



443 a continuous variable as well as LVs. Socio-demographic variables, such as gender  
444 (GEND), age (AGE) and town size (TS), are defined as dummy variables (1  
445 representing women, age less than 50 years, and town size over 10000 inhabitants,  
446 respectively). The education level includes three categories: university degree (UNIV),  
447 completed secondary school (SECOND) and primary school. Thus, two effect-coded  
448 dummy variables were defined. The first one was university degree (UNIV), which took  
449 the value 1 if the respondent had a university degree, 0 if the respondent has completed  
450 secondary school, and -1, otherwise. The second education dummy was having  
451 completed secondary school (SECOND), which took the value 1 if the respondents had  
452 completed secondary school, 0 if the respondent had a university degree, and -1,  
453 otherwise. Finally, all random parameters were assumed to be normally distributed.

454 Table 4 shows the estimated parameters from the RPL model. The no-option  
455 coefficient is negative and significant, which indicates that most of the respondents  
456 participated in the choice experiment by choosing one of the proposed olive oil  
457 alternatives instead of the no-option. The results also reveal that the organic attribute  
458 generates a disutility to consumers, while the most preferred olive oil is the one  
459 produced under a PDO. In line with Calatrava (2002), the organic attribute does not  
460 represent any additional value to Spanish consumers.

461 This finding contradicts the results reported in other studies, such as Gracia and  
462 Magistris (2008) for Italy, Soler et al. (2002), and Vega-Zamora et al. (2011) for Spain,  
463 or Tsakiridou et al. (2006) for Greece. However in these studies, consumers were only  
464 required to choose between organic olive oil and its conventional counterpart, whereas  
465 we have considered the trade-offs not only with other olive oil attributes but also with  
466 other attribute levels within the production system (i.e., PDO) in our study. Moreover,  
467 environmental concerns are not a key factor in a consumer's food choices, especially in  
468 the case of olive oil (Vega-Zamora et al., 2011).`

469 Contrary to the organic attribute, Catalonian consumers show a strong preference  
470 for PDO extra virgin olive oil. PDO extra virgin olive oil is well known among  
471 Catalonian and Spanish consumers. Twenty-eight PDO brands exist in Spain, and five  
472 of them are located in Catalonia. Additionally, the production of this type of olive oil  
473 continues to grow; the domestic market and, to a lesser extent, the EU are its main  
474 destinations (Ruiz-Castillo, 2008).

475 The results further reveal that the price parameter is negative and significant  
476 (Menapace et al., 2011; Vega-Zamora et al., 2011). The local origin of olive oil plays an  
477 important role in shaping consumer's preferences in Catalonia. Catalan olive oils are  
478 preferred over other Spanish or imported oils, while olive oil produced in other Spanish  
479 regions is preferred over imported olive oil, as in Jiménez-Guerrero et al. (2012). In  
480 contrast, the specific brand did not significantly impact consumers' utilities, which  
481 indicates that respondents are more interested in the origin of extra-virgin olive oil than  
482 in the origin of the brand. This result could be related to the fact that many consumers  
483 do not recognize the origin of the brand (that is, whether the manufacturer is located or  
484 not in Catalonia). The results also show that consumers do not value private labels for  
485 this specific product in general.

486 Interestingly, almost all personal trait LVs (except orderly lifestyle) significantly  
487 affected the respondents' preferences for extra virgin olive oil (Table 4). In line with  
488 previous results, we note that the sign of the variable "Healthy Lifestyle" is negative  
489 and significant. Consistent with previous results about the organic attribute, a healthy  
490 lifestyle is not related to the selection of olive oil, although healthy lifestyles may be  
491 conducive to healthier food choices (Losasso et al., 2012). In Catalonia, olive oil is  
492 perceived as a key feature of the traditional Mediterranean diet, and is widely used by  
493 consumers independently from their particular cooking habits or diets. This fact also can  
494 explain the negative sign of the coefficient related to the variable "Cooking Skills".

