LIFE MAGIS
MAde Green in Italy Scheme

# GREEN CONSUMER BEHAVIOUR: INSIGHTS FROM SURVEY AND EXPERIMENTS

Sant'Anna School of Advanced Studies – Management Institute

June 2020

Action A1

The LIFE MAGIS project has received funding from the LIFE Programme of the European Union.

Authors:
Prof. Francesco Testa – f.testa@santannapisa.it
Prof. Fabio Iraldo – f.iraldo@santannapisa.it
Dr. Guia Bianchi – gu.bianchi@santannapisa.it
Dr. Vinicio di Iorio – v.diiorio@santannapisa.it
Dr. Roberta Iovino – r.iovino@santannapisa.it
Dr. Felipe Vizzoto – f.vizzoto@santannapisa.it

## SUMMARY


Introduction ..... 7

I. Consumers as agents of change ..... 7

II. A greener market ..... 7

III. A greener consumer ..... 8

IV. Environmental intentions and actual behaviour ..... 9

1. The Survey across European Countries ..... 11

1.1. Methodology ..... 11

1.1.1. Setting the context ..... 11

1.1.2. Survey design ..... 11

1.1.3. Sample description ..... 13

1.2. Purchasing and post-purchasing intentions ..... 16

1.2.1. Purchasing behaviour ..... 16

1.2.2. Post-purchasing behaviour ..... 20

1.3. Psychographic dimensions ..... 23

1.3.1. Other types of pro-environmental behaviours ..... 23

1.3.2. Consumer identity ..... 27

1.3.3. Environmental concern ..... 31

1.3.4. Perception of self-effectiveness ..... 32

1.4. Trust and greenwashing ..... 35

1.4.1. General trust ..... 35

1.4.2. Trust towards self-declared product claims ..... 37

1.4.3. Trust towards third-party certified product claims ..... 39

1.4.4. Greenwashing ..... 40

1.5. Eco-labels ..... 43

1.5.1. Consumer knowledge ..... 43

1.5.2. Awareness and involvement ..... 44

1.5.3. Credibility ..... 46

1.5.4. Design and visibility ..... 48
1.5.5. Private benefits ..... 49
1.5.6. Persuasiveness ..... 51
1.5.7. Summary about eco-labels ..... 52
1.6. Information on green products ..... 54
1.6.1. Knowledge about life cycle ..... 54
1.6.2. Information seeking ..... 56
1.6.3. Information format preferences ..... 58
1.7. Relations among the variables ..... 60
1.8. Conclusions ..... 61
References (Section 1) ..... 62
2. The experimental study ..... 66
2.1. Context ..... 66
2.2. Experimental Design ..... 67
2.3. Different logics behind the decisions ..... 71
2.3.1. Irrational decisions ..... 71
2.3.2. Rational decisions ..... 71
2.4. Results ..... 72
2.4.1. Sample description ..... 72
2.4.2. Environmental profile choices and its determinants ..... 72
2.4.3. Trade-off behaviour ..... 76
2.5. Conclusions ..... 78
References (Section 2) ..... 79
Appendix A – The Questionnaire ..... 80
Appendix B – Correlation matrix ..... 92

## INDEX OF FIGURES

Figure 1. Purchasing behaviour ..... 17
Figure 2. Life cycle purchasing behaviour by sub-themes ..... 18
Figure 3. Life cycle purchasing behaviour by country ..... 19
Figure 4. Post-purchasing behaviour ..... 20
Figure 5. Life cycle post-purchasing behaviour by sub-themes ..... 21
Figure 6. Life cycle post-purchasing behaviour by country ..... 22
Figure 7. Other types of pro-environmental behaviours ..... 24
Figure 8. Other pro-environmental behaviours ..... 25
Figure 9. Other behaviours by country ..... 26
Figure 10. Consumer identities ..... 28
Figure 11. Consumer identities (total) ..... 29
Figure 12. Consumer identities by country ..... 30
Figure 13. Environmental concern ..... 31
Figure 14. Environmental concern by country ..... 32
Figure 15. Perceived self-effectiveness ..... 33
Figure 16. Perceived self-effectiveness by country ..... 34
Figure 17. Level of general trust ..... 36
Figure 18. Level of general trust by country ..... 37
Figure 19. Trust towards self-declared product claims on packaging (total) ..... 38
Figure 20. Trust towards self-declared product claims on packaging by country ..... 39
Figure 21. Trust towards third-party certified product claims on packaging ..... 39
Figure 22. Trust towards third-party certified declarations on product declarations ..... 40
Figure 23. Greenwashing beliefs (total) ..... 41
Figure 24. Greenwashing beliefs by country ..... 42
Figure 25. Self-reported knowledge of eco-labels ..... 44
Figure 26. Self-reported knowledge about eco-labels by country ..... 44
Figure 27. Awareness and involvement with eco-labels ..... 45
Figure 28. Awareness and involvement with eco-labels ..... 46
Figure 29. Credibility of eco-labels ..... 47
Figure 30. Credibility of eco-labels ..... 48
Figure 31. Design and visibility ..... 48
Figure 32. Design and visibility of eco-labels ..... 49
Figure 33. Private benefits ..... 50
Figure 34. Private benefits of eco-labels ..... 50
Figure 35. Persuasiveness of eco-labels ..... 51
Figure 36. Persuasiveness of eco-labels ..... 52

Figure 37. Sub-dimensions of eco-labels ..... 53
Figure 38. Self-reported knowledge on life cycle ..... 55
Figure 39. General knowledge about life cycle studies ..... 56
Figure 40. Information seeking by consumers ..... 57
Figure 41. Information seeking (total) ..... 57
Figure 42. Information seeking by country ..... 58
Figure 43. Environmental information format preferences ..... 59
Figure 44. Different brands of coffee presented to participants to rate quality and rank. ..... 67
Figure 45. Representation of the environmental profiles presented to the participants using Standard LCA communication style and "Water only" missing info-pattern. ..... 68
Figure 46. Representation of the trade-off question using the "year vs. year" communication style and the "CO2 only" missing information pattern. ..... 69
Figure 47. Representation of the second trade-off question using the "Units converted to daily life references" communication style and the "Non-renewable energy only" missing information pattern. ..... 70
Figure 48. Distribution of answers and average ranking given to each EP by Cartesians, Gamblers and All rational respondents (Cartesians + Gamblers). ..... 73
Figure 49. Ranking of the missing-info profile (EP6) across different missing-patterns for Cartesians (a) and Gamblers (b). ..... 74
Figure 50. Share of respondents' logic by communication style ..... 74
Figure 51. Average ranking given to each of the EPs by communication style for all rational respondents (Cartesians + Gamblers) ..... 75

## INDEX OF TABLES

Table 1. Sample description ..... 15
Table 2. Comparison between sample and referential population ..... 72
Table 3. Proportion of the respondents that would change their initial choices (product ranked 1st with EP ranked 6th) by each combination of alternative product and environmental profile. ..... 76
Table 4. Proportion of the respondents that would change their initial choices (if the alternative product(s) offered a discount) by each combination of alternative product and environmental profile. ..... 77
Table 5. Average discount required to change initial choice (when it has the best ranked environmental profile) for each combination of alternative product and environmental profile. ..... 77

# INTRODUCTION

## I. CONSUMERS AS AGENTS OF CHANGE

We are currently facing serious environmental problems such as climate change, reduction in biodiversity, air pollution, water contamination, and crop toxicity to name but a few. The causes of these problems are, at least in part, related to human behaviour (Steg and Vlek, 2009; Thøgersen et al., 2016). Inequality, as well as unsustainable production and consumption patterns, and growing demand for natural resources have contributed to deteriorate the planet at an increasing rate (UNEP, 2019).

Nowadays, the increasing tendency is to acknowledge the role of consumers in the transition towards a healthy planet and economy. The awareness of a relationship between purchases and environmental protection requires a critical change in food and consumption habits to promote a more sustainable society (Cohen et al., 2005; Munksgaard et al., 2005). In this respect, consumers can contribute through their choices to lessen their impacts on the planet by adopting a greener behaviour (Steg et al., 2014), and influence the supply of environmentally-friendly products. Not only do consumers influence firms over what product they make, but most importantly through their choices they can influence how these products are made. For example, they can choose paper products that use only recycled pulp; organic cotton t-shirts that do not employ child labour in their supply chains; refillable shampoo bottles.

Furthermore, the role of consumers is paramount to shift to a greener economy, as the environmental impacts of products greatly depend on them in two phases of the product life cycle, i.e. in the use and disposal phases. For these reasons, we refer to consumers as "agents of change".

Expectations are growing towards more sustainable products and towards the behaviour of businesses that are increasingly asked to pay attention to materials, processes, and other factors that may affect nature and their surrounding communities and environment. A survey administered in 2015 by Nielsen demonstrates how sustainability is playing an increasingly significant role in consumer decision-making (Nielsen, 2015). By contacting approximately thirty thousand respondents worldwide, as many as 45% of them said they prefer products with reduced environmental impacts. A 2015 Eurobarometer study with 28,910 respondents revealed that the environmental impact of products affects purchasing decisions for 55% of consumers (Eurobarometer, 2014).

## II. A GREENER MARKET

A green product is essentially a product made without the use of particular chemical substances, where priority is given to recycled raw materials, with packaging that minimizes the impact on the environment. Products that abide to the afore definition are increasingly common and in demand by consumers. As a

result, green products are becoming abundant in many sectors of our economy as consumer demand in on the rise.

The most significant example lies in the sky-rocketing sales of organic foodstuff. European sales report for 2014 showed that the organic market has significantly grown, confirming the trends already recorded in the past. In retail sales, organic products were valued at around 26.2 billion euros with a growth rate of 7.6% compared to 2013. Europe confirms that it is following the trends of consumers who are most sensitive to environmental issues, especially in some central and northern countries: 80% of European consumers buy green products and 26% do it regularly (European Commission, 2013). Sales of environmentally-labelled products in the food and beverage sectors have taken off. Confirming this trend, the data on organic products in Italy and France constitutes a market of almost 3.3 billion euros in 2016 with an increase of 5.8% compared to the previous year (European Commission, 2017). Furthermore, the growing interest for green products goes beyond the food sector. Another positive example is organic cosmetics, a well-defined market sector in which the demand for cosmetics with reduced environmental impact continues to grow. Cosmetica Italia, in 2016, declared that the offer of cosmetics in Italy involved 3215 products and represented 48% of consumption. Moreover, the green turnover of Italian companies is estimated at 950 billion euros, equal to 9% of the total Italian cosmetic turnover.

## III. A GREENER CONSUMER

Numerous studies have tried to draw a profile of the green consumer. In the past sustainable consumption choices could be associated to gender, economic availability, and education levels (Ottman, 1995). However, nowadays it is more difficult to link this type of behaviour to the socio-economic characteristics of consumers as other factors, and trends, come into play, alongside the increasing presence and advertising for green products.

This opens up a further problem for consumers, namely the difficulty of choosing products and brands that do have the reduced environmental impacts that they claim to have. Differing from manufactures, consumers often lack the necessary information to assess the environmental characteristics of products.

The impossibility of consumers to be fully aware of the environmental attributes of products or brands leads to an asymmetric distribution of information (King et al., 2005). Such asymmetry can harm both consumers and producers, and society as a whole (Akerlof, 1970). This may be due to the subsequent creation of market inefficiencies (Alchian and Demsetz, 1972), where consumers are no longer capable of identifying green products and distinguishing them from traditional ones, thus making it more difficult to identify the real environmental benefits of such products (Chen and Chang, 2012; Mishra et al., 1998). This outcome is problematic for consumers because it leads to sub-optimal purchasing decisions, in particular

for people who would prefer to buy products with reduced environmental impacts (Darnall and Aragon-Correa, 2014).

## IV. ENVIRONMENTAL INTENTIONS AND ACTUAL BEHAVIOUR

Although previous research indicates that consumers have a positive attitude towards environmental protection (Arvola et al., 2008; Ellen et al., 2006; Liu et al., 2012; Vermeir and Verbeke, 2006), it often failed to translate into a change in behaviour. Many studies revealed that environmentally responsible consumers are only a minority of total consumers (Awad, 2011; Gilget al., 2005; Hustvedt and Dickson, 2009; Moon et al., 2013) and that such consumption patterns still represent only a niche sector (Ottman et al., 2006; Kang et al., 2013). Although the number of individuals who declare to be willing to buy green products has increased over the years, there is still little evidence about the increase of green consumption at the global level.

In spite of growing concerns for the most salient environmental issues such as climate change, depletion of natural resources, and marine pollution, paired with positive consumer attitudes towards sustainability and green products, the market share of consumption with reduced environmental impacts remains limited to only 1 -3% of the entire global market (Bray et al. 2011).

This suggests that environmental considerations play only a secondary role in purchasing decisions (Mohr et al. 2001).

In the context of research on green consumer behaviour, a gap has been highlighted between the favourable attitudes expressed by consumers and their actual purchasing practices (Tanner and Wölfing Kast, 2003; Vermeir and Verbeke, 2006). The above mentioned Nielsen report (2015) found a significant gap between the percentage of consumers who wanted greener products (26%) and those who said they had actually bought them (10%). Another example comes from the fashion sector where a positive consumer attitude towards environmental protection emerged, yet it has rarely translated to increased eco-friendly sales in the same sector (Solomon and Rabolt, 2004; Niinimaki, 2010).

The discrepancy between the positive attitude of consumers towards green products and actual purchases of such products is thus a phenomenon which needs further attention.

Green purchasing behaviour has been the subject of numerous studies which involved different and complex factors. Ecological purchasing has often been analysed with reference to motivational factors that influence consumer behaviour (Ramayah et al., 2010). Other studies have focused on the impact of ethical values and cultural changes (Vermeir and Verbeke, 2006; Wheale and Hinton, 2007; Lehner et al., 2011; Crompton, 2010). While other researchers focused on more practical factors: higher prices and scarce availability of green products could act as obstacles to green purchasing behaviour. However, consumer

perceptions of price and availability may vary according to the context, e.g. green products displacement inside the store and in-store communication (Barbarossa and Pastore, 2014).

Despite numerous attempts to understand the reasons that influence consumer choices, the reasons why consumers engage in green behaviour as part of a more sustainable lifestyle is still missing. With this important reflection in mind, our goal is to shed some light on the factors that may promote or hinder green consumer purchasing behaviour. Moreover, our research would not be complete if we did not investigate also post-purchasing behaviour. In fact, **how consumers use and consume their products has important implications on the total environmental impacts of products over their life cycle.**

We carried out two type of studies:

- First, we conducted a **questionnaire based survey** across 5 European Countries in order to assess the baseline about consumer green behaviour and identify the main factors that can influence consumers towards purchasing green products and using them responsibly after their purchase;
- Second, we conducted **an experimental study**, exploring the consumer preferences and choices in a simulated purchasing setting.

We describe the insights from the survey and the experiment respectively in the *section 1* and in the *section 2* of this report.

# 1. THE SURVEY ACROSS EUROPEAN COUNTRIES

## 1.1. METHODOLOGY

### 1.1.1. Setting the context

To fulfil our research aims, we developed a questionnaire based survey in order to assess consumer green behaviour and identify the relative importance of factors that influence consumers towards purchasing green products and using them responsibly after their purchase.

In order to gather meaningful results, we conducted our research in five countries within the European Union, namely France, Germany, Italy, Spain, and United Kingdom. They are the five most populated nations in Europe, accounting for about 280 million out of 513 million people (Eurostat), almost more than half of the overall European population. Moreover, although they represent the biggest markets of the Continent, there are remarkable differences in terms of culture, habits and consumption patterns among them. For instance, Mediterranean countries share common or similar social habits which greatly differ from northern countries. The variety of socio-cultural aspects of those countries, combined with their magnitude in terms of market size and population, make these countries exceptional candidates to investigate our research objectives.

### 1.1.2. Survey design

In order to investigate the most relevant factors influencing green purchasing and post-purchasing behaviour, a questionnaire-based survey represents one of the most effective tool to collect information in the most objective and reliable way.

The questionnaire used in this study was divided into five sections. The first section had the objective of introducing respondents to the subject under analysis. In this section, respondents were asked to rate how often they engage in green product purchasing and in green post-purchasing behaviour. Regarding green products, questions referred mainly to the food and detergent sectors. These are likely to represent repeated purchases (Leong, 1993) and low-involvement products (Bauer et al., 2006), which may increase the propensity for consumers to use mental short-cuts (Gigerenzer et al., 1999).

The second set of variables investigated in our questionnaire relates to the psychographic variables, such as knowledge on product life cycle; environmental concern; other environmental behaviours; perceived consumer efficacy; consumer identity, and novelty seeking.

A third cluster of variables concentrated on products. For this reason, we can divide this cluster in two parts: one part is dedicated to consumer trust in environmental information on product packaging; while another on eco-labels. First, we focused on general aspects such as: consumer trust, trust towards self or third-party certified labels; and suspicion of greenwashing. Instead, in the second part, our aim was to test respondents on several dimensions related to ecolabels such as: self-reported knowledge; awareness and involvement; credibility; design and visibility; perceived private benefits; and persuasiveness of eco-labels.

In the fourth category of variables, we focused on consumer behaviour for what concerns their own judgement and information assessment. As such, we investigated: knowledge on life cycle; information seeking and information format preferences.

Finally, we included a final section on socio-economic characteristics, including: gender, age, number of inhabitants, family size, income and education levels.

This study was specifically designed in order to avoid the most recurring errors in quantitative data collection and analysis. First, in order to reduce sampling error, we recruited an external provider with the aim of sending out the questionnaire and reaching a broader sample in our targeted locations. For each of the five countries involved in our study, the provider selected a sample of one thousand people in each country involved in the survey, for a total number of five thousand questionnaires submitted. Of those, 4161 questionnaires were completely filled and sent back. This meant that we reached 83% response rate. All the representativeness parameters of the sample that we set a priori were satisfied: gender, age range, and geographical distribution. Moreover, the sample guaranteed a 95% interval of confidence, and a confidence level of 3,5%.

In addition, the structure of the questionnaire aims to minimize the systematic error that occurs when people respond to a survey. Errors can be caused by several factors such as misunderstanding the question or trying to comply with the aim of the researchers. Specifically, some distortions may occur when people are asked to report on their own perceptions, attitudes, and behaviours. Respondents may unconsciously try to appear consistent and rational in their choices.

In order to minimize the common source method bias, we separated items belonging to the same constructs or concept and located in different places through the questionnaire, to prevent people from making inferences among questions; we used different scale formats with different anchors, such as five point Likert scale, seven point Likert scale; semantic differential scale; true or false; ranking scales; and multiple choice questions.

### 1.1.3. Sample description

The questionnaire was submitted from the end of February 2020 to the beginning of March 2020 and a total of 4161 usable questionnaires were collected. These are equally distributed among the five different countries included in our sample. The targeted respondents are a random sample of citizens, from 18 to 75 years old, living in five European countries: France, Germany, Italy, Spain, and United Kingdom. The representativeness of our sample was cross-checked against available data on the Eurostat website.

Gender is equally distributed across all the countries. As additional evidence, we took into account data about gender distribution from Eurostat sources, with the aim to compare our sample with the overall population of the European Member States and United Kingdom and country by country. Eurostat data confirm the evidences of the sample, with a maximum variation of 1% of the gender proportion between in the sample and the overall population.

In the same way, we examined the distribution of the age classes of the sample, and we compared them with those detected by Eurostat. The distributions of the sample are almost identical. UK is confirmed both in the sample and overall (by Eurostat), the nation with the highest percentage (13.26%) of *millennials* (that we identified as those belonging to the 18-24 age group; i.e. those born between 1990 and 2010). The impact of *millennials* is undoubtedly relevant for this study, because they are the generation with a greater sensitivity towards environmental issues, as demonstrated by previous researches. On the contrary, *baby boomers* (that we identified as those belonging to the age group 55-70) represent the largest percentage of the population, with hit recorded in Germany (30.78% of the population of the sample). Eurostat data confirm this evidence: Germany, is the country with the highest percentage of baby boomers (31.47% over the total population). Regarding the size of the cities, the large majority of the respondents from France comes from cities smaller than 100k inhabitant. The figures perfectly suit the morphology of the nations examined: France has a vast number of small towns and just few cities with a large population.

In Germany, families consisting of two people or a single person are more numerous than those with multiple family members (61% of the population of the sample). As the number of the family increases, these kind of families are less and less. By contrast, in Italy, families composed by a single person are very rare (8%) but the majority of the population is made up of families ranging from 2 to 4 members (82%).

