

WORKING PAPER

The more I care, the less I will listen to you: how information, environmental concern and ethical production influence consumers' attitudes and the purchasing of sustainable products

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1 The more I care, the less I will listen to you: how information, environmental concern
2 and ethical production influence consumers' attitudes and the purchasing of sustainable
3 products.
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5

6 **Abstract**

7 Product information strategies are crucial to foster pro-environmental attitudes and the purchasing of
8 green products. To date, few studies have explored the interplay between information, existing
9 environmental concern and barriers to the purchase of green products. By analyzing the data from a
10 survey to a large sample of Italian consumers (n = 8001), six hypotheses to explain the main drivers of
11 consumers' selections of sustainable products were advanced. Attitudes towards the products were the
12 main predictors of green product purchasing and were influenced by consumer's attitudes towards
13 ecolabels, whose marginal effect decreased as the environmental concern increased. This research also
14 demonstrates that a complex interaction between previous environmental knowledge and the use of
15 green labels influence attitudes towards sustainable products, rather than environmental concern per-se,
16 and that ethical aspects of production are important predictors of consumer's attitudes towards
17 sustainable products, despite they have not been traditionally regarded as such. Future studies about
18 green consumer profiling based on how consumers access and integrate information in decision-making
19 are suggested, to improve green marketing campaigns.
20
21

22 **1. Introduction**

23 Large-scale changes in patterns of consumption and the adoption of low-impact products can have a
24 significant environmental impact and are considered ways to address environmental issues and global
25 change (Røpke, 2009; Spargaaren, 2011).

26 There is evidence that over the last few decades an increasing number of consumers are changing their
27 patterns of consumption, and use increasingly more sustainable products in their everyday life
28 (Holloway *et al.*, 2007; Watts, Ilbery and Maye, 2005). Sustainable products can now be found in
29 numerous markets, such as food products (Feldmann and Hamm, 2015), energy (Ozaki, 2011),
30 remanufactured products (Michaud and Llorena, 2011), electrical devices (Sammer and Wüstenhagen,
31 2006), furniture and wooden products (Thompson *et al.*, 2010) and clothing (Meyer, 2001), as
32 demonstrated by their growing market shares (The Nielsen Company, 2015). For example, organic
33 food currently accounts for 4% of total food sales in the United States (United States Department of
34 Agriculture, 2016), and the number of farmer markets selling local food increased by 180% from 2006
35 to 2014 (Low, 2015). Another successful example is the paper market, where certified and recycled
36 products accounted for 72% of the total market in Europe in 2015 (CEPI, 2016).

37 Research into consumer behavior is mainly based on theories concerning values and moral norms, such
38 as the Norm Activation Model (Schwartz, 1970), the Value-Belief-Norm theory (Stern, 2000), and
39 those assuming that human behavior is grounded in self-interest and rational choice, such as the Theory
40 of Reasoned Action (Fishbein, 1979), the Theory of Planned Behavior (Ajzen, 1991), the Alphabet
41 theory (Zepeda and Deal, 2009) and the Integrated Model (Montano *et al.*, 2015). Predictions of
42 behavioral intentions with regard to environmental consumerism differ from those of actual behavior,
43 due to attitude-behavior gaps (Kollmuss and Agyeman, 2002). Product price and availability, or the
44 practical feasibility of purchasing and handling sustainable products, are typical external barriers to
45 sustainable consumption (Cassady; Jetter and Culp, 2007; Gleim and Lawson, 2014; Steg and Vlek,
46 2009; Zsóka *et al.*, 2013).

47 A lack of information about product sustainability can also be a barrier preventing people from
48 selecting more environmental-friendly products. In contemporary society, continual access to
49 information is expected, so unsurprisingly this information is extremely important and acts on
50 consumers at multiple psychological levels. For example, information can have an instant effect on
51 consumers in a store, altering their perceived behavioral control if provided through promotional
52 strategies (Testa *et al.*, 2015) and awakening emotions with powerful effects (Kemp *et al.*, 2012).
53 Consumers can also be affected by information in more indirect ways and developing pro-
54 environmental attitudes (Cornelissen *et al.*, 2008). Research suggests that including information as a
55 factor in existing theoretical models can substantially help understanding consumer behavior (Polonsky
56 *et al.*, 2012; Tafique *et al.*, 2016).

57 Other powerful barriers to engaging in pro-environmental behavior may lie in the level of education of
58 consumers and thus in attributes such as their concern for environmental issues. This is not surprising
59 as social concern about the environment is increasing in many societies, leading to the formation of
60 social norms about the sustainability of human behavior (Félonneau and Becker, 2008; Thøgersen and
61 Ölander, 2002). Lin and Huang (2012) find that environmental concern influences consumption values
62 and choice behavior, but only a relatively limited number of works explore the effect of environmental
63 concern on consumers' processing of product information (Fusco *et al.*, 2012; Chen and Chai, 2010;
64 Kim and Seock, 2009; Milfont *et al.*, 2006; Taufique *et al.*, 2016). Particular research gaps still exist on
65 the effect of environmental concern and product sustainability information on consumer attitudes and
66 purchasing behavior, and their interplay. Rex and Baumann (2007) noted that the majority of literature
67 about green marketing solely considered green labels as providing information about product
68 sustainability, and ignored other forms of advertising used in marketing campaigns. In this study we
69 extend this viewpoint and investigate how labeling and other means of information used by a large
70 Italian retailer could shape consumer attitudes and behavior regarding sustainable products. Another
71 significant research gap is in terms of the interaction between environmental concern and sustainability
72 labels. These have traditionally been studied separately, with no overall perspective of various types of
73 consumables. As many certifications apply to a wide range of products, it is interesting to test whether
74 the interplay between environmental concern and the information conveyed by sustainability labels can
75 be generalizable. There are two novel approaches in this research: (1) examining the importance of
76 product information in shaping positive attitudes and promoting the purchasing of sustainable products;
77 (2) testing the relationship between environmental concern and the importance given to sustainability.
78 The remainder of the paper is organized as follows. In the next section, an assessment of the drivers of
79 consumer behavior towards sustainable products, and the hypotheses of this study are provided. In the
80 methods section the data collection process, the measures used and the statistical analysis are explained
81 in detail. Then, the results obtained are presented and discussed. In the final section it is argued that,
82 despite the existence of an attitude-behavior gap, it emerges that information can play a significant role
83 in orienting consumers towards sustainable products. The implications of the study, limitations of the
84 approach adopted and suggestions for future research on sustainable products are discussed, along with
85 the conclusions.