495 The other three variables, "Food Involvement", "Price Involvement", and "Quality  
496 Involvement" positively affect consumers' preferences for extra virgin olive oil (Table  
497 4). A large number of extra virgin olive oil options are available in Catalonian markets,  
498 which can accommodate a broad range of preferences. People looking for good prices  
499 can easily meet their preference either by buying directly from the producer or  
500 cooperative (30 percent of our sample) or by choosing a promoted product at a retail  
501 outlet. Those looking for quality can also easily fit their preference.

502 Table 4 (middle part) shows that the standard deviations of all relevant attributes  
503 and personal traits are significant, which indicates heterogeneity in the preferences of  
504 Catalonian consumers. The negative effect of healthy lifestyles on consumers'  
505 preferences is not homogeneous across the sample. In fact, the negative coefficient  
506 becomes positive for women and younger people. The negative effect is mitigated for

507 respondents that have completed secondary school, but increases for people living in  
508 larger towns. The negative effect of cooking skills is mitigated in the case of women  
509 and well-educated people.

510 The positive effect of food involvement on consumer's utility increases for women  
511 and the highest educated population, but it becomes negative for younger respondents.  
512 The positive effect of "Price Involvement" is mitigated for women and the better-  
513 educated population, but significantly increases for people living in larger towns. The  
514 positive effect on the consumer's quality involvement when shopping is mitigated in  
515 larger towns and, practically disappears in the case of women.

516 Finally, behavioral LVs affect the utility assigned to the organic attribute.  
517 However, this attribute negatively affects the utility of consumers, as mentioned above.  
518 The interaction parameters found at the lower part of Table 4 indicate that this negative  
519 effect is partially mitigated in consumers affected by subjective norms or with a positive  
520 attitude toward organic food. Nevertheless, the organic attribute does not seem to play a  
521 significant role in the extra virgin olive oil market.

522

## 523 **5. Conclusions**

524 The use of limited information models, such as conventional choice models, could  
525 be problematic if the decision-making process is strongly conditioned by consumers'  
526 personality traits and lifestyles. In this paper, an HCM was applied to understand the  
527 consumer's behavioral process related to the purchase of extra-virgin olive oil in  
528 Catalonia. Special attention was paid to the organic attribute of the oil. This approach  
529 has been proven to be flexible enough to investigate the effect of consumers' food-  
530 related personality traits, lifestyles, and purchasing habits on their purchase intentions  
531 regarding organic olive oil as well as to ascertain the main determinants of consumer  
532 choice when buying extra-virgin olive oil.

533 The results from this study suggest that almost all personal trait LVs significantly  
534 affect respondents' utilities toward extra virgin olive oil. "Healthy lifestyle" is  
535 significantly but negatively associated with extra virgin olive oil utility, which shows  
536 that olive oil preferences in Catalonia respond more to dietary traditions than to healthy  
537 food choices. Nevertheless, this result was not homogeneous across the sample. In fact,

538 the negative effect of “Healthy Lifestyle” was mitigated in women. This result shows  
539 that this population segment cares more about diet and the impact of food on health and  
540 thus bases its food choices on health reasons.

541 Food-related activities (cooking skills) are more related to social and personal  
542 activities than to healthy food measures. Extra virgin olive oil is normally used in  
543 Catalonia for salads, boiled vegetables, or grilled food. People with superior cooking  
544 skills attempt to use alternative products to traditional olive oil.

545 The variables “Price Involvement” and “Quality Involvement” also significantly  
546 and positively affect the respondents’ attitudes toward extra virgin olive oil. These  
547 factors are both associated with the “Perceived Behavioral Control” construct,  
548 expressing the importance of available resources and opportunities in reinforcing  
549 consumers’ perceptions. However, the effect of these two variables is not homogeneous.  
550 Significant differences were found for people living in larger towns. While the overall  
551 positive effect of “Price Involvement” increases in larger towns, the positive effect of  
552 “Quality Involvement” is significantly mitigated.