The data on the distribution of wealth are encouraging: it looks almost well distribute among the citizens. Technically, we are allowed to state that wealth is “normally distributed” among the nations and within each country: with a percentage that ranges from 37,59% (UK) to 53,39% (Spain), the middle-class is the largest cluster of people in all the five countries examined. Indeed, both those who declare to be "very high" in status and those who declare to be "very low" in status are the minorities, but there are some differences even there. Indeed, regarding “very high” status, the wider gap is between Italy (0,24% of the population of the sample) and Germany (3,58% of the population of the sample). By contrast, in the “very

low" status the larger gap exists between Germany (0,99% of the population of the sample) and France (5,1% of the population of the sample). To sum it up, we can imply that Germany is the first ranked in the EU list about wealth, because it is the country with the smaller percentage of "very low" status citizens and the larger percentage of "very high" status citizens among the countries.

Finally, we can notice that the average level of education is relatively high: in every single country, high school graduated represent the larger group, with the exception of Germany, where proportionately there are more people with a middle school diploma.

| | | Spain | | Germany | | France | | UK | | Italy | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Demographic variable | Characteristics | N. | % | N. | % | N. | % | N. | % | N. | % |
| Gender | Men | 413 | 48,25 | 412 | 50,93 | 395 | 47,94 | 392 | 47,69 | 410 | 48,24 |
| | Women | 443 | 51,75 | 397 | 49,07 | 429 | 52,06 | 430 | 52,31 | 440 | 51,76 |
| Age class | 18-24 | 85 | 9,93 | 89 | 11 | 104 | 12,62 | 109 | 13,26 | 87 | 10,24 |
| | 25-34 | 143 | 16,71 | 150 | 18,54 | 150 | 18,2 | 167 | 20,32 | 134 | 15,76 |
| | 35-44 | 194 | 22,66 | 145 | 17,92 | 158 | 19,17 | 155 | 18,86 | 171 | 20,12 |
| | 45-54 | 199 | 23,25 | 176 | 21,76 | 167 | 20,27 | 169 | 20,56 | 203 | 23,88 |
| | 55-70 | 235 | 27,45 | 249 | 30,78 | 245 | 29,73 | 222 | 27,01 | 255 | 30 |
| Size of the city | <10k | 102 | 11,92 | 184 | 22,74 | 314 | 38,11 | 162 | 19,71 | 177 | 20,82 |
| | 10k-30k | 151 | 17,64 | 154 | 19,04 | 165 | 20,02 | 197 | 23,97 | 181 | 21,29 |
| | 30k-100k | 178 | 20,79 | 164 | 20,27 | 162 | 19,66 | 181 | 22,02 | 224 | 26,35 |
| | 100k-250k | 144 | 16,82 | 92 | 11,37 | 87 | 10,56 | 105 | 12,77 | 102 | 12 |
| | 250k-500k | 103 | 12,03 | 72 | 8,9 | 30 | 3,64 | 57 | 6,93 | 39 | 4,59 |
| | >500k | 178 | 20,79 | 143 | 17,68 | 66 | 8,01 | 120 | 14,6 | 127 | 14,94 |
| Family members | 1 | 57 | 6,66 | 211 | 26,08 | 123 | 14,93 | 148 | 18 | 68 | 8 |
| | 2 | 192 | 22,43 | 285 | 35,23 | 240 | 29,13 | 254 | 30,9 | 209 | 24,59 |
| | 3 | 253 | 29,56 | 158 | 19,53 | 177 | 21,48 | 185 | 22,51 | 257 | 30,24 |
| | 4 | 263 | 30,72 | 92 | 11,37 | 177 | 21,48 | 155 | 18,86 | 240 | 28,24 |
| | 5+ | 91 | 10,63 | 63 | 7,8 | 107 | 12,99 | 80 | 9,74 | 76 | 8,95 |
| Income | Very high | 12 | 1,4 | 29 | 3,58 | 19 | 2,31 | 25 | 3,04 | 2 | 0,24 |
| | High | 20 | 2,34 | 41 | 5,07 | 33 | 4 | 22 | 2,68 | 14 | 1,65 |
| | Middle-high | 133 | 15,54 | 136 | 16,81 | 114 | 13,83 | 86 | 10,46 | 100 | 11,76 |
| | Middle | 457 | 53,39 | 370 | 45,74 | 367 | 44,54 | 309 | 37,59 | 421 | 49,53 |
| | Low-middle | 169 | 19,74 | 139 | 17,18 | 167 | 20,27 | 216 | 26,28 | 204 | 24 |
| | Low | 49 | 5,72 | 54 | 6,67 | 70 | 8,5 | 88 | 10,71 | 73 | 8,59 |
| | Very low | 10 | 1,17 | 8 | 0,99 | 42 | 5,1 | 28 | 3,41 | 23 | 2,71 |
| | Not specified | 6 | 0,7 | 32 | 3,96 | 12 | 1,46 | 48 | 5,84 | 13 | 1,53 |
| Education | Elementary school or no education | 19 | 2,22 | 39 | 4,82 | 18 | 2,18 | 25 | 3,04 | 2 | 0,24 |
| | Middle school | 94 | 10,98 | 378 | 46,72 | 79 | 9,59 | 74 | 9 | 91 | 10,71 |
| | High school | 293 | 34,23 | 206 | 25,46 | 392 | 47,57 | 362 | 44,04 | 487 | 57,29 |
| | Bachelor's degree | 337 | 39,37 | 127 | 15,7 | 213 | 25,85 | 275 | 33,45 | 216 | 25,41 |
| | Master's degree or PhD | 113 | 13,2 | 59 | 7,29 | 122 | 14,81 | 86 | 10,46 | 54 | 6,35 |

**Table 1. Sample description**

## 1.2. PURCHASING AND POST-PURCHASING INTENTIONS

The role of individuals has been increasingly highlighted in order to shift towards a greener economy. Individuals can lessen their impacts on the planet by adopting a greener behaviour through their purchasing choices (Steg et al., 2014). In line with this, the need to produce more environmentally-friendly products to consume is at the heart of the recent Circular Economy Action Plan whereby businesses are encouraged to "offer, and to allow consumers to choose, reusable, durable and repairable products" (European Commission, 2020; p. 8). Ensuring sustainable production and consumption is also one of the seventeen Sustainable Development Goals (or SDGs) launched in 2015 by the United Nations (UN, General Assembly, 2015). As can be noted, the focus on consumers as agents of change is both aimed at influencing their purchasing intentions, and the way they consume and dispose of their products, what it is usually referred to as post-purchasing intentions, such as using responsibly, recycling, reusing, etc.

While in the literature purchasing intentions of consumers have been widely investigated, post-consumption intentions have received less attention. Yet, from a circular economy perspective knowing how consumers interact with their products both in the use and disposal phases is an important aspect that needs further attention.

For this reason, respondents were asked to state how often they would engage in green products purchasing behaviour and in green post-purchase behaviour respectively.

### 1.2.1. Purchasing behaviour

From our survey, it emerged at the aggregate level, that when it comes to environmentally-conscious purchasing, consumers tend to carefully plan the amount of food they will buy in order to avoid waste; shop locally-produced food; and buy products made with recycled materials when it comes to paper products and beverages. Instead, they tend not to include environmental impact among their purchasing criteria for soap and detergents. Finally, despite planning what to buy in order to avoid waste, respondents they don't usually buy food about to expire for the same purpose of minimizing food waste at the supermarket. Results on how respondents engage in purchasing are reported in Figure 1.

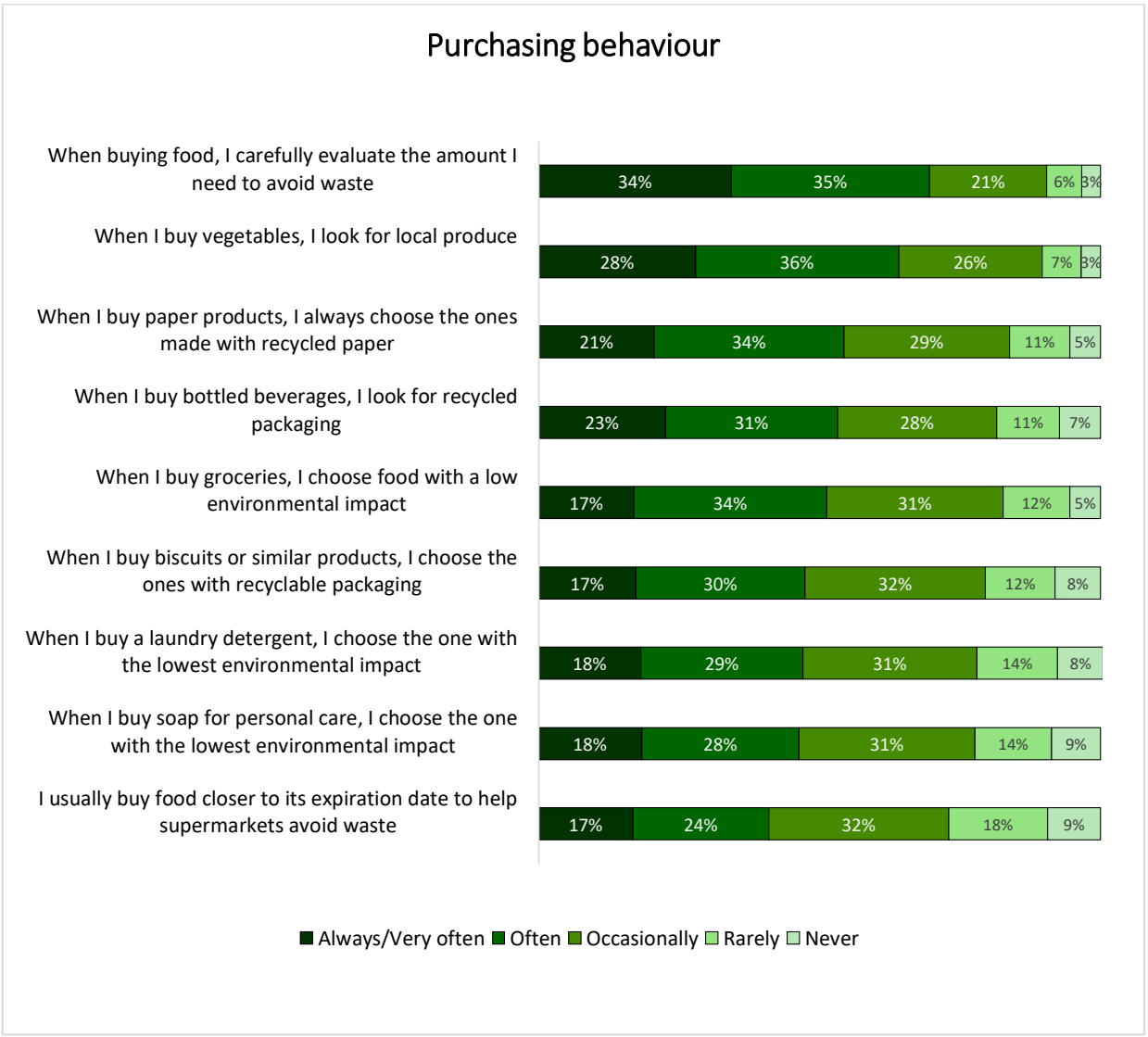


**Figure 1. Purchasing behaviour**

Figure 2 shows life cycle behaviour segmented by four main sub-themes. 'Avoiding food waste' describes consumers who carefully plan their shopping when they buy food. Consumers who look for 'Environmental information on food products' includes consumers looking for locally produced vegetables; recycled bottles when purchasing beverages; buying groceries with low environmental impacts; and buying biscuits with recycled packaging. Then, looking for 'Environmental information on non-food products' involves shopping recycled paper products; and both laundry detergents and soap for personal care with a low environmental impact. Finally, 'Avoiding retailer waste' is when consumers shop products who are closer to their expiration date. Specifically, the majority of respondents tend to behave in such a way as to avoid food

waste. Then, 59% of the respondents in our sample placed high importance keeping in mind different phases of the life cycle when purchasing foodstuff. Non-food items are also important but less so than food products. Finally, when shopping 41% of the respondents try to purchase products about to expire in order to avoid waste at the point of sale.


**Figure 2. Life cycle purchasing behaviour by sub-themes**

In Figure 3, we reported life cycle purchasing behaviour by country. It can be seen that respondents from Italy, Spain, and France give more importance to behaving green when it comes to purchasing. Instead, fewer respondents in Germany and the UK as compared to the aforementioned Mediterranean countries rated as important life cycle considerations in purchasing choices.

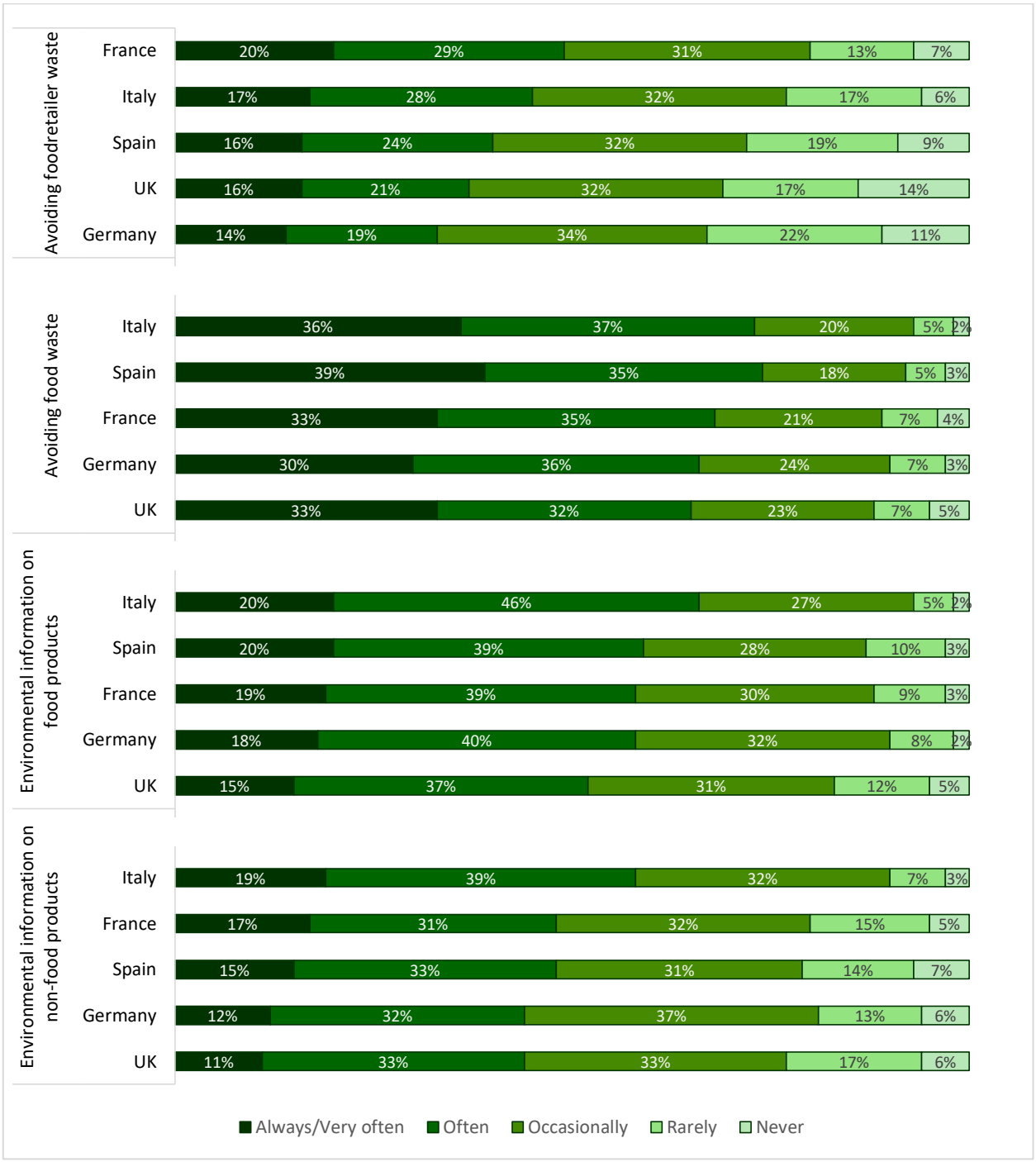


**Figure 3. Life cycle purchasing behaviour by country**

### 1.2.2. Post-purchasing behaviour

For what concerns post-purchasing behaviour, 82% of respondents across the five countries in our sample stated that they tend to eat food they already own that is closer to its expiration date. Interestingly, as we noted above, it is only half, 41%, of the respondents who say they buy food closer to its expiration date. Consumers may avoid buying food closer to its expiration date because they believe it has less nutrients or has lost its freshness, without associating such choice to reducing food waste and ecological behaviours. However, once they own it, they try to limit food waste, but eating what is about to expire first. For the same reason, they tend to plan ahead the quantity of food they will cook. Fewer people instead, eat food beyond its best-before date. Again, this may be due to believing that after that date food is not good anymore, or it is potentially unhealthy. Finally, 47% of respondents only occasionally or rarely reuse food packaging after they consumed its original content. Post-purchasing behaviour evidence is displayed in Figure 4.

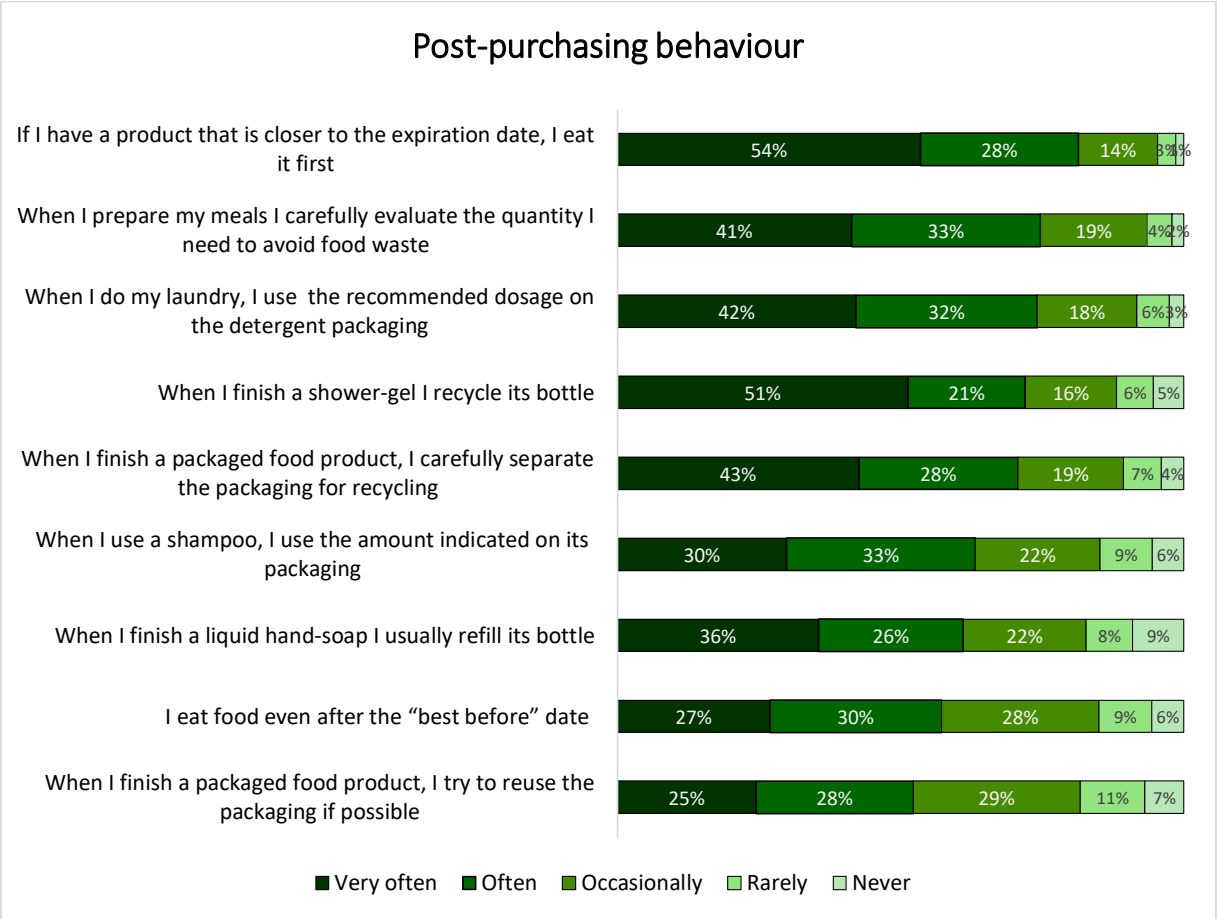


**Figure 4. Post-purchasing behaviour**

Respondents in our sample consider life cycle post-purchasing behaviours as important both for food and non-food products, as can be seen in Figure 5. In particular, consumer post-purchasing behaviour was divided in two main sub-themes. Consumers who adopt 'Environmentally-friendly behaviours with non-food products display the following behaviours: they use the recommended dose on detergents packaging when doing their laundry; they recycle the bottles of their shower gel; they use the amount of shampoo indicated on the label; they refill their hand soap bottle when finished. Instead, consumers who adopt 'Environmentally-friendly behaviours with food products' engage in the following behaviours: they first eat food closer to its expiration date; they prepare their meals having in mind the quantity they may eat; they recycle the packaging of their food products; they eat their food even after the expiration date; and they reuse the packing of their food products.