86

87 **2. Development of hypotheses**

88 The theoretical framework in this study assumes a relationship between consumers' attitudes and their
89 purchasing behavior. This choice was motivated by the high number of psychological theories
90 assuming causality between attitudes and pro-environmental behavior (Ajzen, 1991; Fishbein, 1979;
91 Montano *et al.*, 2015; Zepeda and Deal, 2009), and by the numerous papers on sustainable
92 consumerism, which confirm the validity of such a relationship across many different types of products
93 (Aertsens *et al.*, 2011; Chekima *et al.*, 2016; Feldmann and Hamm, 2015; Goworek *et al.*, 2013; Huijts

94 *et al.*, 2012; Kang *et al.*, 2013; Pino *et al.*, 2012; Thompson *et al.*, 2010; Tilikidou, 2007; Zepeda and
95 Deal, 2009). Therefore the first hypothesis said that:

96 *H1: Positive attitudes towards sustainable products are positively related to their purchasing.*
97 *β_9 should be positive and significant.*

98 While there is substantial evidence that attitudes typically have a moderately positive influence on pro-
99 environmental purchasing behavior, research also highlights an indirect role played by the provisioning
100 of information, and there is evidence that including variables accounting for the perceived quality and
101 quantity of information received by consumers actually improves the understanding of their behavior
102 (De Pelsmacker and Janssens, 2007). With sustainable products, information is crucial as consumers
103 are usually interested in seeking detailed information about the products, their production cycle, origin
104 and environmental footprint (McDonald and Oates, 2006). The need for more information about these
105 aspects paved the way, for example, for the creation of local food markets (Feldmann and Hamm,
106 2015). Similarly, the lack of adequate provisioning of information to consumers can prevent them from
107 identifying green products (Pickett-Baker and Ozaki, 2008), causing market failures (Cason and
108 Gangadharan, 2002).

109 Labels are probably the marketing tools companies and policy makers use most to inform consumers
110 about the origin and nature of products, and in environmental consumerism they have received
111 significant attention, as effective in stimulating positive attitudes, and fostering the selection of
112 sustainable products over conventional ones (Atkinson and Rosenthal, 2014; Prieto-Sandoval *et al.*,
113 2016; Testa *et al.*, 2015). The current research about the use of sustainability labels by local and
114 organic food consumers has led to different conclusions about their relative weight in determining
115 consumer behavior (Aprile *et al.*, 2012; Gracia and DeMagistris, 2016; Grunert and Aachmann, 2016;
116 Janßen and Langen, 2017; Van Loo *et al.*, 2014; Verbeke and Pienak, 2012; Zepeda *et al.*, 2013).
117 However, two points seem to be clear. First, labels do not seem to act directly on purchasing behavior,
118 and rather act on attitudes towards sustainable products. Second, labels alone do not appear to have an
119 intrinsic power to motivate consumers to develop favourable attitudes towards sustainable products.
120 Instead, they interact with other powerful drivers, such as personal norms or the awareness of the
121 consequences of consumer behavior. In this work we have considered the interactions of the most
122 popular eco-labels, regardless of their origin or content, with environmental concern, which is a
123 significant indirect driver of attitudes towards many sustainable products and pro-environmental
124 behavior (Pagiaslis and Krontalis, 2014). Experimental research indicates that environmentally
125 concerned consumers rely more on sustainability labels when evaluating green products (Bickart and
126 Ruth, 2012; Grunert *et al.* 2014), and in this case two hypotheses about the role of labels for sustainable
127 products are proposed:

128 *H2: evaluating labels as an effective means of information about sustainability drives*
129 *consumers to develop positive attitudes towards green products. β_2 should be positive and*
130 *significant;*

131 *H3: perceiving green labels as an effective means of information about sustainability has a*
132 *greater impact over attitudes, in the case of environmentally concerned consumers. β_8 should be*
133 *positive and significant;*

134 The perceived importance assigned to communication campaigns on shaping attitudes towards
135 sustainable products was also investigated. As consumers of sustainable goods seek information and
136 wish to be continuously informed on the characteristics of the products to orient their behavior
137 (Stolzenbach *et al.*, 2013; Sirieix *et al.*, 2013; Zepeda and Deal, 2009), it was hypothesized that:

138 *H4: the perceived importance assigned to communication campaigns as tools to encourage pro-*
139 *environmental behavior promotes favourable attitudes towards green products; β_3 should be*
140 *positive and significant.*

141 Attitudes do not necessarily translate into behavior, because many situational, socio-economic and
142 structural factors can offset their effect, producing apparently incoherent consumer behavior and even
143 preventing consumers with favourable environmental attitudes from engaging in pro-environmental
144 actions (Carrington *et al.*, 2010; Heberlein, 2012; Kollmuss and Agyeman, 2002; Kurisu, 2014;
145 Prothero *et al.*, 2011; Steg and Vlek, 2009). For example, product availability is one the main
146 constraints preventing motivated consumers from purchasing sustainable products (Gleim and Lawson,
147 2014). If a particular sustainable product is actually scarce in shops, or if it is perceived to be scarce,
148 consumers may not purchase it even if they hold favourable attitudes towards it and recognize its
149 sustainability (LaTrobe, 2011; Conner *et al.*, 2010; Steg and Vlek, 2009; Vermeir and Verbeke, 2006;
150 Young *et al.*, 2010; Zepeda and Leviten-Reid, 2004). The more available the sustainable product is in
151 stores, the lower the behavioral costs associated with its purchasing (Steg and Vlek, 2009) and the more
152 purchasing behavior takes place because of convenience practices (Hjelmar, 2011). However, in-store
153 visibility also matters, as this can affect a product's perceived availability (Van Herpen *et al.*, 2012)
154 and therefore modify the perceived self-efficacy of consumers. Traditionally, product displays and
155 promotional strategies in stores are tools that can effectively increase product visibility (Bezawada and
156 Pauwels, 2013; Lin and Huang, 2012). Therefore, two further hypotheses on the influence of the
157 perceived availability of sustainable products on product adoption, and its interaction with promotional
158 strategies, were proposed:

159 *H5: green products in stores are more likely to be purchased if they are perceived to be*
160 *available to consumers. β_{13} should be positive and significant;*

161 *H6: promotions enhance the effect of product availability over product purchasing. β_{17} should*
162 *be positive and significant.*

163

164 **3. Methodology**

165 **3.1 Data Collection**

166 This study uses data gathered in the PROMISE project (<http://www.lifepromise.it/>). Survey
167 development and administration were carried out by ANCC-COOP, the Italian umbrella retailer
168 association for the Legacoop consumers' cooperatives that has a clear commitment to sustainability,
169 which included 7,205,497 associates at the time of the study. Online questionnaires were sent to all the
170 associates with access to the Coop website. Before beginning the survey, respondents received alerts
171 about the upcoming initiative and later a reminder to fill and submit the questionnaire. Data collection
172 took place from April to May 2012.

173 The questionnaires consisted of two sections. In the first, the questions explored the effectiveness of the
174 communication campaign and the resulting improvements in the level of environmentally friendly
175 behavior and purchase choices. In the second section, respondents were asked about their familiarity
176 with the main brands promoted by the project and about the certifications available for several
177 sustainable products. 8001 questionnaires were gathered and we retained 7627 of them (95.3%) in the
178 analysis, discarding those deemed unsuitable due to high proportions of missing answers.

179 Common Method Bias (CMB) or the proportion of variance in the data, which is related to the method
180 instead of the constructs themselves, was controlled in two ways. First, response formats were varied
181 into dichotomous answers, Likert scales, open-ended answers and multiple-response answers, to
182 minimize anchoring bias (Chang & Fong, 2010; Podsakoff *et al.*, 2003). After data collection, the
183 existence of CMB was tested with Harman's single factor test, checking if a single factor accounted for
184 more than 50% of the covariation between latent variables and items, as suggested by Podsakoff and
185 Organ (1986). Although the Harman's single factor test can suffer from false positives, this happens
186 only in case of very high reliability of the constructs, when Cronbach's alpha is greater than 0.95
187 (Fuller *et al.*, 2016). As the values of this index for the data of this research were lower than that

188 threshold the Harman's single factor test suitable for the purpose of this research, and it did not provide
189 any evidence of CMB in the data.

190 **3.2 Measurements**

191 **3.2.1 Dependent Variables**

192 *Green product purchasing* was measured with six items, which asked respondents how often they
193 purchased local food, seasonal food, organic clothes and textiles, energy-efficient electric goods, green
194 cleaning products and environmentally friendly wood and pulp products. The frequency of purchasing
195 behavior was measured with 4-point Likert scales, ranging from "Never" to "Always". The six items
196 were aggregated through factor analysis (Cronbach's alpha = 0.71), after being checked for the
197 existence of a single factor, and this factor score was adopted as the second-stage response variable.
198 Self-reported behavior is a common approach in sustainable consumerism studies, despite the risk of
199 major issues such as social desirability and memory recall bias. The questions were deemed to be
200 suitable, as to date no study has shown the influence of social desirability on self-reported consumption
201 sustainable products, and anonymous questionnaires with confidentiality of information are typically
202 sufficient to measure behavior where no strong social desirability or sensitivity exist (Krumpal, 2013).

203 Respondents were asked about their *attitudes towards green products* by rating 'the importance the
204 following aspects of the product life cycle have in determining your purchase choices and decisions'. In
205 this part of the questionnaire, respondents evaluated the importance of product packaging, waste
206 disposal, employment of reused/recycled material, the environmental impact of production processes,
207 the distance between product site and retailer, and the number of stages in the product chain. These six
208 items were measured with 5-points Likert scales, ranging from 'Not important at all' to 'Very
209 important'. This approach was radically different from previous studies using semantic scales to
210 measure overall respondents' attitudes towards sustainable products (Pieniak *et al.*, 2010; Vanhonacker
211 *et al.*, 2013; Verbeke *et al.*, 2007) and is more "life cycle-oriented". The concept of "product life cycle"
212 is now a tool commonly used to evaluate environmental performance (Guinee *et al.*, 2010), and in
213 recent years has permeated into the public debate about sustainability, so we were comfortable in using
214 data obtained with this approach. The complexity of individual attitudes about product sustainability
215 can be more effectively represented with this approach than with semantic scales. For example, there is
216 practical evidence that consumers can distinguish between the effects of the different phases of the
217 production cycle and perceive the complex dimensionality of product sustainability (Hanss and Böhm,
218 2012). The Cronbach's alpha of the construct was 0.73 and a factor score was obtained with
219 exploratory factor analysis, after having checked the existence of a single factor.

220 **3.2.2 Independent variables**

221 *The importance given to ecological labels and certifications* was measured by asking respondents to
222 'rate the importance of the following environmental, social quality, guarantee and traceability brands
223 have in determining your purchase choices and decisions'. Respondents evaluated the importance they
224 assigned to the most popular green labels, including organic certifications, forest certification, the
225 EcoLabel, energy labels, recyclable packaging labels, fair trade brands, Environmental Product
226 Declarations and certified geographical indications, on a 5-point Likert scale ranging from 'Not
227 important at all' to 'Very important'. As there are a high number of certification labels in Europe
228 (<http://www.ecolabelindex.com/ecolabels/>), this multidimensional construct (Cronbach's alpha = 0.78)
229 was able to fully reflect the importance assigned by respondents to their commonalities, i.e., their
230 information intent, instead of their particulars, i.e., specific framings.