553 The results also suggest that Catalan consumers perceive a disutility from the  
554 organic attribute compared to other production system alternatives (conventional and  
555 PDO). The price is not a relevant factor to explain this result, as organic olive oils are  
556 cheaper than PDO olive oils on average. Environmental or health concerns seem not to  
557 be relevant to consumers’ choices related to olive oil. The organic attribute is not  
558 perceived as a significant quality cue, whereas people looking for quality select PDO  
559 extra virgin olive oil. This result suggests that traditional marketing strategies that have  
560 been used in Catalonia to promote the consumption of olive oils based on environmental  
561 or health issues are not effective.

562 The results also indicate that the role of policy makers in the Spanish olive oil  
563 sector should be re-assessed. In June 2012, the Commission launched an action plan for  
564 the EU olive oil sector, which established six main areas among which quality control  
565 and promotion were included. During the last few years in Spain there has been a  
566 “premiumization” of olive oil, with the introduction of significant innovations in  
567 varieties, packaging, etcetera. These innovations have been the focus of promotional  
568 campaigns jointly financed by producer organizations and public institutions to increase  
569 consumers’ awareness of the health benefits of olive oil. These campaigns have been

570 proven to be effective in export markets but have not been a commercial success in the  
571 domestic market.

572 This study has shown the relevance of behavioral control on shaping consumers  
573 intentions toward olive oil. Policy actions on improving consumers' perception of  
574 control on the olive oil market seem to be needed in Spain. Olive oil is part of the  
575 Spanish culture, but this does not mean that consumers have a good knowledge of types  
576 of olive oil, quality grades, etc. Public institutions should provide more information in  
577 an increasingly differentiated market. If policy makers aim at promoting sustainable  
578 production of olive oil for the domestic market the attributes "Organic" and "Local"  
579 should be reinforced with appropriate information campaigns about the characteristics  
580 of these attributes and adequate control mechanisms should be in place to strengthen  
581 authenticity and protect consumers.

582 The results of this study reinforce the need to include the psychological  
583 characteristics of consumers, such as attitudes, food-related personality traits, purchase  
584 habits, and lifestyle orientation, to explain how individuals make food choices and to  
585 understand their decision-making processes. These findings are likely to encourage a  
586 more widespread application of the HCM in the agro-food marketing field. From a  
587 methodological point of view, more research should be addressed to providing new  
588 tools to estimate the HCM while considering heterogeneity across individuals.

589

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768 Table 1 New olive oil products launched in the world food market from 2011 to 2013

Country	Number of products launched	Percentage
USA	167	15.0
Brazil	129	11.6
Italy	73	6.5
France	54	4.8
Germany	51	4.6
Mexico	48	4.3
Spain	42	3.8
India	38	3.4
Australia	34	3.1
Chile	32	2.9
Colombia	32	2.9
Argentina	30	2.7
UK	29	2.6
South Africa	27	2.4
Venezuela	26	2.3
Russia	25	2.2
Finland	22	2.0
Greece	20	1.8
Canada	19	1.7
Austria	17	1.5
Egypt	15	1.3
Hong Kong	13	1.2
Saudi Arabia	13	1.2
Ukraine	13	1.2
New Zealand	12	1.1
Thailand	12	1.1
Turkey	12	1.1
Czech Republic	11	1.0
Netherlands	11	1.0
Sweden	11	1.0
Vietnam	11	1.0
Portugal	10	0.9
China	9	0.8
South Korea	9	0.8
Israel	6	0.5
Norway	4	0.4
Poland	4	0.4
Singapore	4	0.4
Switzerland	4	0.4
Taiwan	4	0.4
Belgium	3	0.3
Denmark	3	0.3
Indonesia	2	0.2
Ireland	2	0.2
Hungary	1	0.1
Malaysia	1	0.1
Philippines	1	0.1
Total	1116	100.0

769 Source: MINTEL (2015). Global New Products Database (GNPD)

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772 Table 2 Attributes and attribute levels in the Choice Experiment