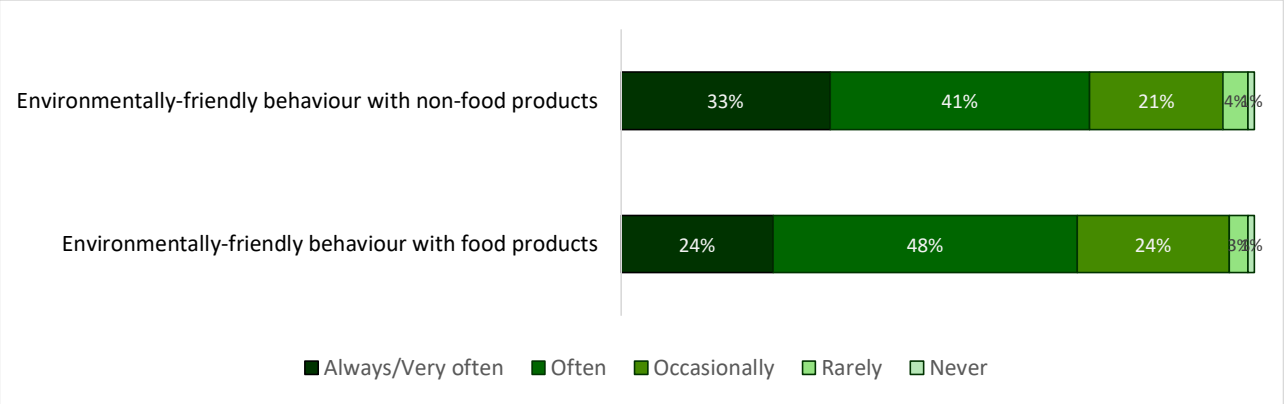


**Figure 5. Life cycle post-purchasing behaviour by sub-themes**

Finally, Figure 6 displays life cycle post-purchasing behaviour by sector by country. Again, Mediterranean countries reported the highest number of respondents engaging in post-purchasing behaviours both in food and non-food sectors as can be seen below.

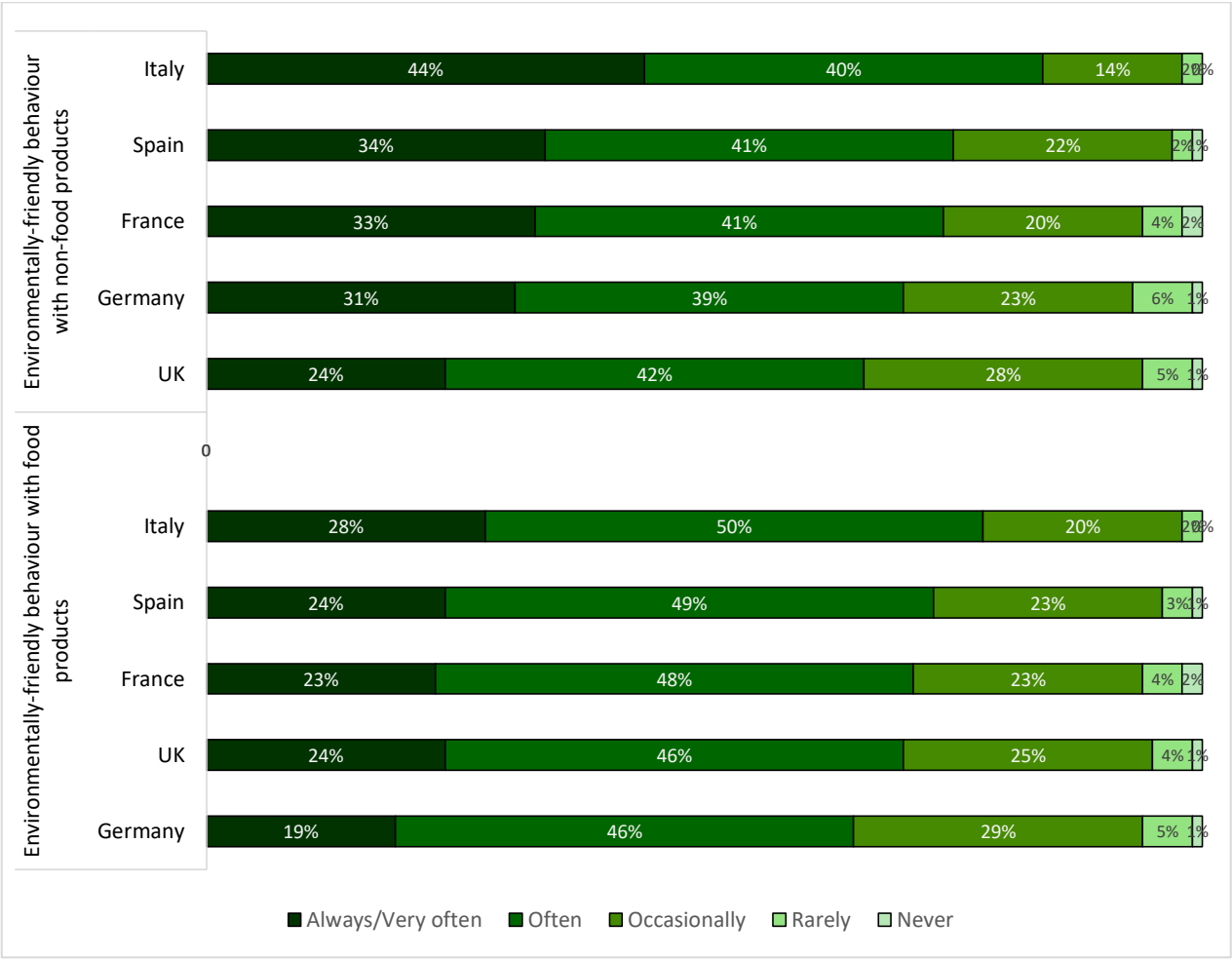


**Figure 6. Life cycle post-purchasing behaviour by country**

## 1.3. PSYCHOGRAPHIC DIMENSIONS

In the following paragraphs, results on the psychographic variables investigated in our survey are reported, namely pro-environmental behaviours, consumer identity, environmental concern, and perceived consumer effectiveness.

### 1.3.1. Other types of pro-environmental behaviours

Empirical evidence highlighted how individuals that engage in green product purchasing tend to display other types of green or pro-environmental behaviours (Testa et al., 2016; Larson at al. 2015). This may be the case as purchasing, and especially, green product purchasing, is not the only behavioural manifestation of an individual's commitment to the environment. Stern (2000) identified four environmentally significant behaviours, which are influenced by the same set of causal variables: environmental activism, non-activist public-sphere behaviours, private sphere environmentalism (which also encompasses green purchasing behaviours), and behaviours affecting organizational decisions.

Several researchers have since then showed how consumer involvement in other types of pro-environmental behaviours, such as environmental activism, is also a predictor of responsible consumerism (Brochado et al., 2017; Khare, 2015).

This is in line with consumer researchers that assume that consumers strive to be consistent in their decision-making. This assumption is rooted in social-psychological research (e.g., attitude research), that indicates that individuals value consistency in both their beliefs and in their behaviour across time (Cialdini, 1993 & 1995). Consistency across behaviours is sought because viewed positively by others.

It follows that individuals who are part of an environmental associations or donate money for environmental causes may be more likely to buy green products or adopt green post-purchasing behaviours.

#### 1.3.1.1. Evidence on other types of pro-environmental behaviour

In our questionnaire, we explored the tendency of individuals in the five countries in our sample, namely France, Germany, Italy, Spain, and the UK, to engage in pro-environmental behaviours. As shown in Figure 7 and 8, the majority of respondents are more likely to engage in conservation types of behaviour. These include recycling, where 83% of respondents state they often do; saving water or energy in their households (76%); and buying energy-efficient appliances or any other type of environmentally-friendly products (60%). This is not surprising, considering that recycling is now mandatory in most EU States, including those in our sample. Furthermore, citizens can receive bonuses once they energy-efficient appliances. Next in order in Figure 7, respondents engage in social environmentalism, such as discussing

environmental problems in their community (42%); cooperating with other people to try and solve environmental problems (26%); and being an active member of a local environmental group (17%). Finally, respondents in our five-country sample display environmental citizenship behaviours for what concerns casting their votes to support an environmental policy (41%); signing a petition on environmental issues (32%); donating money towards an environmental cause (18%); and writing a letter on an environmental matter as a sign of protest (15%).

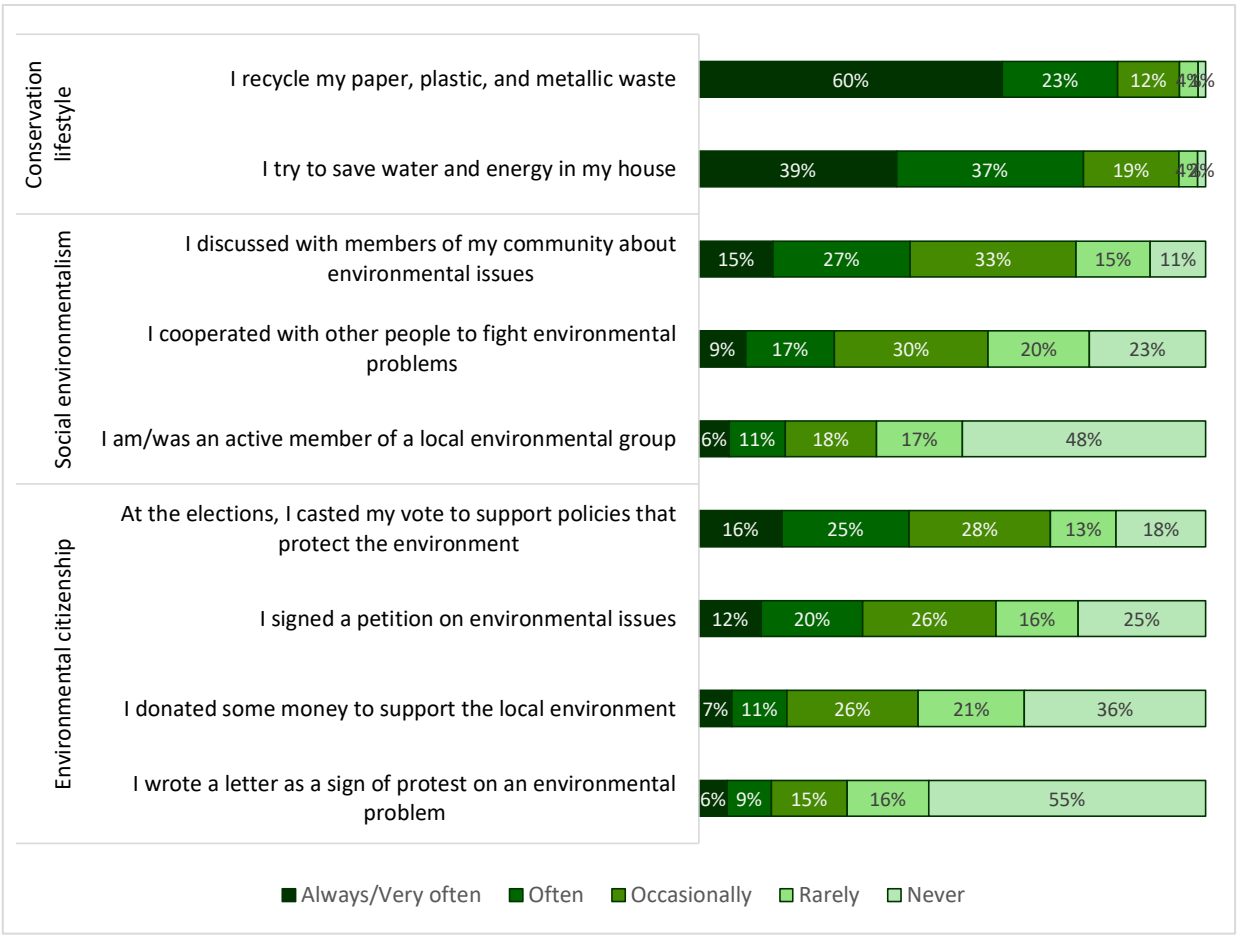


**Figure 7. Other types of pro-environmental behaviours**

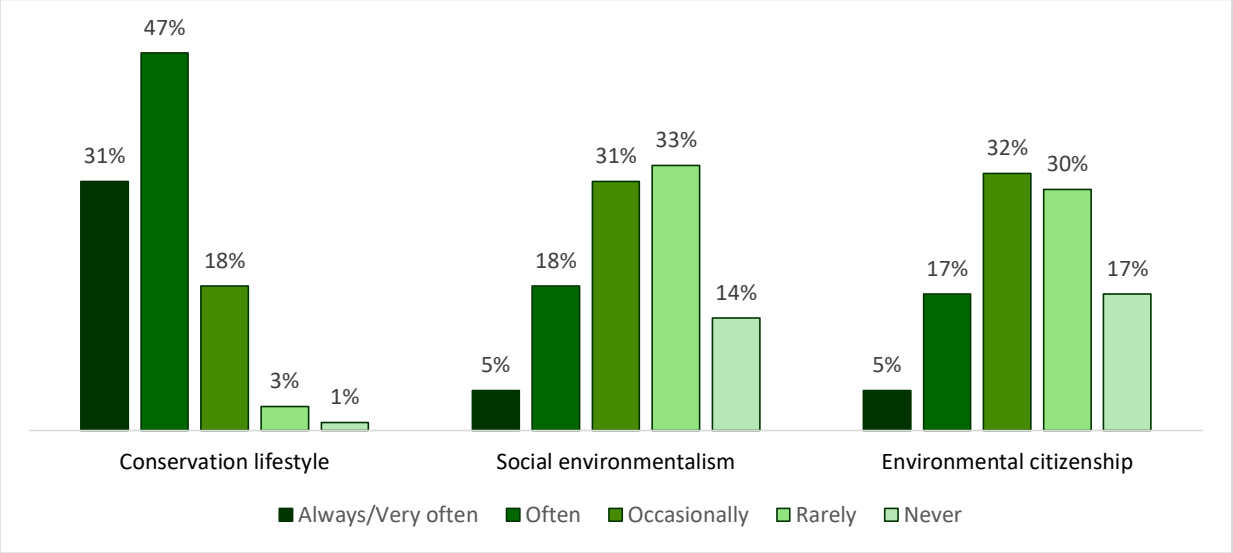


**Figure 8. Other pro-environmental behaviours**

Figure 9 shows how respondents in the five countries surveyed answered to questions about conducting other types of environmental behaviours. In general, it can be noted that Spain, Italy, and France are the countries where the majority of respondents reported highest levels of pro-environmental behaviours.

When it comes to a conservation lifestyle, all respondents regardless of the country share similar results. As for social environmentalism, German respondents tend to portray lower levels of such behaviour as compared with the other sampled countries. Finally, Germans reported an even lower tendency to engage in environmental citizenship with respects to other countries, in particular Spain.

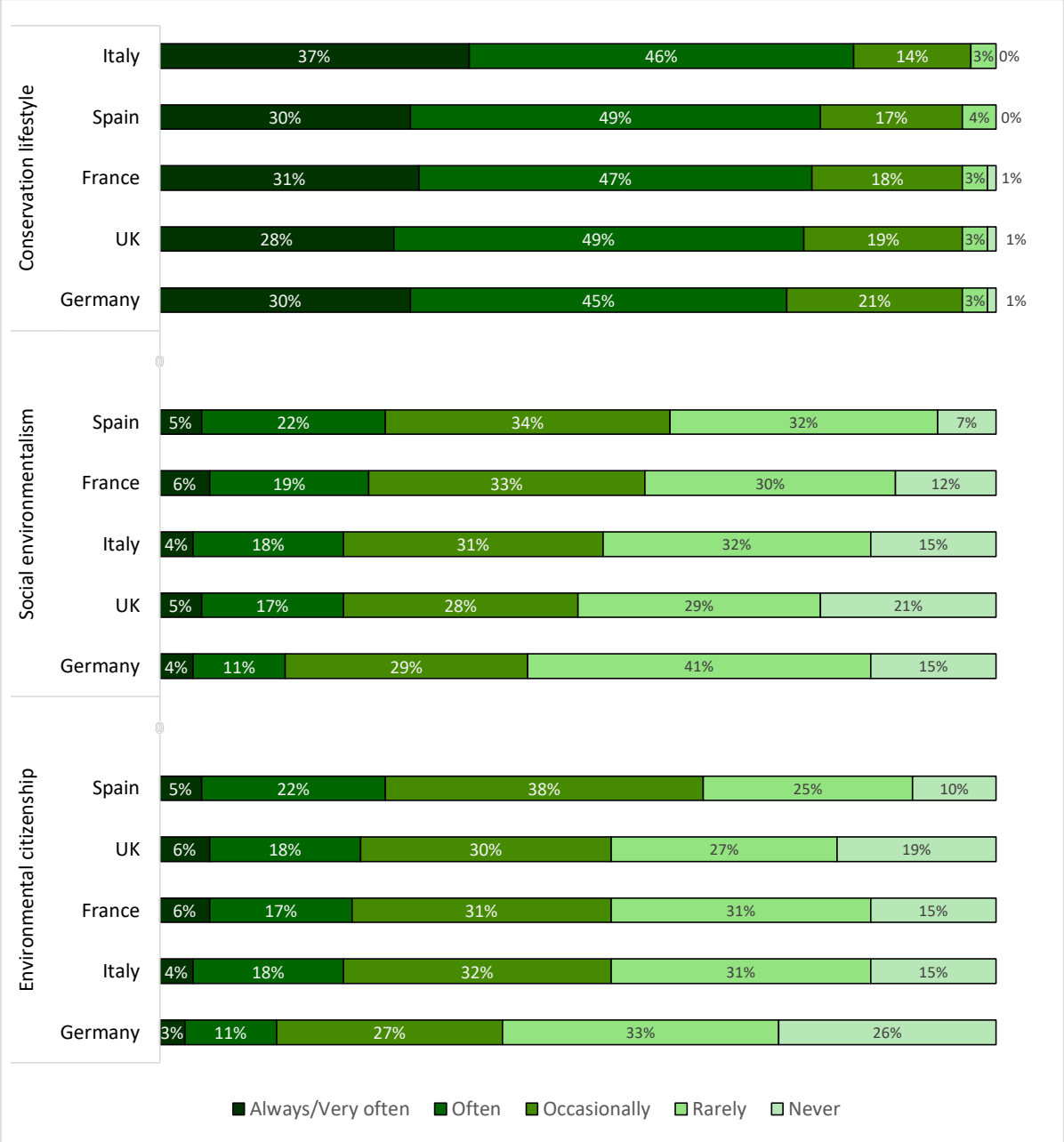


**Figure 9. Other behaviours by country**

### 1.3.2. Consumer identity

The environmental impacts of consumers can be determined by their individual lifestyles, which depend on what they buy, how they use it and conserve it, and finally how they dispose of goods they own (Druckman and Jackson, 2009). Their actions determine who they are and their identities guide their behaviour. According to identity theory people hold an array of identities (Oyserman, 2009), which shape their readiness to act and think. However, they can be flexible and are responsive to their surrounding context. This means that actions are guided by multiple identities. Which identities guide behaviour depends on the context (affecting the salience of identities), although broader identities (e.g., gender) may be salient across contexts.

Consumers make decisions in a wide range of situations, and environmental identities may not always be salient in those situations. An understanding of important consumer identities that have a bearing on green behaviour could help develop more effective environmental policies for a wider audience across different settings.

It is clear that environmental identities are important for green behaviour. However, the relative importance of other consumer identities has received little attention. How people self-identify as consumers can provide insight into the importance of, and relationship between, motives that are often seen as potentially conflicting, such as frugality, thriftiness, materialism, and environmental protection.

#### 1.3.2.1. Evidence on consumer identity

At the aggregate level, it appears that the most salient identity among respondents in the five countries sampled ascribes to being thrifty and adopting thrifty behaviours. In this sense, the majority of respondents totally agree or agree to look for the best value for money (56%) and look for bargains (51%). Being frugal comes right after, as frugal behaviours score second highest. In particular, respondents totally agree or agree to buy energy-efficient appliances (49%); stay within their budgets (46%); carefully plan their purchases (37%); and only buy what they need and only replace it when it is necessary (35%). A moral identity ranks third in aggregate terms. Notably, when it comes to moral behaviours, respondents totally agree or agree to buying local products (37%); buying environmentally-friendly products (31%); and buy products made in healthy and safe environments (28%). Finally, respondents did not rank high regarding to behaviours that can be ascribed to being a shopper, as they totally agree or agree to loving shopping (37%); being impulsive buyers (20%); frequently changing their preferences (18%); and following trends (18%). Single items can be seen in Figure 10, while Figure 11 shows the aggregate results for what relates to consumer identities.