231 *The importance assigned to communication campaigns as means of information* about sustainable
232 products was measured through seven items (Cronbach's alpha = 0.79). Respondents were asked to rate
233 the effectiveness of some of the Coop's communication strategies for sustainable products in raising a
234 general awareness about sustainability on a 5-point Likert scale, ranging from 'Not important at all' to
235 'Very important'. The strategies were radio advertisements, television advertisements, advertisements

236 in daily newspaper and magazines, information campaigns to members who were eco-consumers, web
237 communication and internal communication with general Coop members.
238 The *importance assigned to in-store promotions* as tools to incentivize sustainable products was
239 measured with three items, asking respondents to evaluate the effectiveness of in-store promotional
240 strategies (Cronbach's alpha = 0.79): discounts, selection of recommended products and assisted sales.
241 These variables were factor-analyzed, and latent-variable scores were calculated and used as predictors
242 in the final model.
243 The *perceived availability of sustainable products* was measured with a single item asking respondents
244 to rate the difficulty they typically face in finding eco-friendly products at Coop stores, on a 5-point
245 Likert scale, from 'No difficulty' to 'Very high difficulty'. It was decided to use this indirect approach
246 with a reversed item as it was less demanding for respondents, because asking them to evaluate product
247 availability could have sounded vague and risked resulting in various sources of bias, including
248 memory recall.
249 The respondent's level of *environmental concern* was measured as a score, obtained by adding five
250 dichotomous questions, asking whether respondents were worried about climate change, air pollution,
251 water pollution, waste production, and resources consumption.
252 Factors important for attitude formation and product purchasing were also included as predictors in the
253 model. Green consumers form their attitudes about sustainable products from the perceived safety
254 connected with their use, their quality, the perceived ethical standards of the production cycle (Chang
255 and Fong, 2010; Cotte and Trudel, 2009; Hanss and Böhm, 2012; Howard and Allen, 2010; McCluskey
256 and Loureiro, 2003) and the confidence they have in the retailer (Perrini *et al.*, 2010). These aspects
257 were therefore included in the survey. Respondents were asked to evaluate the influence these variables
258 had over the choice of purchased products on a 10-point scale ranging from 'Little' to 'Very much'.
259 Other second-stage predictors were also included in the model, to account for barriers preventing
260 consumers from adopting sustainable products and determining an attitude-behavior gap (Kollmuss and
261 Agyeman, 2002; Steg and Vlek, 2009). Product-specific factors, such as brand and price, were
262 considered (Glaim and Lawson, 2014; Michaud and Llorena, 2011; Özsomer, 2012), by asking
263 respondents to evaluate their influence over the choice of purchased products on a 10-point rating scale
264 ranging from 'Little' to 'Very much'. Respondent-specific factors, such as age, gender and the level of
265 education, were considered as well as these can pose considerable constraints to the adoption of green
266 products in some social contexts, offsetting the effects of favourable attitudes (Diamantopoulos *et al.*,
267 2003; Feldmann and Hamm, 2015; Luchs and Mooradian, 2012; Testa, Cosic and Iraldo, 2016). Single-
268 question rating scales and Likert scales were treated as continuous variables, so the assumptions of
269 parametric statistics were not violated (Norman, 2010). Table 1 shows the format, the aggregation
270 mode and the descriptive statistics of the study's variables.

271 INSERT TABLE 1 ABOUT HERE

272 3.3 Statistical analysis

273 A two-stage regression was used to test the study's hypothesis, to account for the effect of various
274 predictors over attitudes, which in turn determine purchasing behavior. In the first stage the effect of
275 predictors on attitudes towards green products was modelled with an ordinary least squares (OLS)
276 regression. Predictors of attitudes towards sustainable products included environmental concern,
277 attitudes towards ecological labels, perceived effectiveness of information received by communication
278 campaigns, perceived importance given to the trust in the retailer, importance of product quality,
279 importance of product safety and ethical features of the product. An interaction term was also included
280 to account for the interaction between environmental concern and the attitudes towards ecological
281 labels. In the second stage, the effect of attitudes and other predictors on the regular purchasing of
282 green food was modelled with another OLS regression. Second stage predictors included perceived
283 difficulty in finding green products, the perceived effectiveness of promotional strategies for increasing

284 awareness of green products, the importance of product price and product brand, along with the age,
285 level of education and sex of respondents. An interaction term was also included, to account for the
286 interaction between the perceived difficulty in finding green products and the perceived effectiveness
287 of promotional strategies. As the Breusch-Pagan test revealed the existence of heteroscedasticity in
288 both stages of the model, the White correction for model residuals was used in both stages of model
289 fitting. The structure of the full model can be seen in Equation 1.

290 INSERT EQUATION 1 ABOUT HERE

291 It was proposed that the level of environmental concern modified the effect of the perceived
292 effectiveness of sustainability labels over attitudes towards green labels and certifications, and that the
293 importance assigned to in-store promotions modified the effect of product availability over product
294 adoption. Therefore the two interaction terms were treated as moderations. Moderation can be defined
295 as the effect of a third variable over the causal effect between two other variables (Wu and Zumbo,
296 2008) and the two interaction terms were tested for their significance following Frazier et al. (2004). In
297 the first step the coefficient and the level of statistical significance of the interaction term between the
298 moderator and the variable of interest were evaluated, and then a likelihood-ratio test between the full
299 model and the nested model without the interaction term and the moderating variable was performed. A
300 moderation was deemed to occur if the interaction term was significant and if it increased the variance
301 explained by the model.

302 At each stage of the model, the data were graphically explored to verify the occurrence of non-linear
303 associations between variables. In multivariate regressions, non-linear relationships between the
304 dependent variable and its predictors require the use of polynomial terms, or of non-linear modelling
305 (e.g., GAM). Furthermore, in the variable selection the multicollinearity of predictors can be assessed
306 by exploring their associations with Pearson's linear correlation test, but only if such associations are
307 linear. As any non-linear relationship between predictors in either stage was detected and given that
308 Pearson's correlation coefficient was always smaller than 0.53, we did not believe that multicollinearity
309 was occurring (Table 2). As the associations between the dependent variable and its predictors were
310 always linear, higher-order terms were not included in the regression. To remove any possible effects
311 caused by different scales, all predictors in the two stages of the model were standardized. Finally,
312 post-estimation diagnostic plots, which are included in the Supplementary Material, were performed.
313 Model residuals were plotted against fitted values, leverage against squared residuals and also
314 performed added variable plots.