<i>Attributes</i>	<i>Levels</i>
Production system	Conventional Protected Denomination of Origin (PDO) Organic
Origin	Spain Catalonia Imported
Brand	Spanish manufacturer Catalonia manufacturer Private label
Price	<b>3.70 €</b> <b>6 €</b> <b>7.5 €</b>

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791 Table 3. Results from the Structural Equation Model (SEM) to explain consumer's purchasing  
 792 intentions towards organic olive oil

<i>Structural relationships</i>	<i>Parameter Estimate</i>	<i>Std error</i>	<i>R<sup>2</sup></i>	<i>Goodness of fit statistics</i>
<b>Attitude</b> → Food Involvement	0.299 <sup>***</sup>	0.0653	0.329	$\chi^2 = 2021.270$ df = 741 NC = 2.727 < 3 RMSEA = 0.0658 < 0.08 CFI = 0.952 > 0.90 NFI = 0.926 > 0.90 NNFI = 0.946 > 0.90 IFI = 0.952 > 0.90 RFI = 0.918 > 0.90
<b>Attitude</b> → Healthy Life Style	-0.0784	0.0701		
<b>Attitude</b> → Ordered Life Style	0.384 <sup>***</sup>	0.0825		
<b>Attitude</b> → Cooking Skills	0.033	0.0575		
<b>Perceived Behavioural Control</b> → Knowledge	0.248 <sup>***</sup>	0.0655	0.318	
<b>Perceived Behavioural Control</b> → Price Involvement	0.234 <sup>***</sup>	0.0549		
<b>Perceived Behavioural Control</b> → Quality Involvement	0.491 <sup>***</sup>	0.0532		
<b>Purchase intention</b> → Subjective Norm	0.167 <sup>***</sup>	0.0351	0.623	
<b>Purchase intention</b> → Attitude	-0.127 <sup>***</sup>	0.0388		
<b>Purchase intention</b> → Perceived Behavioural Control	0.772 <sup>***</sup>	0.0559		

793 Notes : \*\*\*p<0.01; \*\*p<0.05; \*p<0.1  
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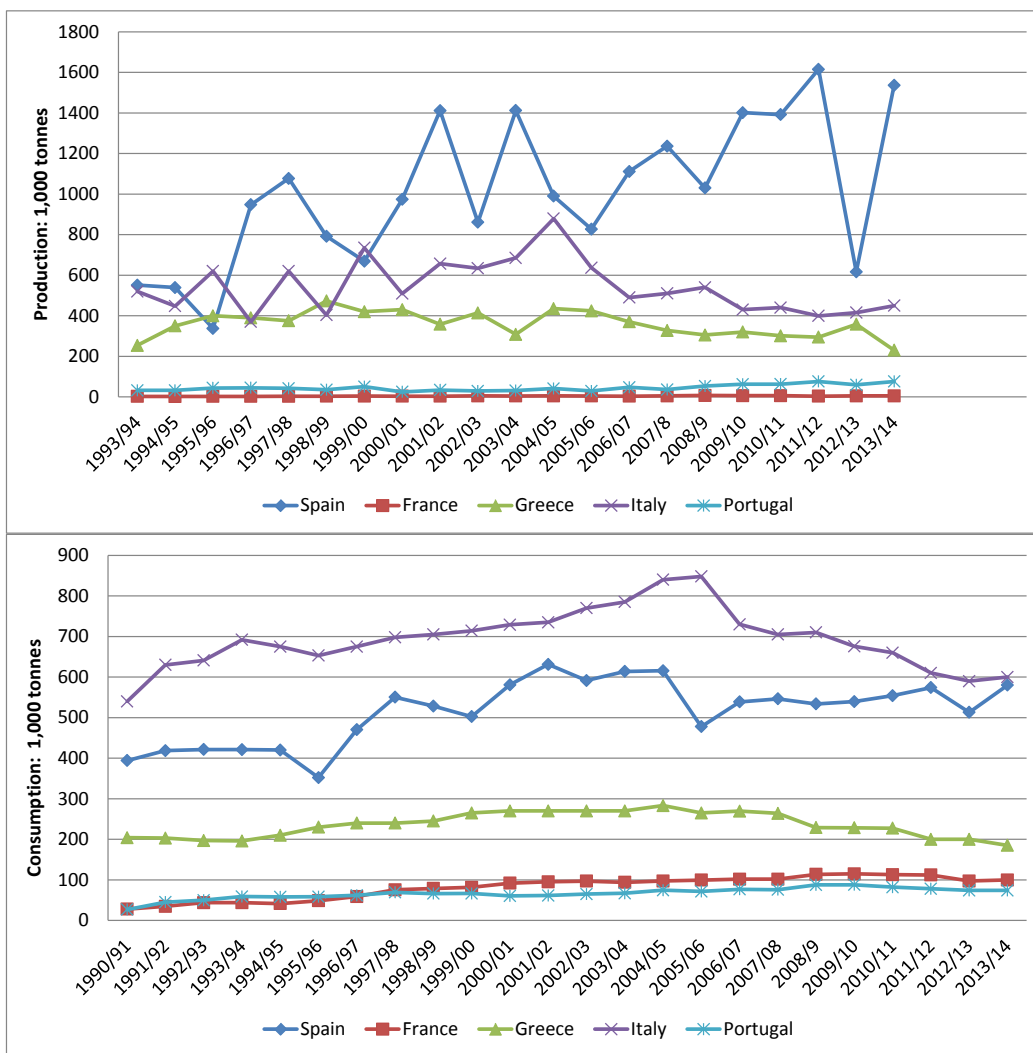
795 Table 4. Estimated parameters from the Random parameter Logit (RPL)