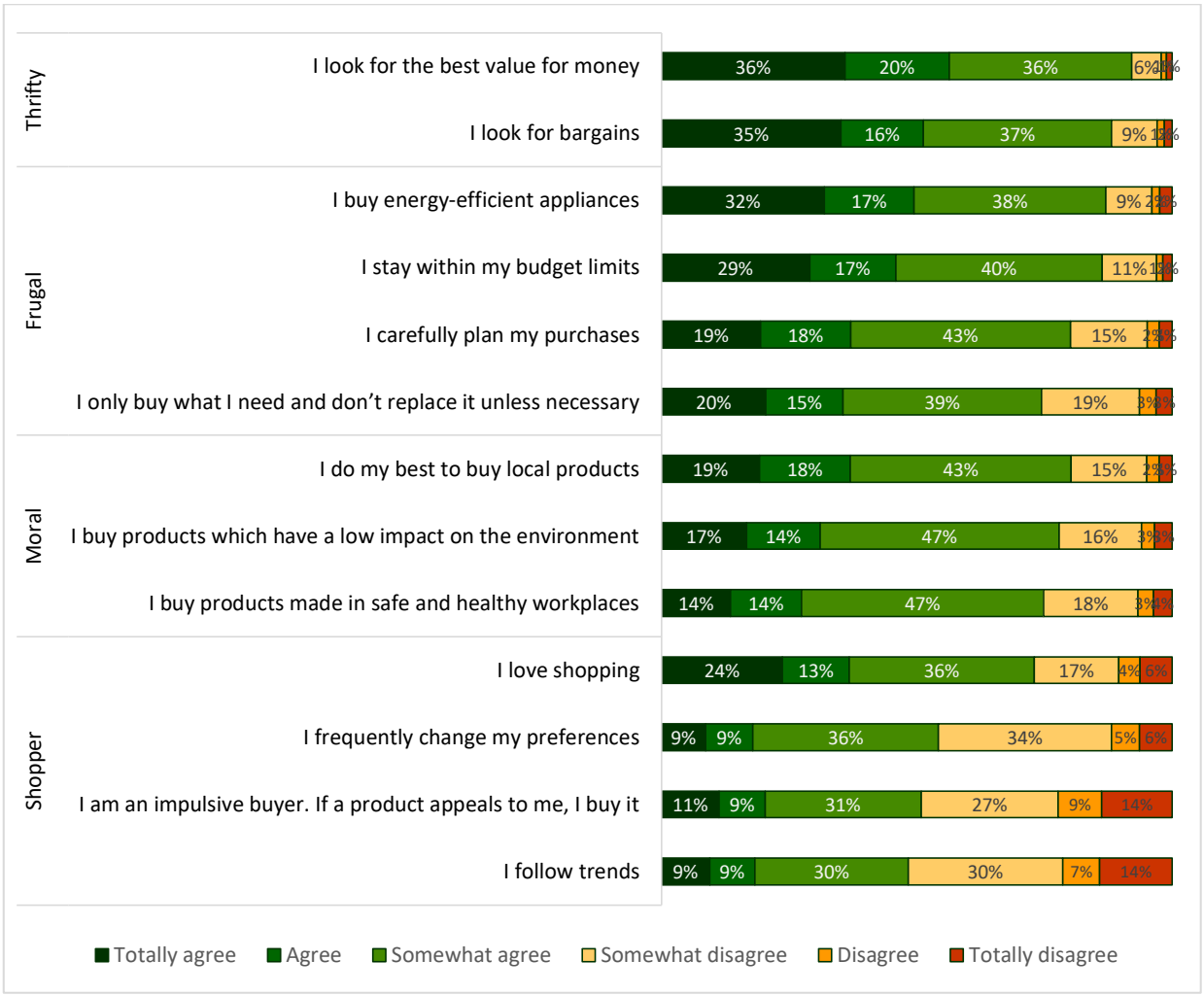


**Figure 10. Consumer identities**

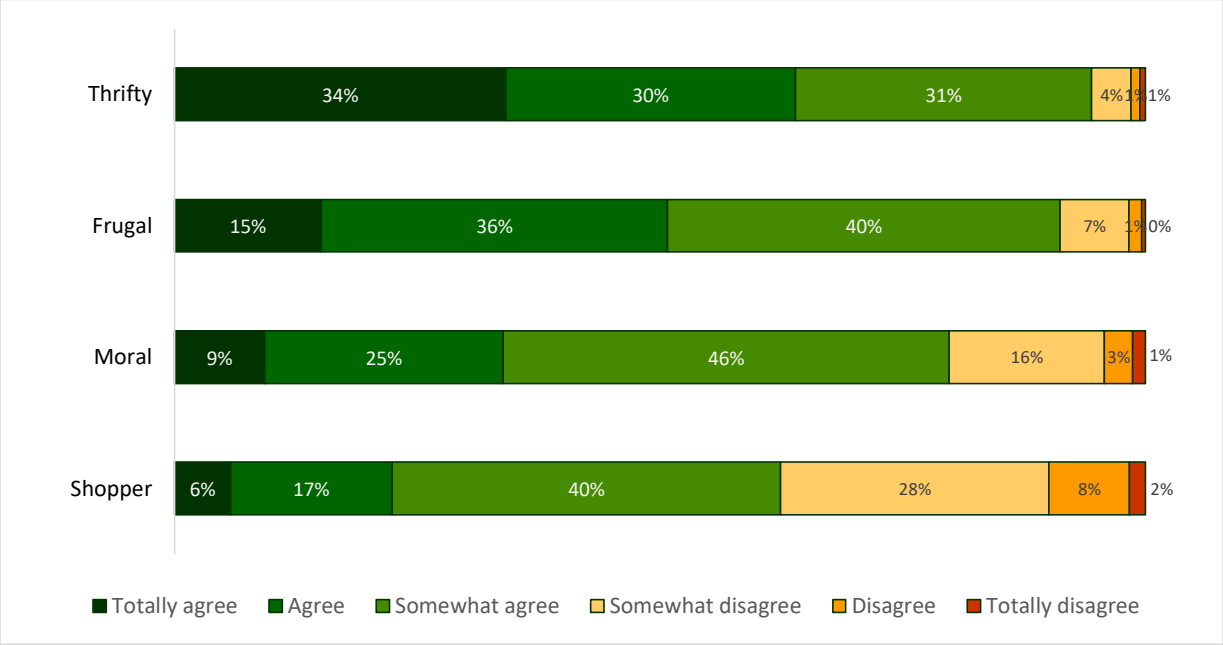


**Figure 11. Consumer identities (total)**

Figure 12 shows the differences in consumer identities by country. With the exception of being thrifty, British respondents are the ones identifying the least as being frugal or moral. However, they also scored low for being a shopper. Italians and Spaniards scored generally high as can be seen below.

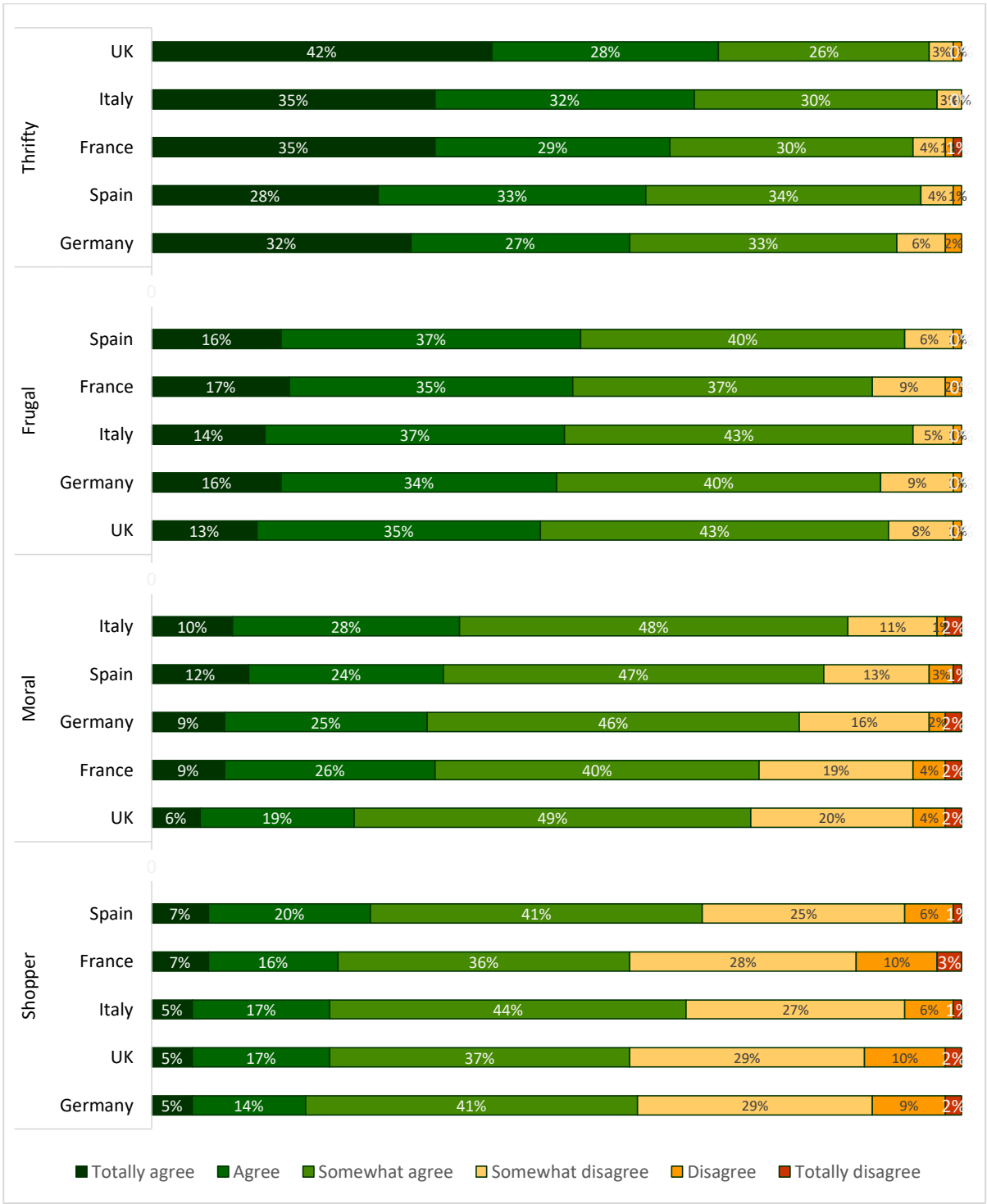


**Figure 12. Consumer identities by country**

## 1.3.3. Environmental concern

Environmental concern plays an important role in shaping consumer attitudes and influencing their consumption choices (Trivedi et al., 2018; Newton, et al., 2015). Environmental concerns can be best described as preoccupation with pollution and degradation of natural resources held by individuals (Trivedi et al., 2018).

Environmental concerns underline a sense of urgency and apprehension. For this reason, individuals enact a series of steps such as increased attention, motivation, evaluation, and defence, which are aimed at mitigating their environmental concerns, through the activation of a specific behaviour such as green consumption behaviour. To motivate and evaluate the identified behaviour, consumers may seek additional information in order to make sure that purchasing and post-purchase green behaviour will contribute to saving the environment.

### 1.3.3.1. Evidence on environmental concern

As can be noted in Figure 12, respondents in all countries in our sample tend to agree over environmental concerns.

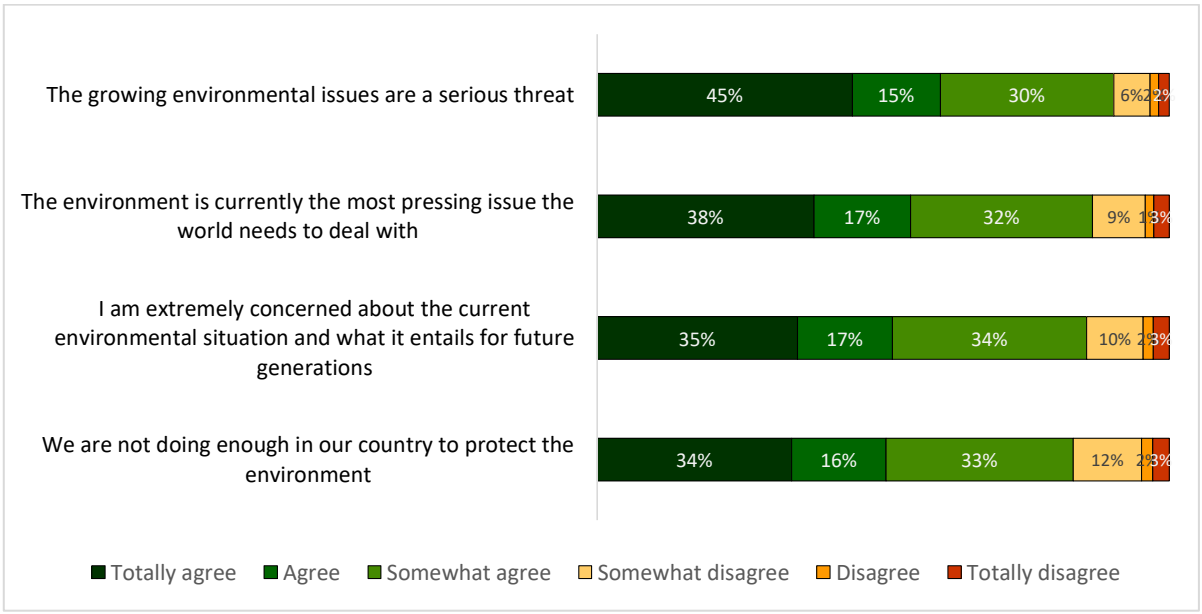


**Figure 13. Environmental concern**

In Figure 13, results for environmental concern are displayed by country. It can be noted that Spaniards are the most concerned respondents in our sample, while Germans are the least concerned with the

environment. In spite of this, 52% of respondents in Germany are concerned about the environment, while 5% are not concerned about environmental problems.

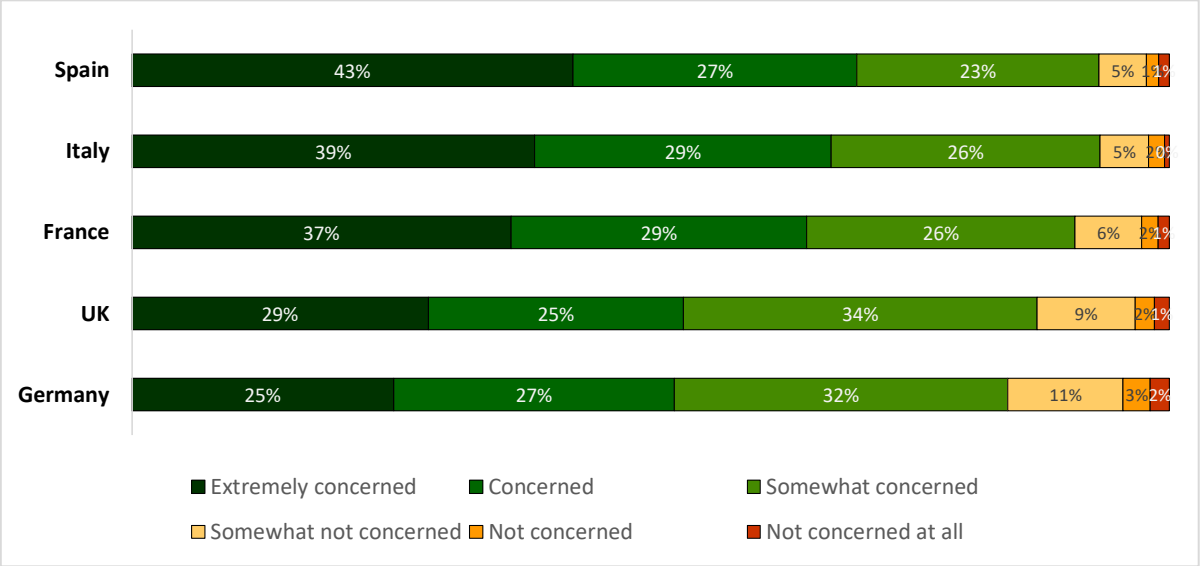


**Figure 14. Environmental concern by country**

## 1.3.4. Perception of self-effectiveness

Environmental concern does not always result in a desired behaviour, such as environmentally sustainable product purchases (Vermeir and Verbeke, 2008). In the literature, this missing link between environmental concern and green purchasing behaviour has been associated to perceived consumer effectiveness (PCE). In the literature, PCE has been identified as a factor that helps explain environmentally conscious consumer behaviour (Roberts, 1996). It is described as the extent to which an individual judges or believes to be able to affect environmental resource problems through their choices and actions. For example, the more consumers feel that they can do something about reducing pollution, the more they consider the impact of their purchases. A high level of PCE motivates consumers to show their positive attitudes towards sustainable products through actual consumption behaviour (Vermeir and Verbeke, 2008). In fact, PCE was found to directly affect environmentally and/or socially sustainable consumption (Kang et al., 2013; Kim and Choi, 2005; Vermeir and Verbeke, 2008; Webb et al., 2008).

### 1.3.4.1. Evidence on perceived self-effectiveness

In Figure 14, single items that describe PCE are shown at the aggregate level. Half of the respondents (52%) across our geographical diverse sample agree that is it worth making efforts to save the environment. Nearly half (47%) instead believe that by purchasing environmentally-friendly products they can have a

positive impact on the environment and society at large. Finally, 44% of the respondents think that individually they can make a difference through their actions and choices as consumers.

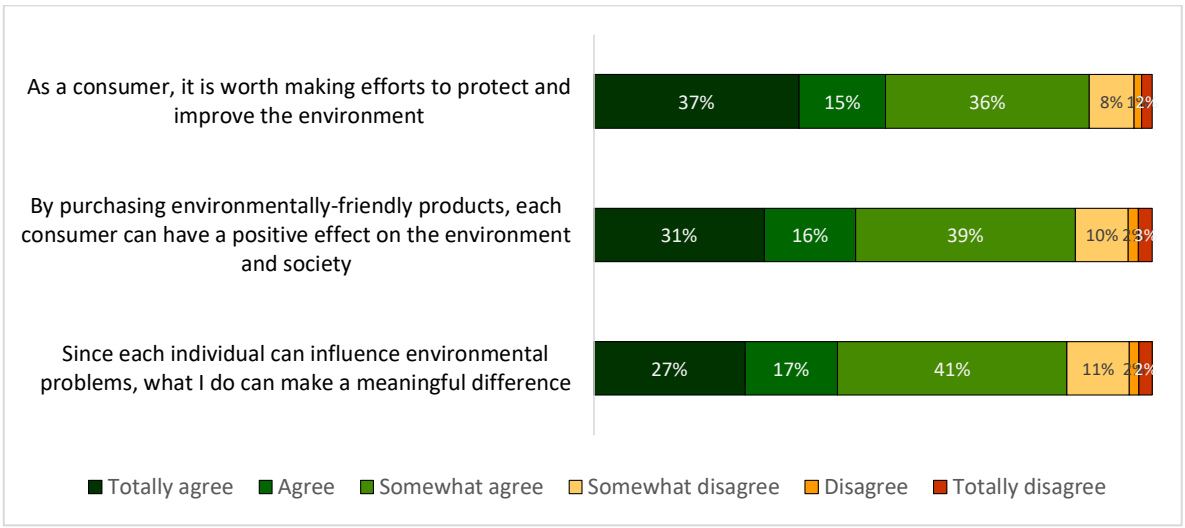


**Figure 15. Perceived self-effectiveness**

Figure 15 shows results of PCE by country. By looking at the results, Italians rated the highest in terms of very high and high PCE (59%); followed by Spaniards (55%); then French and British people (47%); and Germans (45%). French (40%), British (39%), and German (38%) people ranked higher with regards to having a moderate belief of PCE. While Spanish and Italian people scored 34% and 33% respectively in moderate PCE. Again, northern Europeans, specifically Germans and British, together with France are the countries with the lowest PCE in our sample.