315 INSERT TABLE 2 ABOUT HERE

316

317 **4. Results**

318 Model diagnostics did not reveal any pattern in the residuals and this supported the validity of the
319 statistical analyses. The final model explained 0.26 of total variance in green product purchasing (Table
320 3).

321 In the first stage the importance given to ecological certifications and labels was the most important
322 predictor of attitudes towards sustainable products ($\beta_2 = 0.28 \pm 0.008$, $p < 0.01$), followed by the
323 importance of the ethical features of the product ($\beta_7 = 0.17 \pm 0.009$, $p < 0.01$). Environmental concern
324 was also a significant predictor ($\beta_1 = 0.06 \pm 0.008$, $p < 0.01$), and its interaction term with importance
325 given to ecological certifications and labels was significant, despite small in magnitude ($\beta_8 = -0.032 \pm$
326 0.007 , $p < 0.01$). The likelihood ratio test between the full model and the nested one, without the
327 environmental concern score and the interaction term, was significant. Nevertheless, the overall
328 increase in the R^2 was only 0.002 (Table 3).

329 In the second stage, attitudes towards sustainable products were the most important driver of
330 purchasing behavior ($\beta_9 = 0.87 \pm 0.20$, $p < 0.01$), followed by the age of respondents ($\beta_{12} = 0.10 \pm 0.07$,
331 $p < 0.01$). All the other predictors were significant and had small marginal effects. The gender of

332 respondents was non-significant (Table 3). The perceived importance of promotions had a small
333 marginal effect ($\beta_{14} = 0.05 \pm 0.008$, $p < 0.01$) and was significant. Its interaction term with consumers'
334 self-efficacy was significant at the 0.05 cut-off, and had a small marginal effect ($\beta_{17} = 0.02 \pm 0.007$, $p <$
335 0.05). The likelihood ratio test between the full model and the nested model without the perceived
336 importance of promotions and the interaction term was significant and provided an increase in the R^2 of
337 about 0.001 (Table 3).
338

339 INSERT TABLE 3 ABOUT HERE
340

341 5. Discussion

342 This empirical analysis of drivers of green purchasing behavior of a large sample of Italian consumer
343 provides, from diverse perspectives, a valuable contribution to the current debate on sustainable
344 consumerism.

345 First, despite the attitude-behavior gap (Vermeir and Verbeke, 2006), empirical evidence has identified
346 several aspects related to the importance of pro-environmental attitudes in the purchasing of green
347 products at supermarkets. The results give support to Hypothesis 1, agreeing with the various theories,
348 like the Theory of Reasoned Action (Fishbein, 1979), the Theory of Planned Behavior (Ajzen, 1991),
349 the Alphabet Theory (Zepeda and Deal, 2009) or the Integrated Model (Montano and Kasprzyk, 2015),
350 asserting that holding positive attitudes towards sustainable products orients consumers towards
351 purchasing them. Furthermore, the analysis reveals that acquiring information from green labels can
352 strengthen individual attitudes. Despite disagreeing with some research about sustainable products,
353 showing a relatively superficial use of sustainability labels by consumers (Grunert, Hieke and Wills,
354 2014; Horne, 2009), these results agree with other studies emphasizing the role of information in
355 shaping personal pro-environmental beliefs and norms, which in turn determine the individual
356 predisposition towards green products (Borin *et al.*, 2011; Pickett-Baker and Ozaki, 2008). Strong
357 support for Hypothesis 2 was found, as perceiving green labels as an effective traceability tool fosters
358 positive pro-environmental attitudes.

359 The effect of environmental concern over attitudes per-se was limited. In fact, the interaction term
360 with the perceived importance given to green labels was negative and significant, but had a small
361 moderation effect, contradicting Hypothesis 3. This result, while agreeing with Mainieri *et al.* (1997),
362 might sound counter intuitive, because it contradicted various studies showing that environmental
363 concern affects attitudes towards green products or sustainable services (Aman, Harun and Hussein,
364 2012; Bamberg, 2003; Han, Hsu and Lee, 2009; Kim and Han, 2010) and also some theories, like the
365 Theory of Reasoned Action (Ajzen and Fishbein, 1980) hypothesizing that specific beliefs, like
366 environmental concern, affect human behavior indirectly by determining individual attitudes. Previous
367 research (Grunert, Hieke and Wills, 2014) suggests that despite green consumers being
368 environmentally concerned, at the product level sustainable food selection is mainly guided by food-
369 specific concerns. The findings from this research appear to corroborate this by suggesting that
370 environmental concern alone does not guide information processing. Future survey research focusing
371 on food-specific concern and its interaction with the use of ecolabel information is recommended.

372 Another interesting result is the effect of the importance given to communication campaigns as a means
373 of providing information about green products on consumer attitudes. From the results, perceiving
374 information campaigns as an important tool to provide information about sustainable products does not
375 affect respondent's attitudes about sustainable products, as the coefficient of the variable was extremely
376 low. Although studies have shown that green consumers actively seek information to shape their
377 attitudes and guide their purchasing behavior (Stolzenbach *et al.*, 2013; Sirieix *et al.*, 2013) and the
378 Alphabet Theory explicitly formalized this process for sustainable food consumption (Zepeda and

379 Deal, 2009), the results from this research provide little evidence of this with regard to informative
380 campaigns, confuting Hypothesis 4.

381 Surprisingly, the ethical aspects of production are the second most important predictor of attitudes
382 towards green products. While ethical issues have been found to influence how consumers evaluate
383 products (Bodur *et al.*, 2014) and shape their attitudes (Bean and Sharp, 2011; Onozaka and McFadden,
384 2011; Zepeda and Deal, 2009) such of a strong effect on attitudes towards green products in general
385 was unexpected. To the best of our knowledge few studies have explored this aspect. Hanss and Böhm
386 (2012), studied the various dimensions of sustainability and found that consumers place a high value on
387 the fairness and equity standards of the labels. De Medeiros and Ribeiro (2017) found that Brazilian
388 consumers positively evaluated certifications guaranteeing recycled raw materials when choosing
389 furniture.