<i>Parameters</i>	<i>RPL</i>	<i>Standard error</i>
Conventional (CONV) <sup>1</sup>	1.280	----
Denominated Origin Protected (DOP)	0.251***	0.039
Organic (ORG)	-1.531***	0.253
Spanish origin (OSP) <sup>1</sup>	0.178	----
Catalan origin (OCAT)	0.490***	0.036
Imported origin (OIMP)	-0.668***	0.045
Spanish manufacturer (MSP) <sup>1</sup>	0.074	----
Catalan manufacturer (MCAT)	-0.005	0.050
Private brand (PRB)	-0.069	0.055
Price	-0.868***	0.027
No option (NOP)	-3.265***	0.818
Attitude (ATT)	----	----
Behavioral Control Preception (BCP)	----	----
Subjective Norm (SBN)	----	----
Orderly lifestyle (OLS)	-0.240	0.515
Healthy lifestyle (HLS)	-0.820**	0.282
Price Involvement (PIN)	1.587***	0.430
Quality involvement (QIN)	1.505**	0.537
Food involvement (FIN)	1.022**	0.463
Cooking-Skills (COS)	-2.408***	0.435
	<i>standard deviations</i>	<i>Standard error</i>
DOP	0.410***	0.032
ORG	0.733***	0.049
OCAT	0.765***	0.034
Price	0.794***	0.030
OLS	0.261***	0.024
HLS	0.549***	0.035
PIN	0.012	0.012
QIN	0.504***	0.041
FIN	Fixed Parameter	----
COS	0.149**	0.049
<i>Parameter-Variable</i>	<i>Heterogeneity in mean</i>	<i>Standard error</i>
ORG-ATT	0.276***	0.039
ORG-BCP	-0.093**	0.041
ORG-SBN	0.190***	0.033
OLS-SECOND	-0.511**	0.239
OLS-UNIV	-0.353	0.323
OLS-GEND	-0.854*	0.469
OLS-TS	1.804***	0.449
HLS-SECOND	0.661***	0.155
HLS-GEND	1.002***	0.243
HLS-TS	-2.070***	0.284
HLS-AGE	1.198***	0.230
PIN-UNIV	-0.881**	0.290
PIN-GEND	-1.198**	0.375
PIN-TS	0.779**	0.347
PIN-AGE	-0.491*	0.278
QIN-SECOND	1.820***	0.287
QIN-UNIV	-0.761**	0.382
QIN-GEND	-1.646**	0.501
QIN-TS	-1.072*	0.583
FIN-SECOND	-1.635***	0.247
FIN-UNIV	0.730**	0.352
FIN-GEND	0.964**	0.384
FIN-AGE	-2.241***	0.384
COS-SECOND	0.405*	0.233
COS-UNIV	1.425***	0.298
COS-GEND	1.009**	0.427
COS-AGE	2.689***	0.413
<i>Goodness-of-fit</i>		
L-likelihood		-2903.046
R2 adjs		0.41527