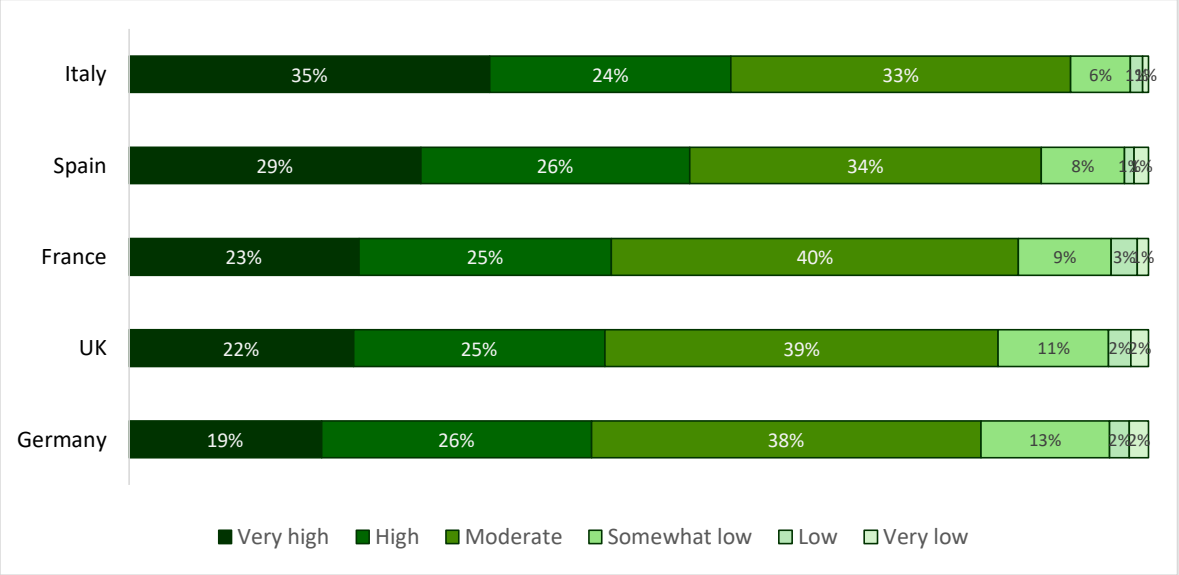


**Figure 16. Perceived self-effectiveness by country**

## 1.4. TRUST AND GREENWASHING

Although many manufacturers label their products as being “green”, “sustainable”, “environmentally-friendly” and so on, consumers generally lack the necessary information to assess the truthfulness behind these claims. The impossibility of consumers to be fully aware of the environmental attributes of a product, a process, or a brand leads to an asymmetric distribution of information (King et al. 2005). Information asymmetry harms both parties involved in an exchange (Akerlof, 1970). In order to balance this asymmetry, companies try and communicate their efforts to protect the environment. As emerged from studies on corporate social responsibility, organizations that are active in the environmental domain need to communicate their efforts in order to benefit from them (Gosselt et al., 2019; Parguel et al. 2011), and to build a reputation that might protect (or restore) their image vis-à-vis negative publicity (Vanhamme and Grobben, 2009).

This being said, companies need to be careful with their environmental marketing efforts. Not only do they need to be attentive with the content of their green messages, but also with their frequency and intensity. This is because when consumers are bombarded with green claims they may become sceptic about the real motives and even trustworthiness behind these efforts. Experts refer to misleading information about a company environmental efforts as ‘‘greenwashing,’’ defined as ‘‘the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service’’ (Delmas and Burbano, 2011).

Although consumers often expect to get information about a company social and environmental commitment efforts both from internal and external sources, they tend to perceive an external source as being more credible than an internal one (Dawkins, 2004). Therefore, trusting the source of information is a crucial factor to make the information itself reliable. In order to balance this distortive perception, companies can opt to a third-party certification, that stands for and external assurance of the organization’ effort to correctly manage its environmental impacts and improve its environmental performance (King et al., 2005).

### 1.4.1. General trust

One-fifth (22%) of respondents declared to be trusting, attributing a high or very high score to statements such as ‘*most people deserve to be trusted’* and *‘I am willing to trust’*. While 28% of the respondents reported that they tend to be somewhat trusting, 30% of them declared instead to be somewhat distrusting. Finally, 20% of respondents in our sample are generally distrusting. Such results can be seen in Figure 16.

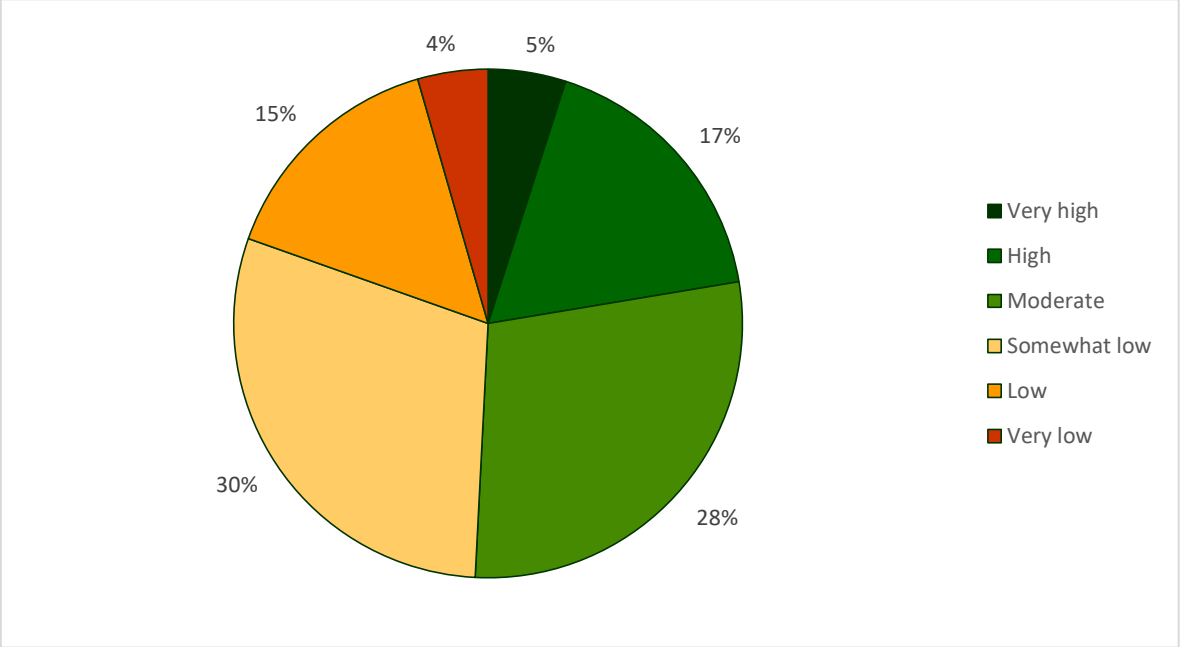


**Figure 17. Level of general trust**

Results by country indicate that respondents in the UK tend to trust more in comparison to other countries. While the difference with Spain is minimal, there is a stark contrast with Italy. Italians tend to be more distrusting towards other people or circumstances. In fact, one third of Italians (34%) affirmed to be somewhat distrusting while 24% have low and very low levels of trust, differing from 16% of British respondents. Evidence is shown in Figure 17.

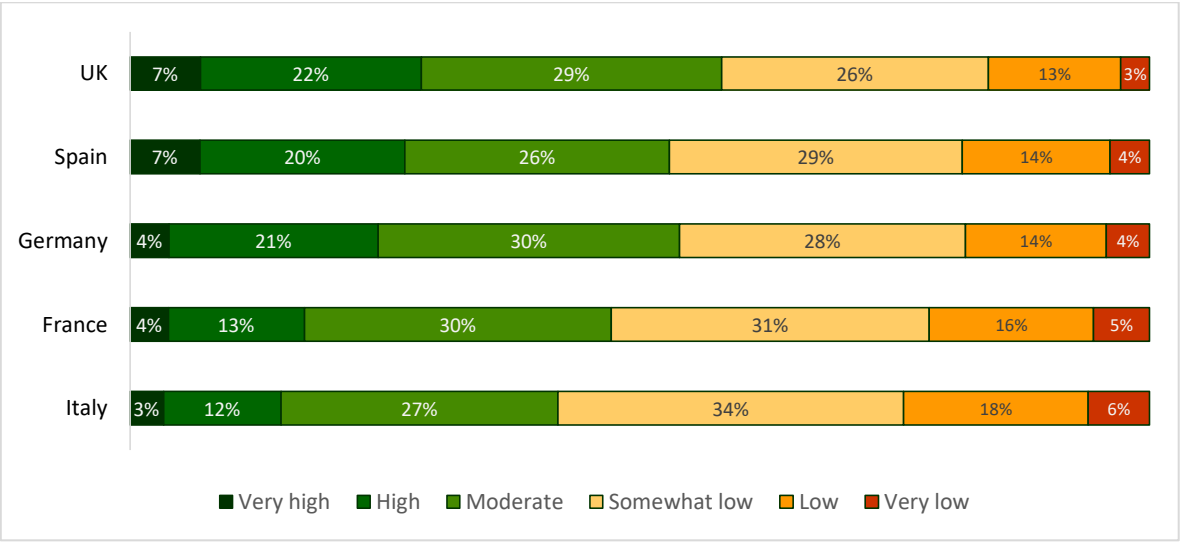


**Figure 18. Level of general trust by country**

### 1.4.2. Trust towards self-declared product claims

When the tendency to trust is towards something specific, the answers change. In particular, respondents in our sample were asked to state their trust towards self-declared claims placed on their products by firms. At the aggregate level, 18% of respondents affirmed to trust self-made claims on products. The percentage of respondents who are moderately trusting self-made claim is nearly half of our sample (46%), while 26% tend to distrust to some extent such self-declared claims. Finally, 10% of respondents said they don't trust self-declared claims on products. Evidence in presented in Figure 18.

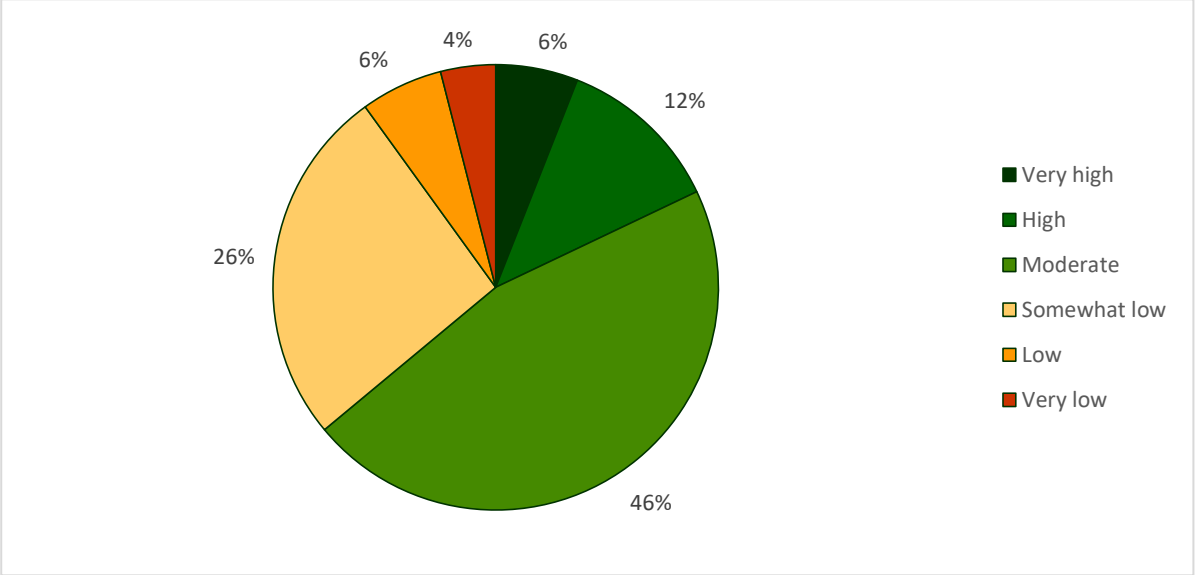


**Figure 19. Trust towards self-declared product claims on packaging (total)**

Figure 19 reports trust towards self-declared claims in each of the five countries in our sample. Italians seem to be the most trusting consumers when it comes to self-declared claims on products: 23% of them trust such claims, and 55% tend to trust to some extent self-made claims on packaging. Germany and the UK are the countries were most respondents affirmed to completely distrust or distrust to some extent self-declared claims on product packaging. As can be seen, despite Italians reported to be the least trusting in general, while British respondents display the highest sense of general trust (see Figure 17), when it comes to self-declared claims the situation is reversed.

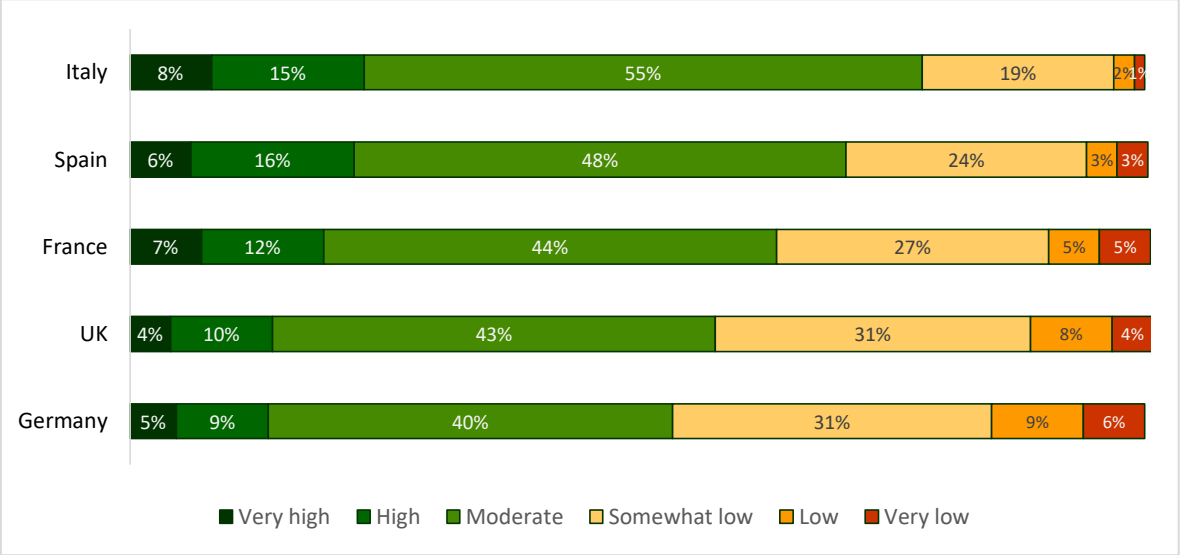


Figure 20. Trust towards self-declared product claims on packaging by country

### 1.4.3. Trust towards third-party certified product claims

Next, by asking respondents about their level of trust towards third-party certified claims on product packaging, we noted that results at the aggregate level were quite similar to trust towards self-made claims by firms as can when comparing Figure 20 and Figure 21 below.

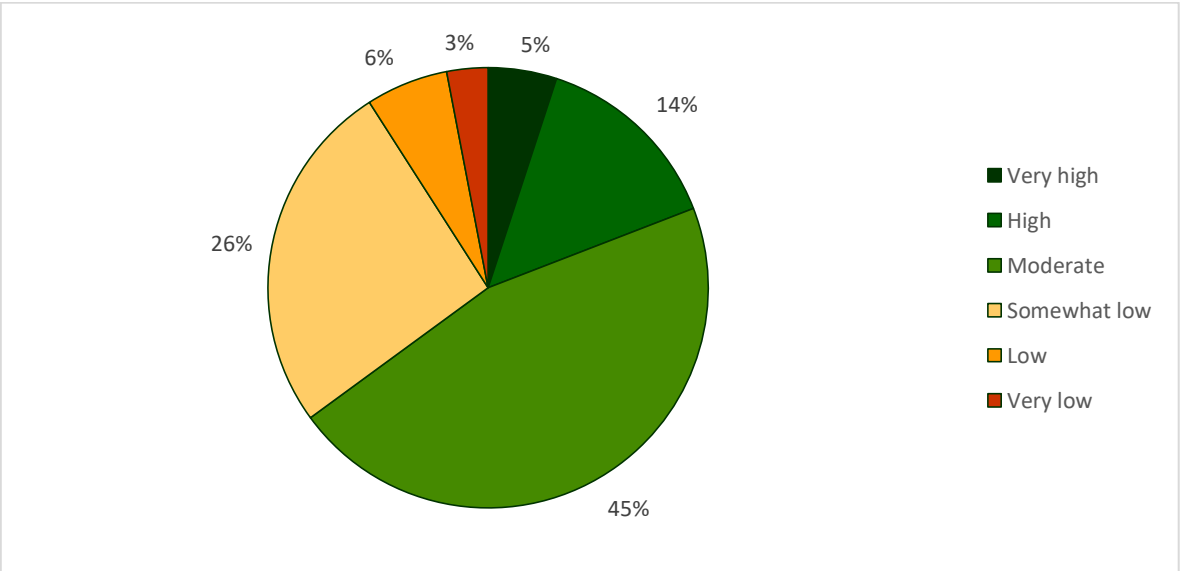


Figure 21. Trust towards third-party certified product claims on packaging

The same can be said with regards to results by country, with the only exception of Spanish respondents trusting more self-made claims instead of third-party certified claims on product packaging, as shown in Figure 21.

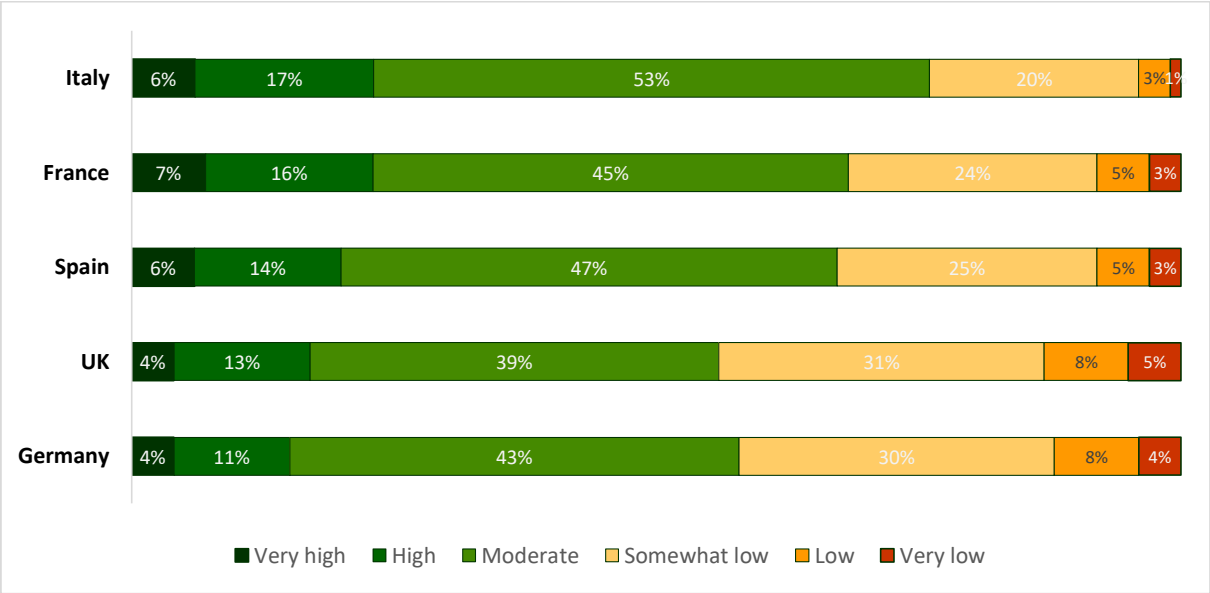


**Figure 22. Trust towards third-party certified declarations on product declarations**

### 1.4.4. Greenwashing

When it comes to environmental information about products, consumers are quite alert. In our survey, the staggering majority of respondents tend to mistrust information released by companies about their environmental performance of their products. Respondents rated their agreement with statements that described companies overstating environmental claims about their products or misleading consumers with their claims, regardless of how they are presented, notably either with visual graphics or written statements.

At the aggregate level only 4% or respondents are not sceptic about product environmental information as advertised by companies. One-fifth (19%) of respondents have a low level of greenwashing beliefs. Whereas 49% and 28% of respondents either have tend to be somewhat sceptic with some greenwashing beliefs, or are completely sceptic towards the real environmental impacts of products. Evidence on greenwashing beliefs is shown in Figure 22.