390 The second part of the model highlighted the role of pro-environmental attitudes in determining the
391 adoption of green products. The perceived availability of green products had an overall small marginal
392 effect on the response variable, and Hypothesis 5 was rejected. This finding contradicted various
393 studies about green consumerism, that traditionally regarded limited product availability as an
394 important barrier to product adoption, discouraging even those consumers with the most favourable
395 pro-environmental attitudes from choosing sustainable goods (Conner *et al.*, 2010; LaTrobe, 2011; Steg
396 and Vlek, 2009; Vermeir and Verbeke, 2006; Young *et al.*, 2010; Zepeda and Leviten-Reid, 2004), as
397 well as the Integrated Model (Montano and Kasprzyk, 2015) which identifies environmental constraints
398 as a key factor for the attitude-behavior gap. However, this finding also agreed with other research
399 suggesting that product availability alone is a minor component in the utility maximization process of
400 consumers (Jensen and Mørbak, 2013) and that other factors regulate its influence over consumer
401 behavior. For example, the marginal effect of the perceived importance of promotions and its
402 interaction with the perceived availability were small, but both variables were significant and the
403 likelihood ratio test provided evidence against rejecting them from the full model. Therefore,
404 Hypothesis 6 cannot be rejected and this might point to the existence of a complex interplay between
405 product availability and marketing strategies, which can enhance product visibility, like promotions.
406 There is strong theoretical evidence that promotions and product display can have a major effect over
407 product adoption (Yin *et al.*, 2009) and such considerations have been supported by practical evidence
408 obtained through manipulative experiments (Chuang *et al.*, 2015; Hurley *et al.*, 2013). The results
409 partially agree with Annunziata and Scarpato (2014), who suggested that an increase in product
410 visibility through displaying and promotional strategies can stimulate the adoption of sustainable
411 products.

412 The results also suggest that price is not always a critical factor in the adoption of local products by
413 consumers, as its marginal effect over consumers' behavior was found to be relatively small. Previous
414 research has found that price is only one of the possible attributes influencing a purchasing decision,
415 and its effect may be offset by other aspects of sustainability that have a stronger leverage over
416 consumers' decisions. For example, it has been suggested that green products may be purchased to
417 maintain status and reputation (Griskevicius *et al.*, 2010), so it can be hypothesized that higher prices
418 do not necessarily constitute a barrier to product adoption, and may even be an incentive.
419 Demographics do not appear to be crucial, with the exception of the age of consumers, which had a
420 small yet significant marginal effect. The results agree with previous evidence on sustainable products
421 such as local food, where the frequency of consumption typically increases with the age of consumers
422 (Feldmann and Hamm, 2015). Interestingly, however, no evidence of the so-called "gender effect" was
423 found, as the sex of respondents was non-significant. These results contradict research suggesting that
424 women evaluate product sustainability more than men in their decision-making (see for instance Luchs
425 and Mooradian, 2012).

426 The study's limitations necessitate further research into various aspects of the interaction between
427 consumers and green products. It must be noticed that this research adopts an intermediate level of
428 specificity, focusing on drivers of sustainable consumption for a wide range of sustainable products,
429 while most of existing studies explored the role of intrinsic and external drivers over purchasing
430 behaviour towards specific goods or over a wide range of pro-environmental behaviors, including those
431 who are not related to consumption. The constructs in the questionnaire, like attitudes, were
432 operationalized according to this selected level of specificity and future research should test the
433 findings from this study by focusing on specific product categories and operationalizing context-
434 specific constructs.

435 Furthermore, as web-based surveys typically under-represent older respondents and consumers
436 belonging to cooperatives might differ from traditional, the data cannot be representative of all Italian
437 consumers, and no inference can be drawn for them. However, as the COOP is the largest Italian
438 retailer with more than eight million members in Central and Northern Italy, accounting for about 25%
439 of the resident population, it is unlikely that only motivated and concerned consumers form its
440 membership. Therefore, future research should test whether any inference could be drawn about
441 consumers in Central and Northern Italy from these COOP members, provided that suitably tailored
442 sampling approaches are adopted. The aim was to test for the effect of various psychological drivers,
443 and the provisioning of information, on consumer behavior, so the sample was suitable for the research
444 goals of this study. Questionnaires and self-reported behavior, are valuable in obtaining evidence
445 countering assumptions about consumerism applied to sustainable products. However, they are not
446 suitable for disentangling complex interactions, nor to elucidate causality between variables. Future
447 studies should address these issues by taking a quasi-experimental approach, through factorial survey
448 experiments (Auspurg and Hinz, 2014; Wallander, 2009). While a fully experimental approach can be
449 hard to implement in consumerism, for ethical and practical reasons, factorial surveys can be
450 reasonably effective at providing insights about relationships and causality between variables. For
451 example, factorial surveys can provide insights into the interaction between environmental concern and
452 the use of ecolabels, as the findings contradict other research on this topic. The use of factorial surveys
453 can also enable researchers to design experiments that account for the interaction between various
454 forms of environmental concern and different types of labels, conveying different types of information.
455 This point is a valuable contribution to the specific research field, as conventional surveys are not an
456 optimal tool to explore these fine-grained interactions.

457 Another approach to investigating the interaction between pre-existing environmental concern and the
458 use of labels could be the use of longitudinal-data analysis about product purchasing. Although
459 approach has traditionally been neglected in environmental consumerism (Panzone *et al.*, 2013),
460 considering consumers' purchasing habits can provide a stable and reliable proxy of their long-term
461 environmental concern. Furthermore, longitudinal data analysis can account for seasonality in product
462 purchasing (Canavari *et al.*; 2002; Pearson *et al.*, 2011; Rööös and Karlsson, 2013), an issue that was
463 impossible to explore with the cross-sectional data of this study, that were collected over only one
464 month.