Notes : \*\*\*p<0.01; \*\*p<0.05; \*p<0.1; <sup>1</sup> Base level; (SE): Standard Error; Gender (GEND), age (AGE) and town size (TS), are defined as dummy variables (1, representing women, age lower than 50 years, and town size over 10000 inhabitants, respectively). Education is defined by two effect-coded variables: university degree (UNIV) and completed secondary school (SECOND)

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802 Figure 1. World olive oil production and consumption 1993-2014 (main countries)



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804 Note: 2012/13 data are provisional and 2013/14 data are estimated.

805 Source: Data from the international olive oil council (November 2013).

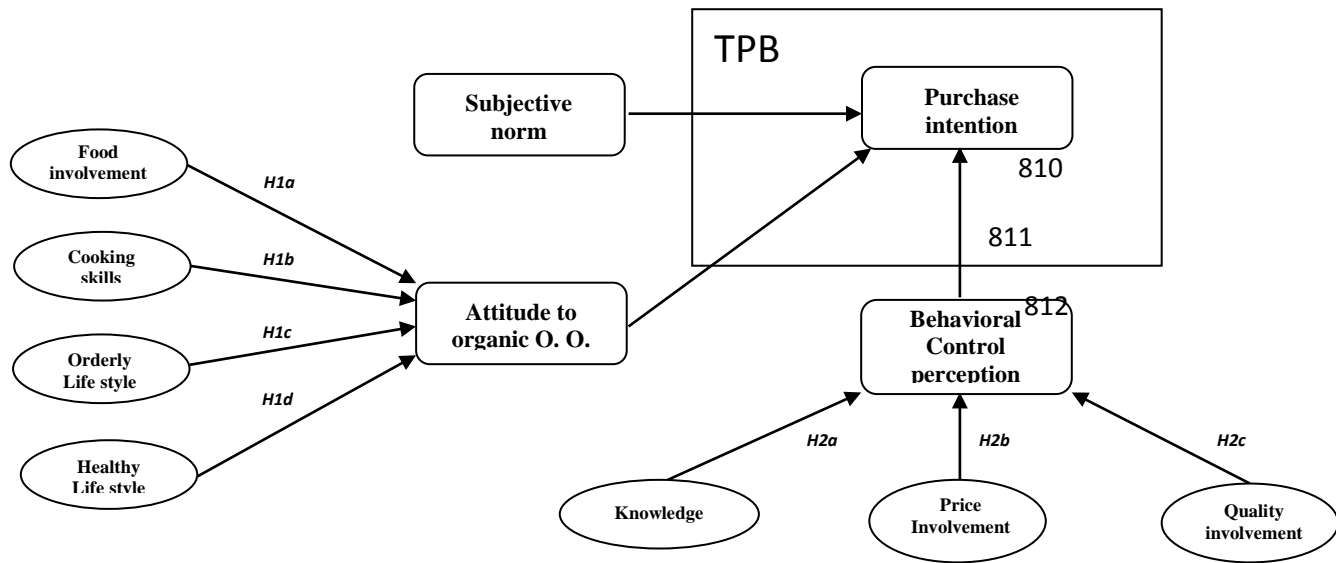
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807 Figure 2. A conceptual model to understand organic olive oil purchase intention.