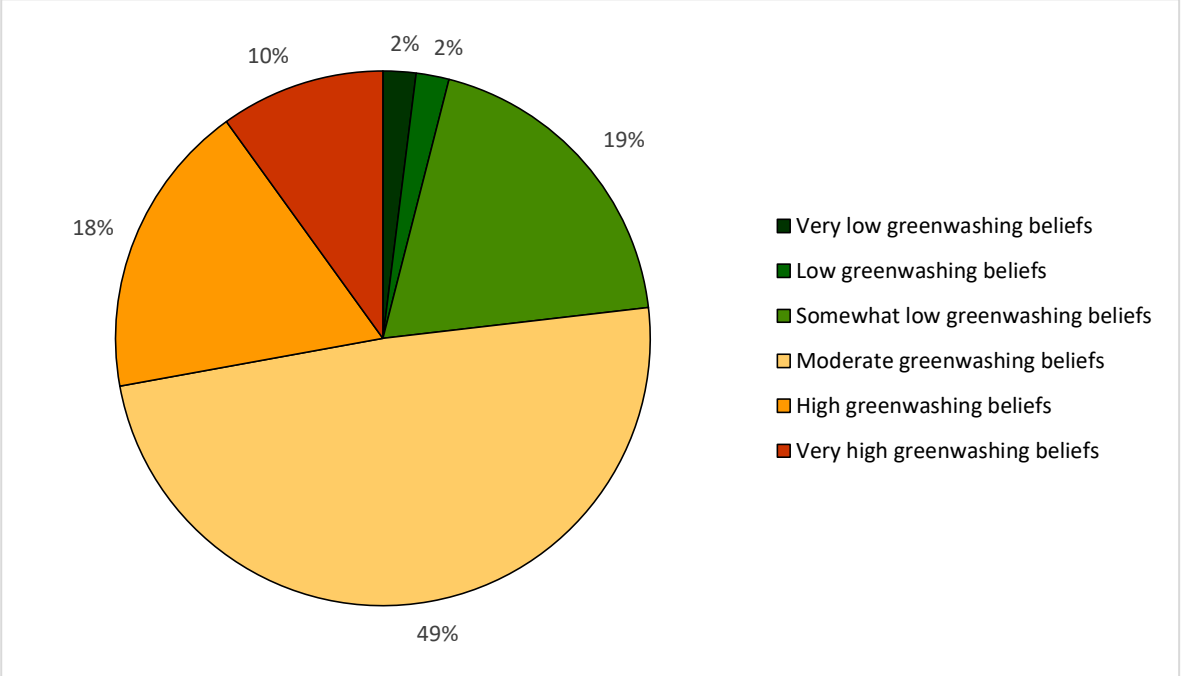


**Figure 23. Greenwashing beliefs (total)**

Figure 23 denotes that results tend to be fairly similar across the five countries involved in our study. However, Italian respondents appear to be less sceptic towards product environmental information as advertised by companies.

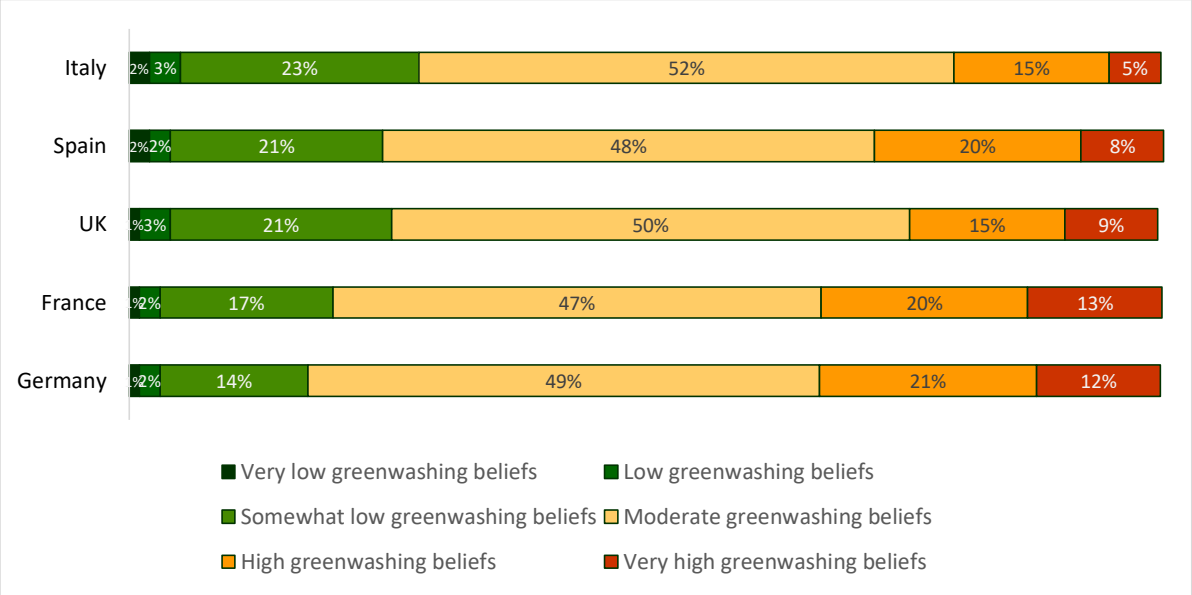


**Figure 24. Greenwashing beliefs by country**

## 1.5. ECO-LABELS

Ecolabel represents a specific type of label, focused on the environmental impact of the product. The linkage between environmental and eco-label knowledge is positively associated with attitudes towards the environment (Taufique, et al., 2017). Labels serve the purpose of providing information to consumers.

Eco-labels are signals that aim to reduce information asymmetry between producers and consumers about the environmental performance of products. They are labelling systems for consumer products, on a voluntary basis. They are a form of sustainability measurement directed at consumers. They help producers communicate their environmental commitment to the market while also helping consumers take environmental concerns into account when products. Understanding eco-labels is crucial for consumers, and it depends on a variety of factors: from design and visibility to credibility and persuasiveness of such labels.

### 1.5.1. Consumer knowledge

Approximately two/thirds of respondents in our sample (62%) know the meaning of the term of recycled, in line with our findings in Figure 7 claiming that 60% of individuals recycle always/very often and 23% do so often. Terms like organic, energy-efficient, and eco-friendly report similar results across our sample as can be seen in Figure 24, while in Figure 25 results by country are shown. As can be seen Spanish, Italian, and German respondents reported to know the meaning of certain eco-labels, while French respondents declared to know eco-labels meaning to a lesser extent. However, the difference regarding the knowledge of eco-labels across countries is not high.

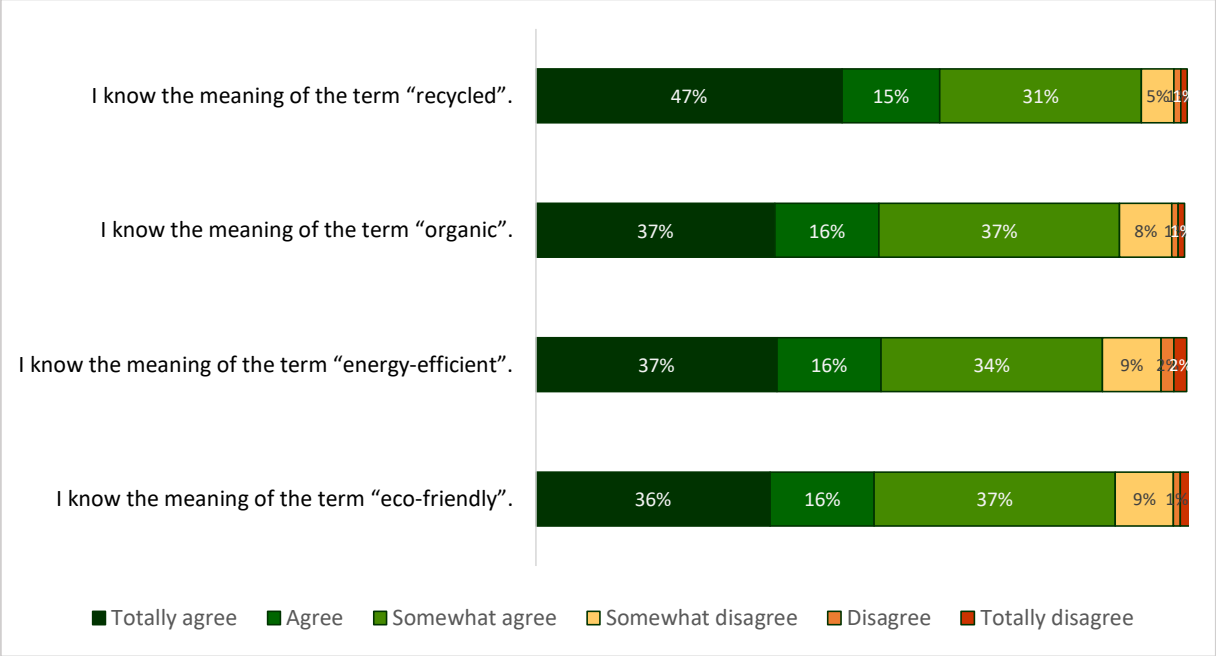


**Figure 25. Self-reported knowledge of eco-labels**

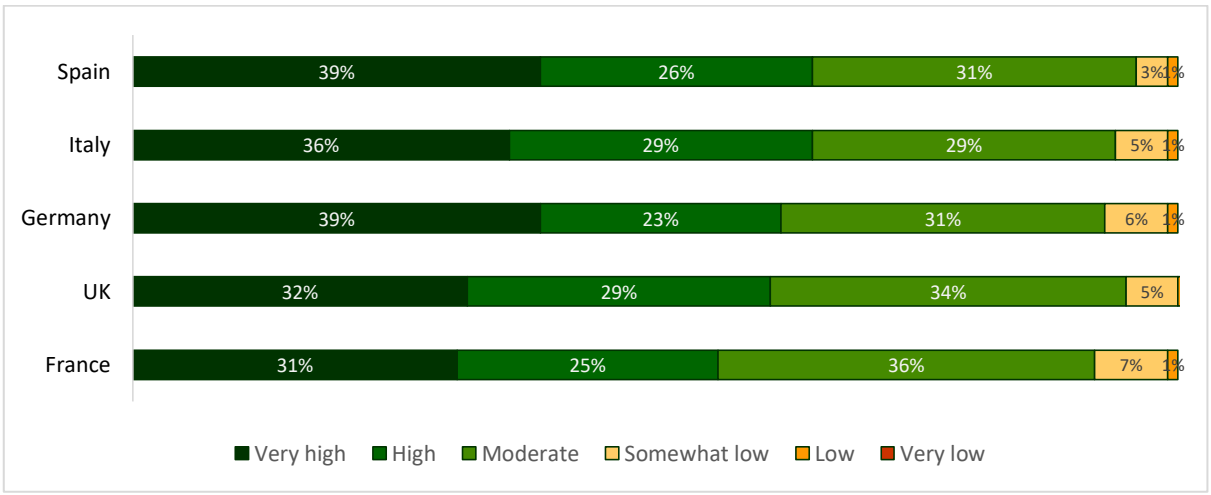


**Figure 26. Self-reported knowledge about eco-labels by country**

## 1.5.2. Awareness and involvement

When it comes to awareness and involvement with eco-labels, 43% of respondents claim to have heard the terms eco-label, while only 27% think of themselves as experts in terms of ecolabels. In this respect, 30% of respondents are not informed about eco-labels. Results are shown in Figure 26.

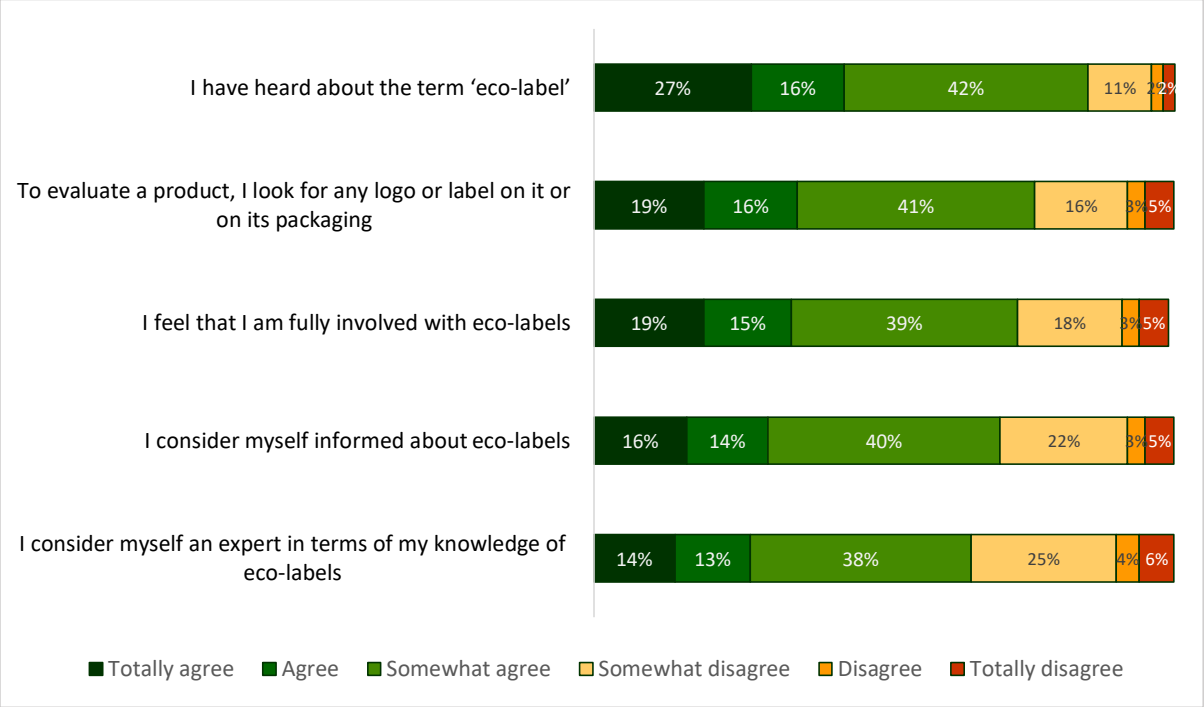


**Figure 27. Awareness and involvement with eco-labels**

From our survey, it emerged that Spanish and Italian people are more likely to be aware and involved with eco-labels. France follows closely after the two Mediterranean countries. While the two northern countries in our sample, namely Germany and the UK, appear to be less aware and involved with eco-labels. Evidence is shown in Figure 27.

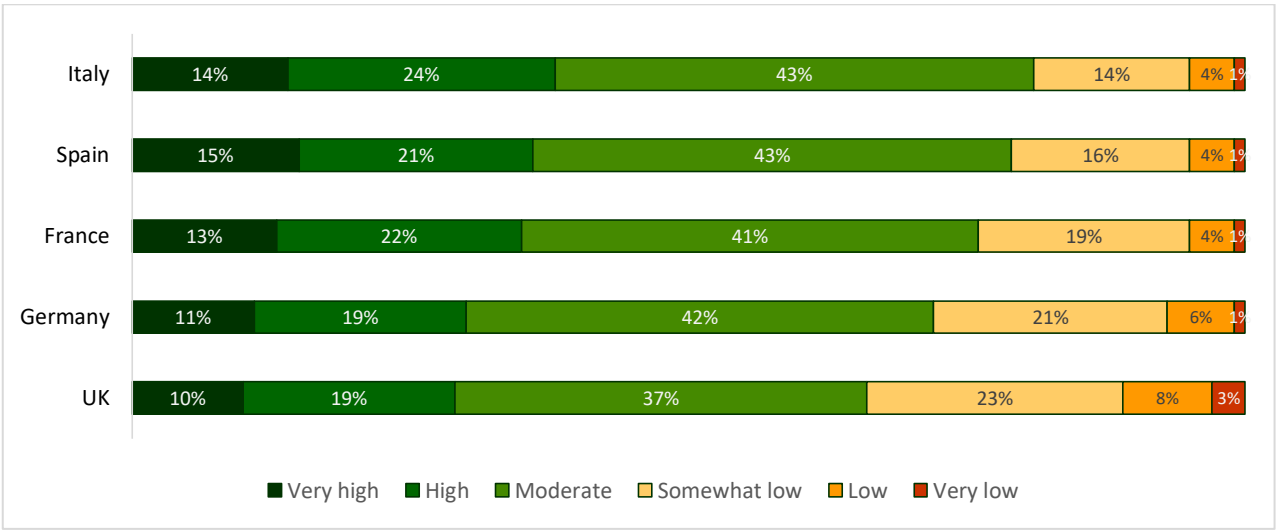


**Figure 28. Awareness and involvement with eco-labels**

### 1.5.3. Credibility

Eco-labels aim to signal the environmental aspects of a product to consumers. To fulfil this objective, they also need to be credible. Approximately 80% of respondents in the five countries sampled think of eco-labels as reliable source of environmental information about a product. Results are shown in Figure 28.

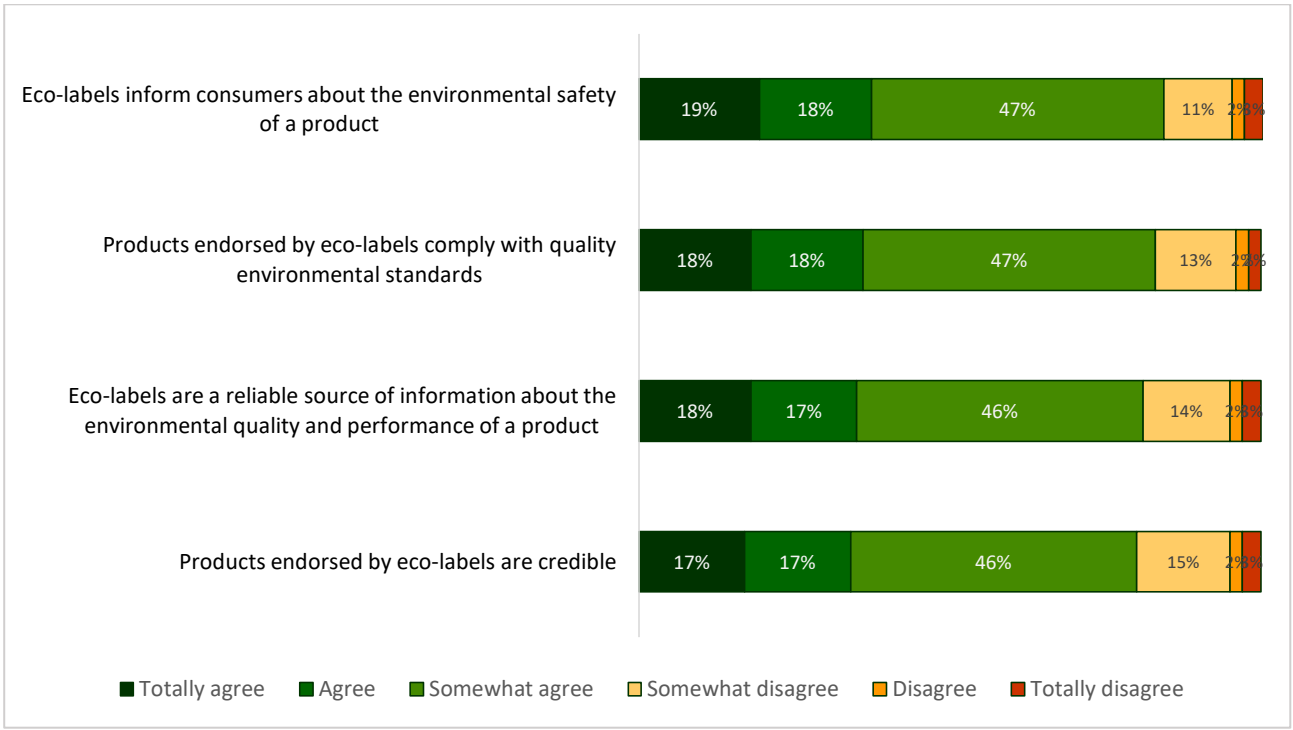


**Figure 29. Credibility of eco-labels**

Italian respondents have the highest level of credibility towards eco-labels. This is in line with the results showing that Italians have the highest level of trust towards either self-declared product claims or third-party certified product claims, as shown in paragraphs 3.2 and 3.3. While Spanish and French respondents share similar results with regards to credibility of eco-labels, British and German respondents show the lowest levels of credibility in eco-labels as shown in Figure 29.