465 Finally, it is recommended that future research addresses the issue of social desirability (Fisher, 2000;
466 Kreuter *et al.*, 2008; Krumpal, 2013) in environmental consumerism and pro-environmental behavioral
467 science. This study, like the majority of those in social sciences, is based on self-reports. Pro-
468 environmental social norms are becoming more integrated into contemporary society, at least among
469 certain segments of the population (Félonneau and Becker, 2008; Kanchanapibul *et al.*, 2014;
470 Thøgersen and Ölander, 2002), so it is reasonable to assume that this may lead to an increase in social
471 pressure about the environmental impact of specific lifestyles, and ultimately to under- or over-
472 reporting pro-environmental attitudes and behavior.

473

474 **6. Conclusions**

475 The objective of this study was to investigate the effect of information-related drivers on the frequency
476 of the purchasing of green products, by using data from a cross-sectional survey carried out over a large
477 sample of Italian consumers' cooperatives. The findings contribute to the literature in several ways.

478 First, this work provides a valuable contribution about the role of information in the theoretical
479 framework of consumer behaviour, suggesting that the inclusion of elements about consumer's
480 previous ecological knowledge and use of information can increase the predictive power of theoretical
481 frameworks. The findings on the importance of labels as drivers of consumer's attitudes agree with
482 research demonstrating their effectiveness in fostering positive attitudes.

483 Second, the study emphasizes the effect external factors can have over consumers' attitudes. Labels
484 influence consumers' pro-environmental attitudes, but they do not recognize any particular role of
485 informative campaigns. The use of labels thus depends on the level of environmental concern held by
486 consumers: it could be advanced that labels can be effective in engaging unconcerned or mildly
487 concerned consumers, while they lose their effect when environmental concern is already high.
488 Furthermore, consumers appear to perceive the multi-dimensionality of product sustainability and
489 recognize that the ethical aspects of production have an important influence over their evaluation of
490 sustainable products.

491 Third, the study confirms the noticeable effect of attitude on consumers' purchasing frequency, and
492 thus confirms one of the cornerstones of the significant theories on predicting purchasing behavior,
493 such as the Norm Activation Model, the Value-Belief-Norm theory and the Theory of Planned
494 Behavior. However, the study also demonstrates that a complex interaction between previous
495 environmental knowledge and the use of green labels are driving forces of these attitudes.

496 This work can provide useful suggestions to policy makers and retailers. Instead of profiling "green"
497 consumers only according to their demographics or, taking into account the basis of how they access
498 and integrate information in product evaluation would greatly help sustainable marketing. This
499 approach is common in areas that depend on pro-environmental behavior, such as food and health, and
500 it would enable communication campaigns and labelling to be tailored towards specific segments of the
501 populations.

502
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783 **TABLES**

784 Table 1. Model variables: descriptive statistics and

Variable name	Introductory statement	Questions	Measurement	Type of variable	Hypothesis
Dependent variables					
Attitudes towards green products	Please rate the importance the following aspects of the product life cycle have in determining your purchase choices and decisions	Quantity and kind of packaging	5-points Likert scale from 'Not important at all' to 'Very important'	Continuous variable (mean = 0.024, sd = 0.009), obtained by factor analysis (Cronbach's alpha = 0.73).	H ₁
		Possibility of waste disposal and packaging reuse			
		Environment of reused or recycled material for the good production			
		Environmental impact of the production process (e.g water consumption, pesticide usage, air emissions			

		etc...)			
		Distance between production site and retailer			
		Number of stages in the production chain (from the producer to the consumer)			
Purchasing of sustainable products	How often do you purchase the following kinds of product?	Organic food	4-points Likert scale from 'Never' to 'Always'	Continuous variable (mean = 0.030, sd = 0.009), obtained by factor analysis (Cronbach's alpha = 0.71).	H ₁
		Local food			
		Seasonal food			
		Clothing made of natural and certified textile			
		Electrical and electronic device (like household electrical appliances) with the lowest power consumption			
		Household cleaning product with a low environmental impact			
		Ecologic paper			
Eco-friendly furniture					
Independent variables					
Environmental concern	Which of the following issues are you most concerned about?	Climate change	Dichotomous variable	Aggregation through sum of the single questions	H ₃
		Air pollution			
		Water pollution			
		Waste production (e.g packaging)			
		Resource			

		consumption			
		None			
Importance given to ecological labels and certifications	Please rate the importance the following environmental, social quality, guarantee and traceability brands have in determining your purchase choices and decisions	Organic brand	5-points Likert scale from 'Not important at all' to 'Very important'	Continuous variable (mean = 0.038, sd = 0.009), obtained by factor analysis (Cronbach's alpha = 0.78).	H ₂ , H ₃
		Forest certifications (FSC or PEFC)			
		Eco-label			
		Energy label			
		Packaging label			
		Fair trade brands			
		Environmental Product Declaration (EPD)			
		Certified geographical indication (e.g DOP, IGT, DOC, Made in Italy)			
Importance assigned to communication campaigns	In your opinion which of the following instruments and strategies of communication/information used by Coop have been most effective at raising a general awareness about sustainability?	Radio advertisement	5-points Likert scale from 'Not important at all' to 'Very important'	Continuous variable (mean = 0.09, sd = 0.011), obtained by factor analysis (Cronbach's alpha = 0.79).	H ₄
		Tv advertisement			
		Daily newspaper advertisement			
		Magazines advertisement			
		Eco-consumerist information campaign			
		Communication on the web			
		Communication on magazines for members			
Product quality	Please rate on a scale of 1 to 10 (with 1 being "little" and 10 "very much") the influence the following aspects have on the choice of the product you purchase	Quality of the product	10-points rating scale, from 'Little' to 'Very much'	Continuous variable (mean = 9.07, sd = 0.015)	-
Trust in the retailer	-	Safety of the product	10-points rating scale, from 'Little' to 'Very much'	Continuous variable (mean = 7.73, sd = 0.02)	-
Product safety	-	Safety of the product	10-points rating scale, from 'Little' to 'Very much'	Continuous variable (mean = 8.70, sd = 0.018)	-