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830 Figure 3. Example of a choice set

	<u>Alternative "A"</u>	<u>Alternative "B"</u>	<u>Alternative "C"</u>	<u>Alternative "D"</u>
<u>System of production</u>	<i>Extra-virgin olive oil with PDO</i>	<i>Conventional extra-virgin olive oil</i>	<i>Organic extra-virgin olive oil</i>	<i>None of them</i>
<u>Origin of olive oil</u>	<i>Spain</i>	<i>Catalonia</i>	<i>Imported</i>	
<u>Brand</u>	<i>Spanish Manufacturer</i>	<i>private label</i>	<i>Catalonia Manufacturer</i>	
<u>Price</u>	<i>3.70 €/liter</i>	<i>7.50 €/liter</i>	<i>6 €/liter</i>	

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837 **Appendix A**838 **Table A1. Confirmatory factor Analysis on personality traits**

<i>Índ</i>	<i>Factores and items</i>	<i>Mean (SD)</i>	<i>Standardized Factor loadings (SE)</i>	<i>Variance</i>	<i>Cronbach Alpha</i>	<i>'s Composite Reliability (variance extracted)</i>	<i>References</i>
	<b>Orderly Lifestyle</b>			74.40%	0.82	0.819 (0.602)	Gil et al. (2000)
<b>OLS_1</b>	I try to reduce stress.	6.888 (1.892)	1.372*** (0.108)				
<b>OLS_2</b>	I try to lead an ordered life and methodical.	7.308 (1.571)	1.325*** (0.0674)				
<b>OLS_3</b>	I try to equilibrate between my work and my personal life.	7.317 (1.679)	1.304*** (0.104)				
	<b>Healthy lifestyle</b>			56.75%	0.57	0.559 (0.302)	Gil et al. (2000)
<b>HLS_1</b>	I try to control salt intake.	6.720 (2.74)	1.097*** (0.157)				
<b>HLS_2</b>	I eat frequently fruits and vegetables.	7.312 (2.180)	1.062*** (0.117)				
<b>HLS_3</b>	I try to not eat precooked foods.	8.180 (1.621)	1.489*** (0.121)				
	<b>Food purchase</b>			75.68%	0.88	0.885 (0.663)	Soler and Gil (2002)
<b>FP_1</b>	I usually buy more the product in promotions	7.040 (2.159)	1.995*** (0.0906)				
<b>FP_2</b>	I usually pay attention in the promotions.	7.135 (2.177)	2.072*** (0.0929)				
<b>FP_3</b>	I remember the price paid in the last time.	6.343 (2.397)	1.415*** (0.126)				
<b>FP_4</b>	I compare the prices of different bands available.	6.723 (2.160)	1.696*** (0.104)				
	<b>Quality involvement</b>			77.64%	0.83	0.840 (0.636)	Soler and Gil (2002)
<b>QIN_1</b>	I buy the product independently to their price.	5.535 (2.433)	1.656*** (0.117)				
<b>QIN_2</b>	It is relevant for me paying more if the product has more quality.	6.553 (1.813)	1.635*** (0.0851)				
<b>QIN_3</b>	Pay more if the product has a guaranteed quality.	6.683 (1.793)	1.578*** (0.0927)				
	<b>Food involvement</b>			68.08%	0.83	0.846 (0.584)	Adapted from Chen (2007) and Candel (2001)
<b>FIN_1</b>	Mainly, I eat to have good health.	7.947 (1.599)	0.942*** (0.0804)				
<b>FIN_2</b>	Eating is a pleasure.	8.248 (1.404)	1.065*** (0.0754)				
<b>FIN_3</b>	The food accounts a significant part of the family's traditions.	8.190 (1.486)	1.334*** (0.0664)				
<b>FIN_4</b>	The food is a link to provide information about other cultures.	8.015 (1.651)	1.314*** (0.0981)				
	<b>Cooking skills</b>			58.87%	0.76	0.767 (0.456)	Candel (2001)
<b>COS_1</b>	I like cooking.	6.697 (2.430)	1.522*** (0.120)				
<b>COS_2</b>	I like to watch food programs on TV.	6.082 (2.797)	1.895*** (0.126)				
<b>COS_3</b>	I like to subscribe to cooking magazines.	3.750 (3.091)	2.191*** (0.125)				
<b>COS_4</b>	I like to offer food as gifts.	5.650 (2.531)	1.69*** (0.128)				