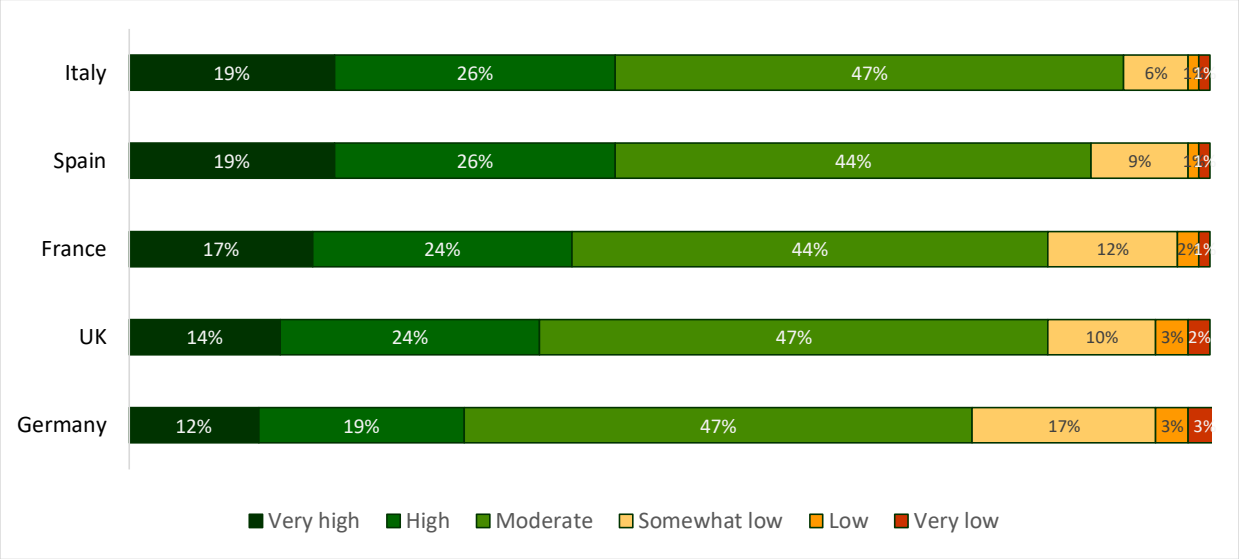


**Figure 30. Credibility of eco-labels**

## 1.5.4. Design and visibility

Interestingly, the appeal of existing eco-labels on products seems to be a divisive topic. Half respondents in our sample tend to rate eco-labels as not looking appealing to them, while the other half disagree with this statement. However, two-thirds of respondents either disagree to some extent or disagree with paying attention only to appealing eco-labels. Evidence is shown in Figure 30.

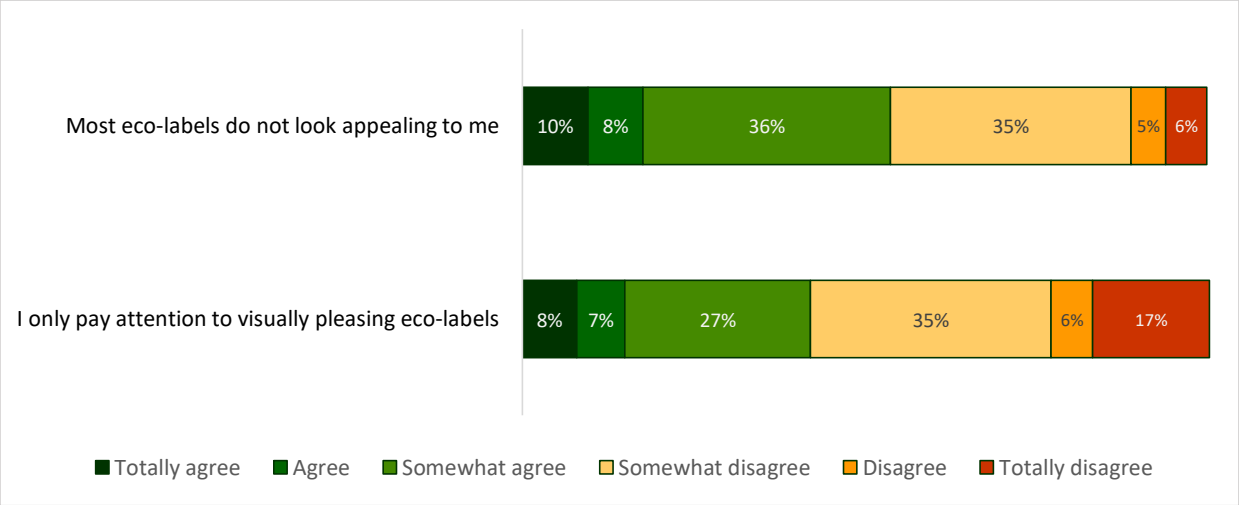


**Figure 31. Design and visibility**

How eco-labels appear on product packaging, i.e. their design and visibility, is rated as being highly important (22%) or somewhat important (40%) by French respondents. Spanish and Italian respondents share similar ratings. British and Germans respectively affirmed to be attentive to eco-labels design and visibility as shown in Figure 31.

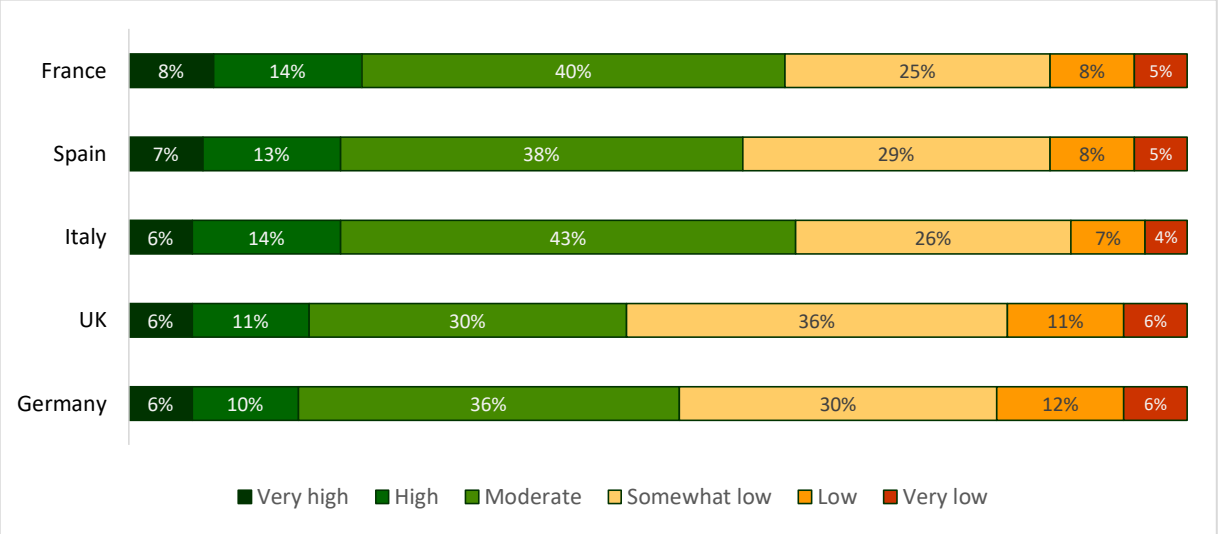


**Figure 32. Design and visibility of eco-labels**

## 1.5.5. Private benefits

Respondents in our sample agree with the fact that eco-labels should advertise information that directly benefit them, such as their taste or health. Therefore, the so-called private benefits should be portrayed on product packaging, alongside the social benefit of benefiting the environment and/or society. Evidence is shown in Figure 32.

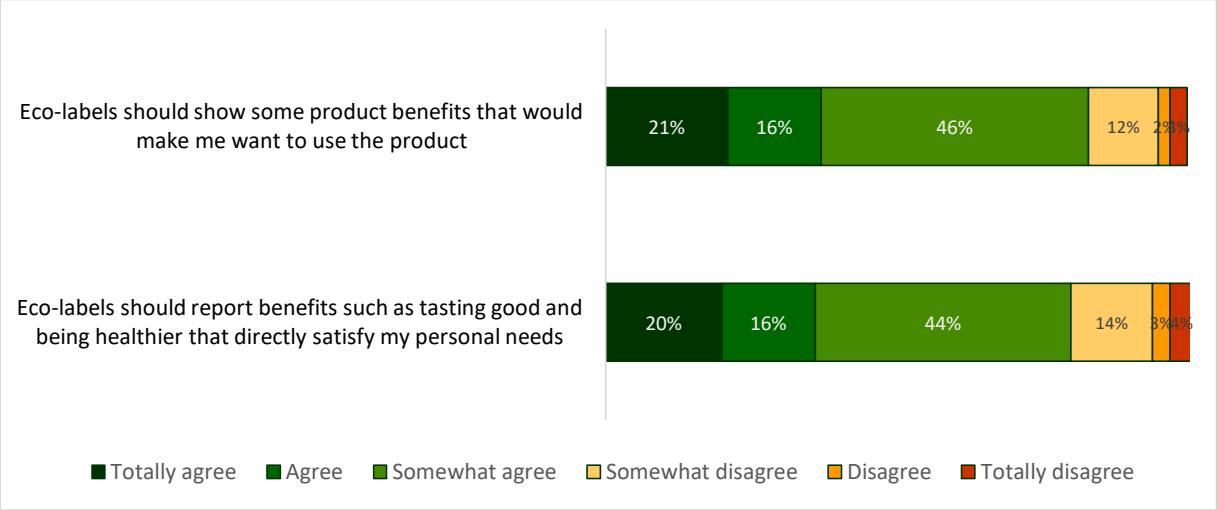


**Figure 33. Private benefits**

As shown in Figure 33, 49% respondents in Spain and 48% in France think that eco-labels should display private benefits alongside the information they are intended to communicate. While in Italy, only 44% of respondents in our sample shared this view, only 33% of respondents in the UK rated private benefits on eco-labels as important.

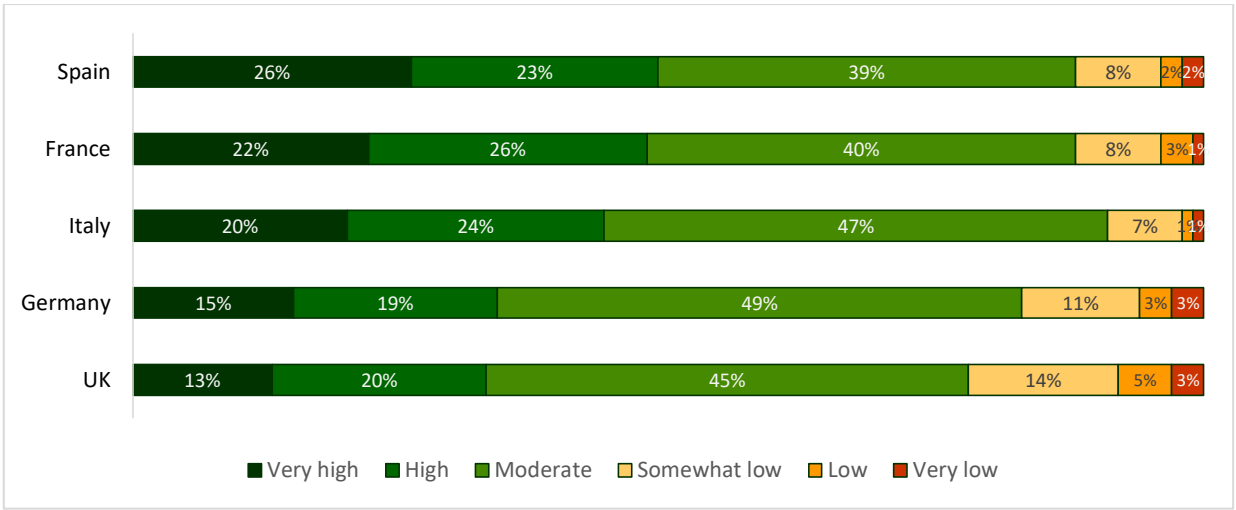


**Figure 34. Private benefits of eco-labels**

## 1.5.6. Persuasiveness

One-third of respondents have a more positive opinion of products with an eco-label on their packaging. However, as shown in Figure 34, only 28% agree that eco-labels influence their buying choices.

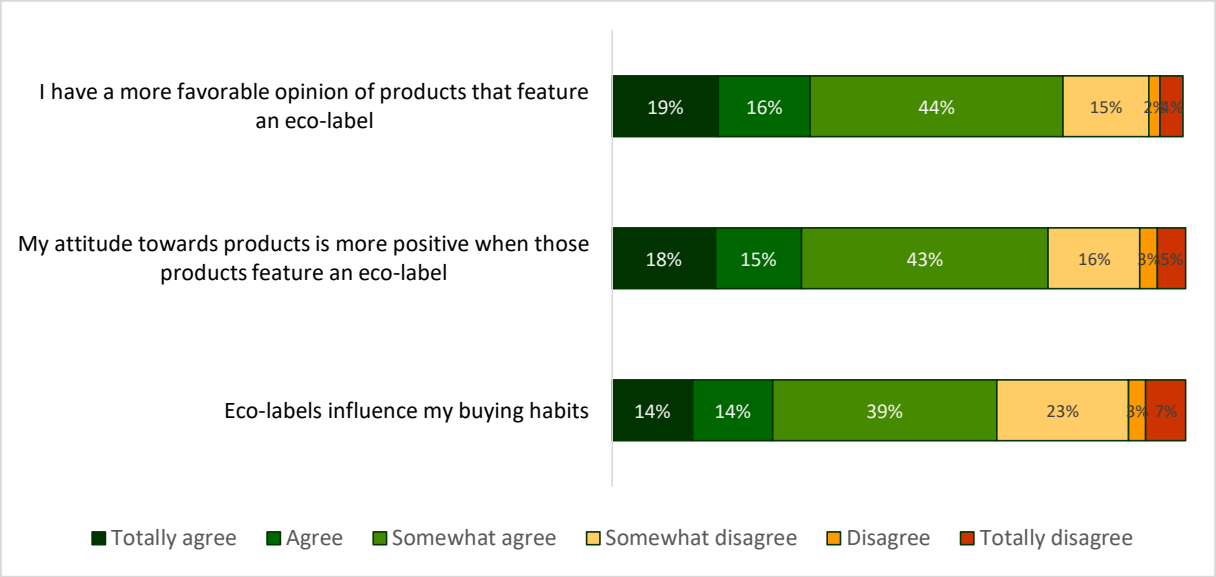


**Figure 35. Persuasiveness of eco-labels**

Mediterranean respondents in our sample think that eco-labels are persuasive enough to influence in their purchasing choices. Instead, fewer respondents in northern countries stated that eco-labels influence their choices when shopping. Results are shown in Figure 35.

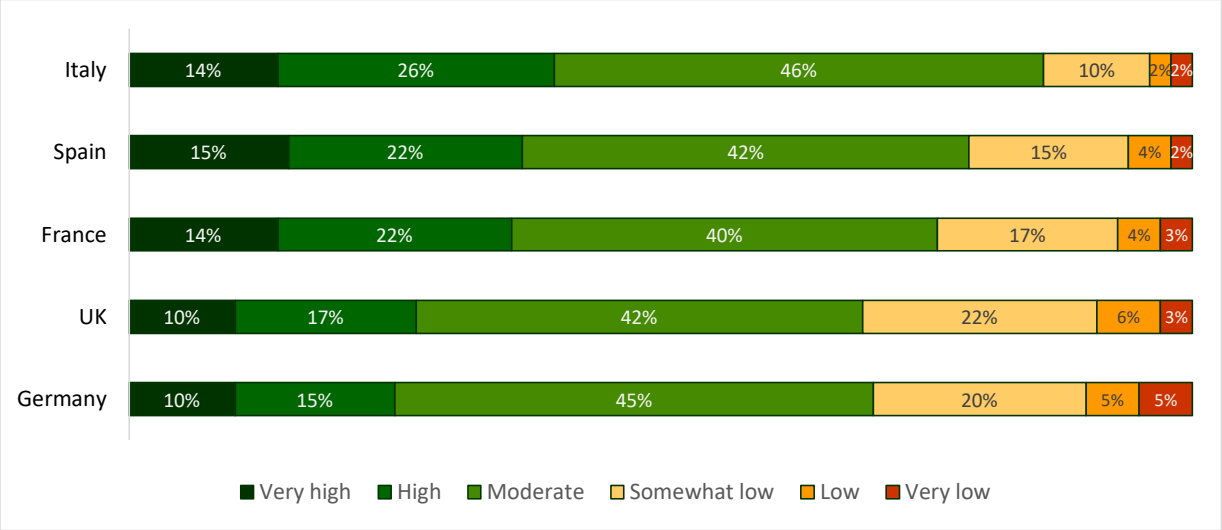


**Figure 36. Persuasiveness of eco-labels**

## 1.5.7. Summary about eco-labels

We summarized graphically our findings regarding the main attributes on eco-labels in Figure 36. As can be noted, self-reported knowledge on eco-labels scored high among respondents in our sample. Next, it appears that showing what private benefits consumers can gain from buying eco-labelled products is important to them. The same can be said about the credibility of information that eco-labels deem to convey. Being aware and involved with eco-labels was ranked very high and high by a total of 34% respondents. However, only one-third of our respondents are persuaded by eco-labels to buy eco-labelled products, while 17% and 7% of respondents are convinced by eco-labels to buy eco-labelled products. According to these results, the presence of an eco-label alone has an influence on one-third of respondents. Finally, the design of eco-labels was rated by 29% of respondents as having a somewhat low level of importance and by 14% as having low and very low importance.

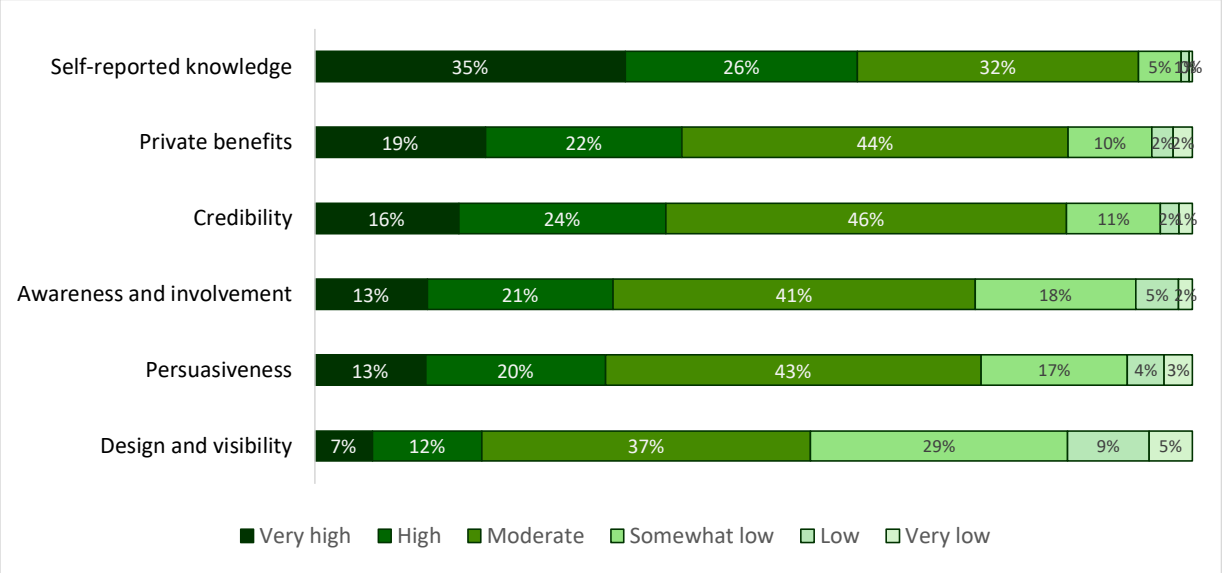


**Figure 37. Sub-dimensions of eco-labels**

## 1.6. INFORMATION ON GREEN PRODUCTS

As highlighted in the most recent EU Green Deal (European Commission, 2020), “reliable, comparable and verifiable information also plays an important part in enabling buyers to make more sustainable decisions and reduces the risk of ‘green washing’”. In particular, producers need to provide complete, correct, and easy-to-understand information on the environmental performance of their products along their life cycles. Otherwise, the lack of such information may lead to greener products not being rewarded by the market (Borin et al., 2011). Furthermore, studies on consumer behaviour have shown there is a misalignment between consumer perceptions about the environmental performance of products and their real performance based on life cycle assessments (Van Dam, 1996; Boesen et al. 2019). In this respect, not only do producers need to provide information, but consumers need to seek that information that can guide them in their purchasing choices. Consumer propensity to gather additional information on the environmental impacts of green products along their life cycles may be particular important to understand their environmental benefits, which may not be always immediately perceived. For these reasons, we investigated the level of knowledge about life cycle as a concept and the life cycle assessment, and the information seeking attitude of consumers.

### 1.6.1. Knowledge about life cycle

As shown in Figure 37, respondents reported to be more knowledgeable about the concept of product life cycle, than about the life cycle assessment methodology (LCA). Indeed, approximately half of the respondents think they are not aware of the meaning of LCAs. Surprisingly, more respondents affirmed to know what the Product Environmental Footprint (PEF) is.