			much'		
Ethical aspects of production	-	Ethical and social side of the product	10-points rating scale, from 'Little' to 'Very much'	Continuous variable (mean = 7.59, sd = 0.022)	-
Perceived availability of sustainable products	Do you have any difficulty in finding eco-friendly products in Coop stores?	-	5-points Likert scale from 'No difficulty' to 'Very high difficulty'	Continuous variable (mean = 3.41, sd = 0.013)	H ₅
Importance assigned to in-store promotions	How effective do you consider the different ways of promoting low environmental impact products in Coop stores?	Discount and promotion	5-points Likert scale from 'Not effective at all' to 'Very effective'	Continuous variable (mean = 0.023, sd = 0.011), obtained by factor analysis (Cronbach's alpha = 0.79).	H ₆
		Selection of recommended products			
		Assisted sale			
Product price	Please rate on a scale of 1 to 10 (with 1 being "little" and 10 "very much") the influence the following aspects have on the choice of the product you purchase	Price	10-points rating scale, from 'Little' to 'Very much'	Continuous variable (mean = 7.77, sd = 0.02)	-
Product brand	Please rate on a scale of 1 to 10 (with 1 being "little" and 10 "very much") the influence the following aspects have on the choice of the product you purchase	Product brand	10-points rating scale, from 'Little' to 'Very much'	Continuous variable (mean = 5.61, sd = 0.03)	-
Respondent's age	-	1	Open-ended	Continuous numeric variable	-
Respondent's sex	-	1	Cross-mark question	Dichotomous	-
Respondent's level of education	-	1	Cross-mark question	Ordinal variable	-

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Table 2. Pearson's correlation test of predictors for each stage of the model

	Env.concern	Certifications	Communication	Product quality	Trust retailer	Safety	Ethics
Env. concern	1						
Certifications	0.08	1					
Communication	0.02	0.14	1				
Product quality	0.04	0.11	0.05	1			
Trust retailer	0.02	0.14	0.09	0.31	1		
Safety	0.04	0.20	0.06	0.53	0.49	1	
Ethics	0.07	0.34	0.11	0.31	0.32	0.39	1

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	Env.concern	Certifications	Communication	Product quality
Importance of promotions	1			
Perceived availability	0.19	1		
Product price	0.02	0.03	1	
Product brand	0.04	0.04	0.14	1

Table 3. Output of the two-stage OLS: coefficients of predictors and indexes of fitness.

First stage: OLS regression on attitudes towards green products, with White correction and 100 Bootstrap replications						
Variable	Symbol	Coef	S.E	t	95% C.I	
					Lower	Upper
Constant	α_1	0.027***	0.0076	3.54	0.012	0.042
Environmental concern	β_{1Fs}	0.059***	0.0078	7.50	0.043	0.074
Importance given to ecological labels and certifications	β_{2Fs}	0.28***	0.009	3.27	0.26	0.29
Importance assigned to communication campaigns	β_{3Fs}	0.026***	0.0076	3.47	0.011	0.041
Product quality	β_{4Fs}	-0.012	0.010	-1.24	-0.032	0.0072
Trust in the retailer	β_{5Fs}	-0.0019	0.0096	-0.20	-0.021	0.017
Product safety	β_{6Fs}	0.0089	0.11	0.80	-0.013	0.031
Ethical aspects of production	β_{7Fs}	0.168***	0.010	16.48	0.15	0.19
(Environmental concern : Importance of labels)	β_{8Fs}	-0.032***	0.0080	-4.02	-0.048	-0.016
N = 7627	F = 263.21	Prob > F = 0.00	Root MSE = 0.66	Moderator effect of 'Environmental Concern'		
				R ²		Likelihood ratio test
				Full model	Model without 'Environmental	

					concern'		
				0.26	0.25	p-value = 0.002	
Second stage: OLS regression on green product purchasing, with White correction and 100 Bootstrap replications							
Variable	Symbol	Coefficient	S.E	z	95% C.I		
					Lower	Upper	
Constant	α_{1s}	-0.204***	0.045	-4.54	-0.29	-0.12	
Attitudes towards green products	β_{1s}	0.870***	0.02	34.20	0.82	0.92	
Sex	β_{2s}	0.007	0.016	0.48	-0.023	0.039	
Level of education	β_{3s}	-0.049***	0.009	-5.15	-0.068	-0.030	
Age	β_{4s}	0.100***	0.007	13.88	0.086	0.11	
Perceived availability of sustainable products	β_{5s}	0.052***	0.008	6.76	0.037	0.068	
Instore promotions	β_{6s}	0.050***	0.009	5.76	0.034	0.068	
Product price	β_{7s}	-0.053***	0.009	-6.00	-0.071	-0.36	
Product brand	β_{8s}	-0.028***	0.009	-3.14	-0.046	-0.011	
(Instore promotions : Availability	β_{9s}	0.019*	0.008	2.29	0.0028	0.036	
N=7627	Wald $\chi^2 = 2113.99$	Prob > $\chi^2 = 0.000$	Root MSE = 0.66	Moderator effect of 'Promotions'			
				R ²		Likelihood ratio test	
				Full model		Model without 'Promotions'	
				0.26	0.25	p-value = 0.0007	

798 †p<0.1; *p<0.05; **p<0.01; ***p<0.001

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800 Equation 1. Formula of the two stage OLS model.

801 Attitudes towards green products $\sim \alpha_1 + \beta_1$ Environmental concern + β_2 Importance given to
802 ecological labels and certifications + β_3 Importance assigned to communication campaigns + β_4
803 Product quality + β_5 Trust in the retailer + β_6 Product safety + β_7 Ethical aspects of production+
804 + β_8 (Environmental concern * Importance given to ecological labels and certifications) + ϵ_i

805 Green product purchasing $\sim \alpha_2 + \beta_9$ Attitudes towards green products + β_{10} Respondent's sex + β_{11}
806 Respondent's level of education + β_{12} Respondent's age + β_{13} Perceived availability of sustainable
807 products + β_{14} Importance assigned to instore promotions + β_{15} Product price + β_{16} Product
808 brand + β_{17} (Importance assigned to instore promotions * Perceived availability of sustainable
809 products) + ϵ_i

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