839 Notes : \*\*\*p&lt;0.01; \*\*p&lt;0.05; \*p&lt;0.1; SD: Standard Deviation; SE: Standard Error.

840 Table A2. Confirmatory factor Analysis on Behavioral factors

<i>Índ</i>	<i>Factor</i>	<i>Means (SD)</i>	<i>Standardized Factor loadings (SE)</i>	<i>Variance</i>	<i>Cronbach 's Alpha</i>	<i>Composite Reliability (variance extracted)</i>	<i>References</i>
	<b>Attitude</b>			81,96	0.97	0.948 (0.755)	Adapted from Alemán et al. (2006), and Roitner-Schobesberger et al. (2007)
ATT_1	The consumption of organic olive oil reduces human exposure to chemical residues.	6.867 (1.764)	1.502*** (0.110)				
ATT_2	Organic olive oil is healthy for children.	6.862 (1.660)	1.178*** (0.0678)				
ATT_3	The product is suitable for a healthy diet.	7.088 (1.636)	1.324*** (0.0666)				
ATT_4	The production of organic olive oil helps indirectly to reduce water pollution by waste chemicals and pesticides.	6.923 (1.680)	1.553*** (0.0579)				
ATT_5	The production of organic olive oil helps indirectly to conserve agricultural soil.	6.933 (1.716)	1.648*** (0.0563)				
ATT_6	The production of organic olive oil improves environmental sustainability	6.893 (1.809)	1.662*** (0.0626)				
	<b>Behavioral Control Perception</b>			69,79	0.87	0.816 (0.443)	Adapted from Krystallis and Chryssohoidis (2005), and Roitner-Schobesberger et al. (2007);
CP_1	I trust the product because of its certification by an organization or regulatory board of organic farming.	6.447 (1.601)	1.306*** (0.108)				
CP_2	I trust the product because it is sold exclusively in specialty stores.	6.668 (1.646)	1.293*** (0.0840)				
CP_3	I have confidence in the information provided on the product label.	6.202 (1.710)	1.35*** (0.0930)				
CP_4	I have confidence that a product certified as organic really is organic.	6.103 (1.866)	1.441*** (0.109)				
CP_5	The product is not available in the usual supermarkets where I normally do my shopping.	7.270 (1.843)	0.758*** (0.124)				
CP_6	Seek the product, me generates high cost in terms of time and money.	6.728 (1.862)	0.622*** (0.114)				
	<b>Purchase intention</b>			76,91	0.858	0.875 (0.701)	Adapted from Lea and Worsley (2005)
PI_1	If I have more information and confidence, I buy organic olive oil.	5.923 (2.179)	1.938*** (0.221)				
PI_2	I buy more if the product is cheaper.	5.770 (2.219)	1.856*** (0.100)				
PI_3	If organic olive oil is more readily available, I most often buy it.	5.655 (2.246)	1.912*** (0.116)				
	<b>Knowledge</b>			87,63	0.861	0.876 (0.780)	
KN_1	Lack information about the benefits of organic products.	6.905 (1.834)	1.586*** (0.118)				
KN_2	Lack of information about the label that identifies products as organic.	6.872 (1.889)	1.705*** (0.116)				
	<b>Subjective norms</b>			86,61	0.926	0.934 (0.825)	Chen (2007)
SBN_1	My kids prefer organic olive oil.	2.342 (2.475)	2.059*** (0.104)				
SBN_2	My family prefers organic olive oil.	2.465 (2.422)	2.382*** (0.0710)				
SBN_3	Persons who are important to me prefer organic olive oil.	2.578 (2.436)	2.215*** (0.0885)				

841 Notes : \*\*\*p&lt;0.01; \*\*p&lt;0.05; \*p&lt;0.1; SD: Standard Deviation; SE: Standard Error.