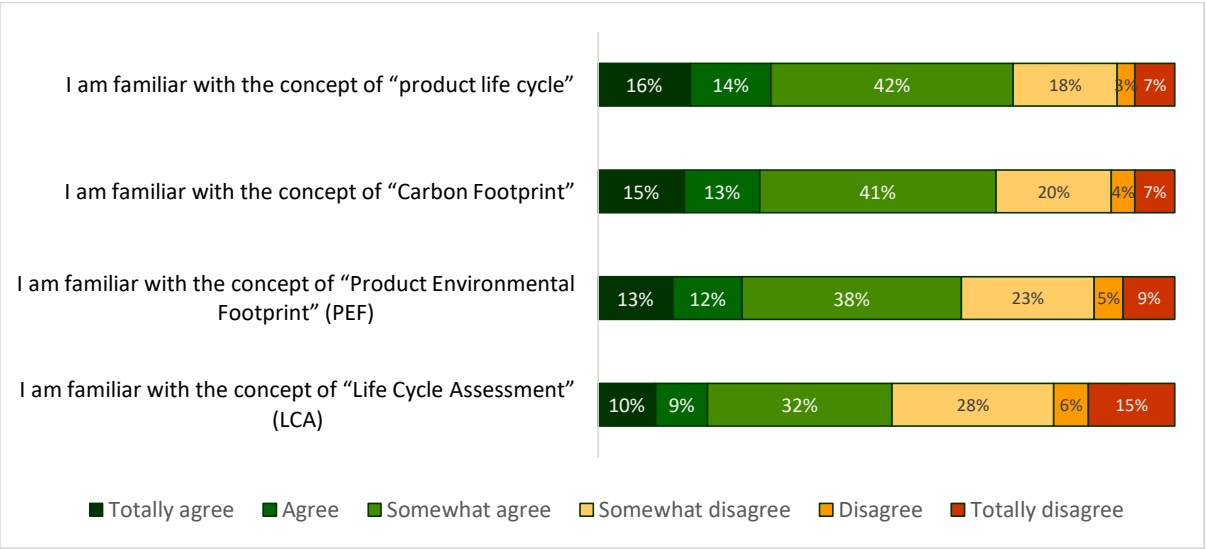


**Figure 38. Self-reported knowledge on life cycle**

As shown in Figure 41, 65% of respondents in our sample know that as a consumer they can play a part in reducing the environmental impacts of products. While 11% thought the opposite was true, one quarter of the sample chose ‘I don’t know’ as an answer. Approximately half of the respondents chose the correct answer concerning the definition of both the LCA and PEF studies. Fewer people (43%) are aware about the existence of a methodology to calculate the environmental performance of products throughout their life cycle. A further inferior slice of our sample, 31%, knows that the Carbon Footprint does not account for the amount of coal extracted to manufacture products. Results are shown in Figure 38.

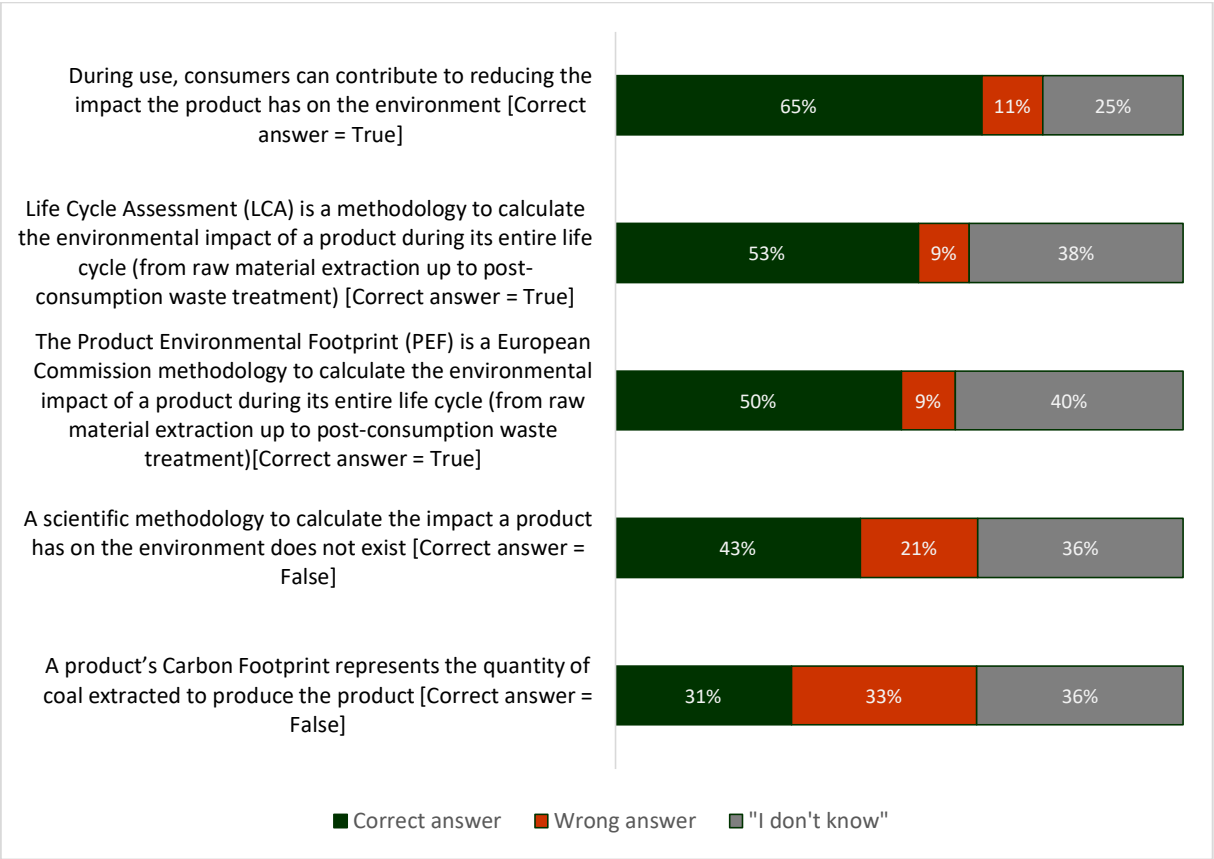


**Figure 39. General knowledge about life cycle studies**

## 1.6.2. Information seeking

In relation to Figure 39, only 30% of respondents totally agree and agree they look for more information about the manufacturing process of products, such as where they were manufactured, the ingredient list, and environmental information. Regarding this statement, 46% tend to agree they do so. In two other statements, we asked if they look for more information on whether the product packaging or other sources, like websites and other media. Interestingly, the percentage of respondents is quite similar within the two behaviours, as can be seen below.

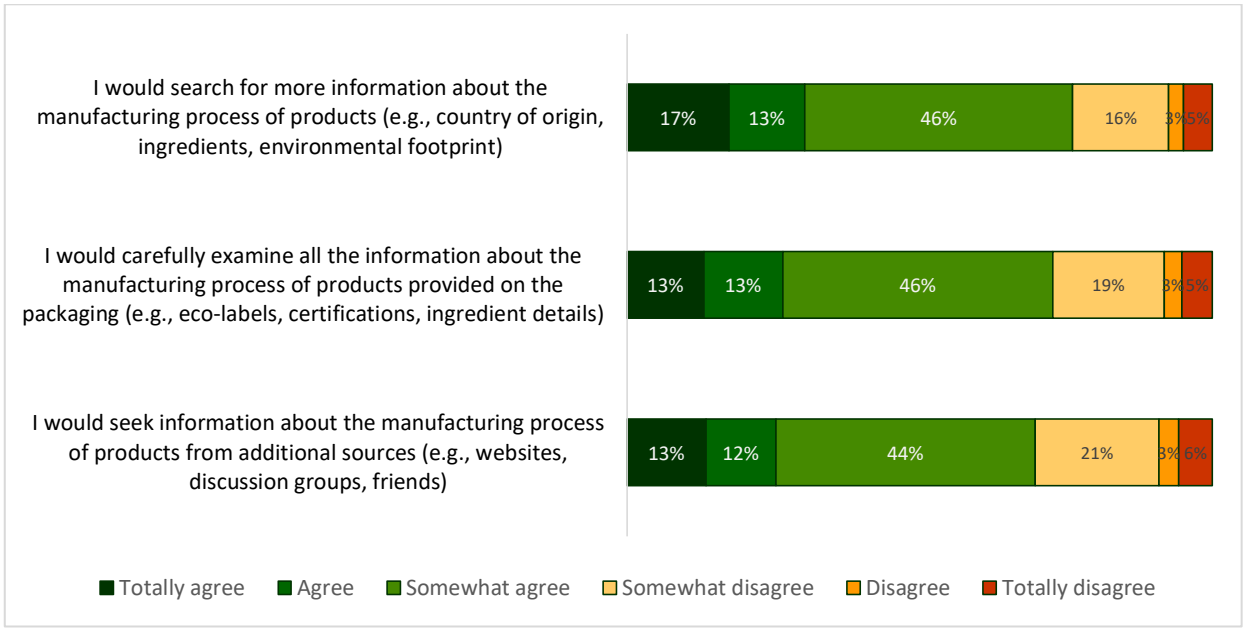


**Figure 40. Information seeking by consumers**

Figure 40 shows the percentage of respondents in our sample who declare to look for additional information on the manufacturing process of products and those who do not. While 29% agree they look for more information, 46% only tend to agree, 19% tend to disagree, and 6% disagree.

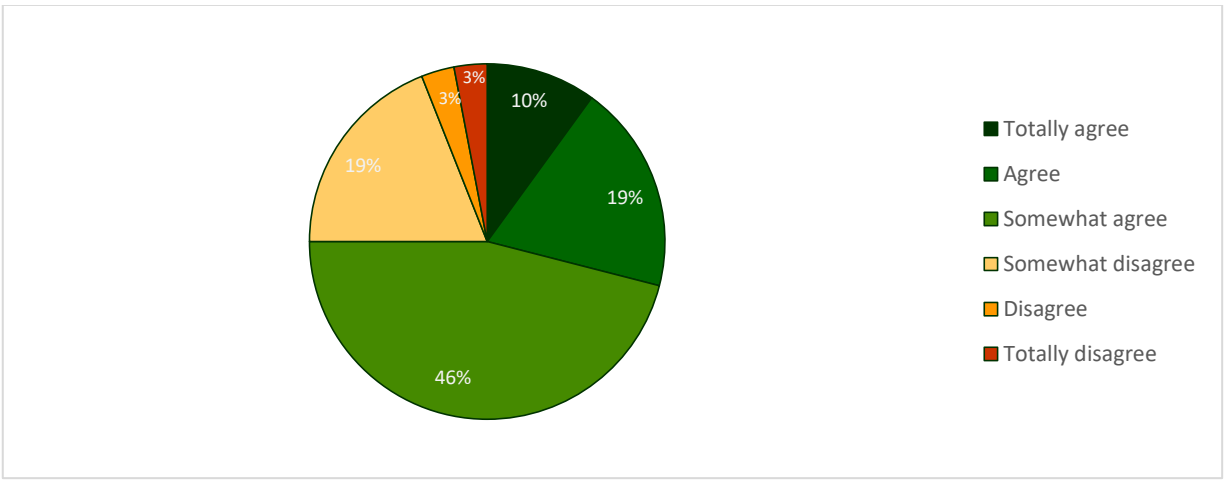


**Figure 41. Information seeking (total)**

Finally, when compared by country, respondents in Italy and Spain are closely followed by French when it comes to look for additional information about products. British instead declare to have a lower predisposition to look for additional information as shown in Figure 41.

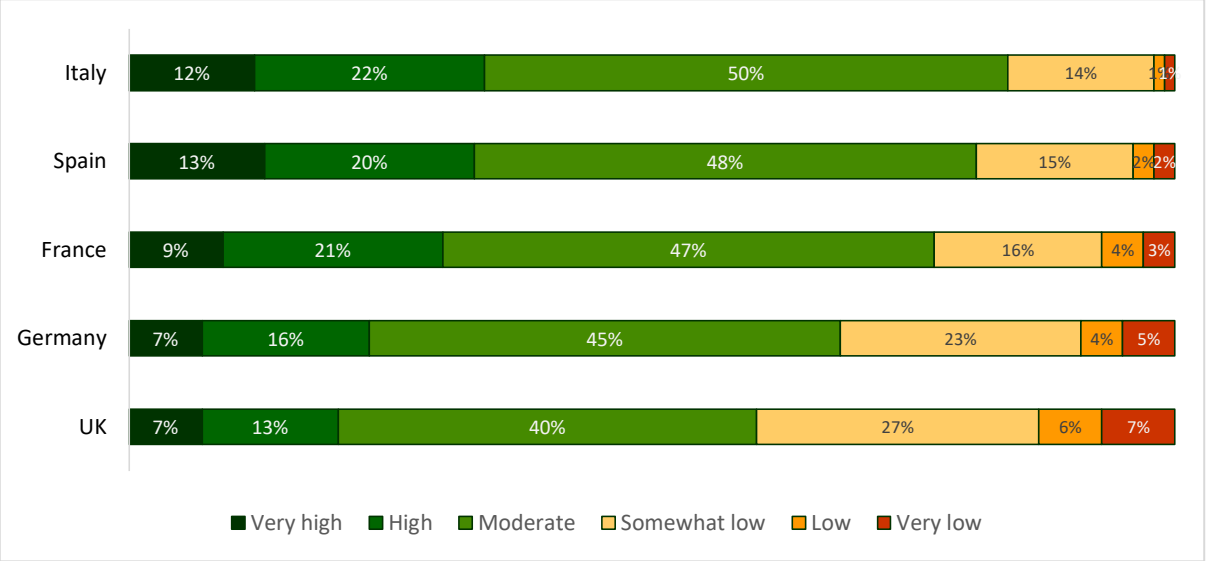


**Figure 42. Information seeking by country**

## 1.6.3. Information format preferences

We asked respondents to state their preferences about how they would rather visualize environmental information on product packaging. Respondents could state up to three preferences among those shown. In Figure 42, results indicate that 35% of the respondents prefer environmental information to be presented with a scale rating environmental characteristics from best to worst, such as those already in use with energy appliances. One of the reasons that may explain this preference is consumers are familiar with this method and it is easy to understand. Following from this, 25% of the respondents chose numerical data as a way to display environmental information, followed by 24% who chose a comparison on environmental performance of similar products.

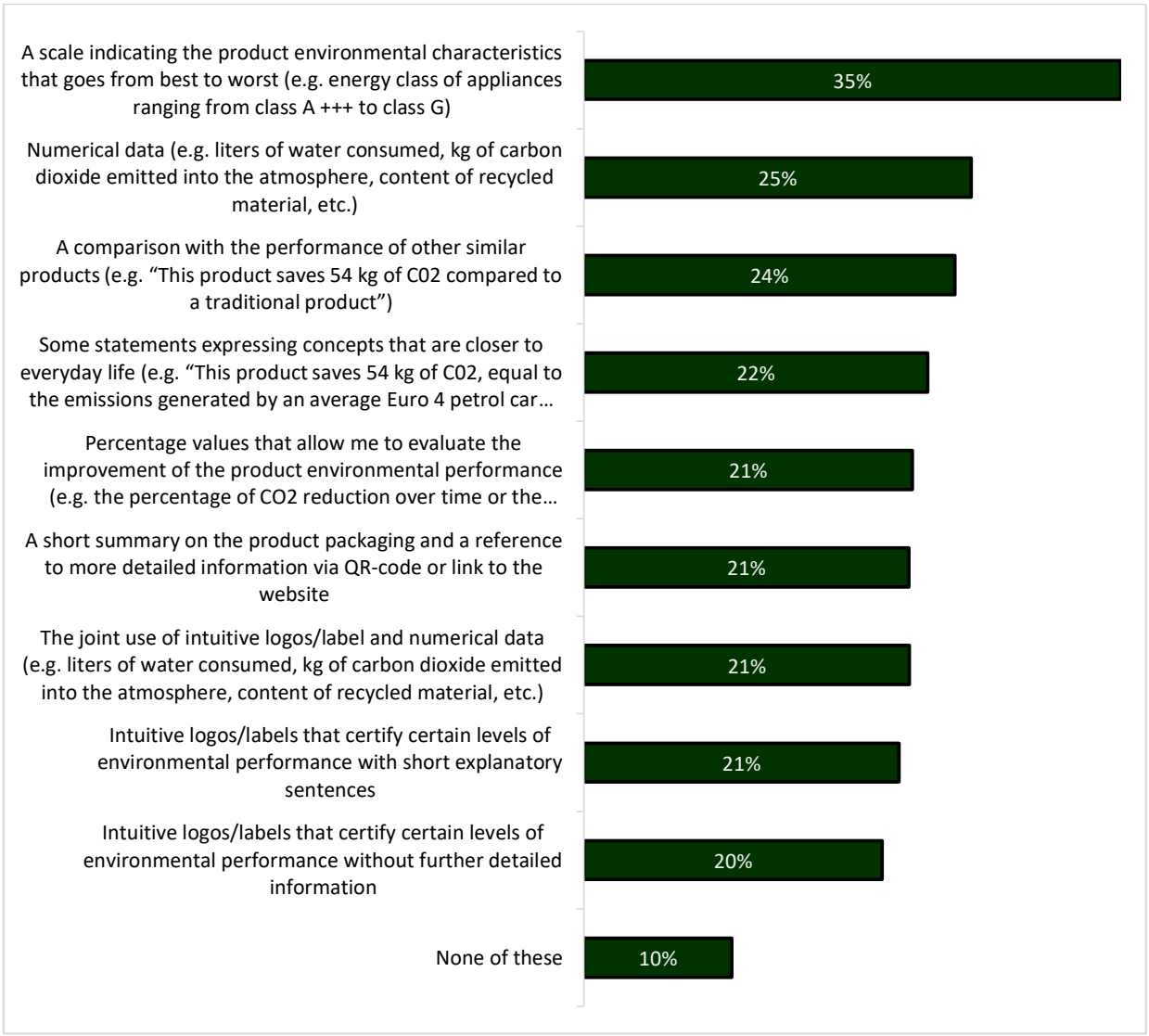


**Figure 43. Environmental information format preferences**

## 1.7. RELATIONS AMONG THE VARIABLES

To shed light on the main factors related with the green purchasing and post-purchasing behaviour, we investigated the correlation among the variables measured through the questionnaire. Hereafter we describe the main evidences, while the complete correlation matrix is reported in the *Appendix B* of this report.

First, we found a strong correlation between the **life cycle attentive purchasing behaviour of food and non-food products**, with a correlation coefficient - hereafter "β" - equal to 0,85. This means that, in general, people who behave accordingly to the life cycle environmental impact reduction, follow the same considerations both for food products and for other non-food consumer products. Moreover, a strong correlation was found also between **purchasing** and **post-purchasing behaviour**, showing that people that buy *green*, more likely will act *green* also in post-consumption choices (β= +0,56 for non-food category and β= 0,53 for food category).

The analysis showed also that **other pro-environmental behaviours** such as conservation lifestyle, social environmentalism and environmental citizenship are strongly predictive of a consumer life cycle attentive behaviour both in purchasing and post-purchasing (β≈0,50).

An important relation was found also between the **purchasing behaviour** and the **perception about eco-labels**. In particular, we found that **awareness and involvement** in eco-labels and their perceived **credibility** and **persuasiveness** are strongly predictors of green products buying behaviour (β≈0.60). This suggests that eco-labels, and in general credible and verifiable environmental information, are fundamental elements to take into consideration to provide to consumer a crucial instrument to make more responsible and life cycle attentive choices. Also the personal **predisposition to seek for further information** is resulted strongly related with the green purchasing behaviour (β≈0.50). In fact, information on the environmental features is not always easy to decipher even when businesses disclose information on their products, and **concerned consumers** are more likely to undertake intentional learning strategies to make informed decisions. In this way the action of seeking information can increase the probability of making environmentally aware choices related to buying products. This gives suggestions also for future development of informative strategies for an easier accessibility to information: the more the consumer will be led to look for information – also with the support of new technologies -, the more likely he will be able to choose critically and support the green market.

It deserves attention also the observed strong relation between the **post-purchasing behaviour** and the **perceived consumer effectiveness (PCE)**. This one can be defined as the consumer's estimate of his or her ability to contribute effectively to specific environmental related outcomes through individual specific behaviours. This means that consumers need to be reassured about the usefulness of their actions in order

to be motivated to act. This could be done also through a complete and understandable information that quantifies in transparency the environmental advantages derived from their own choices.

We didn't find relevant correlation between the purchasing (and post-purchasing) behaviours and the **demographic variables** such as family size and educational level. These correlations are statistically significant but very low ($\beta<0,05$).

## 1.8. CONCLUSIONS

This study highlighted how individuals across five European countries behave in purchasing and post-purchasing situations (green consumption). When it comes to purchasing behaviour, respondents are particularly attentive to avoid food waste. However, respondents tend to adopt green purchasing behaviour when they buy foodstuff, whereas in the post-purchasing phase they engage in green life cycle behaviour with non-food products.

Respondents reported high levels of conservation lifestyle, as they recycle their waste and try to save energy and water in their households. Furthermore, among different types of consumer identities, respondents rated thrifty behaviours higher than other behaviours belonging to other consumer profiles.

Mediterranean countries, i.e. Italy, Spain, and France, are generally more environmentally concerned than northern countries in our sample, namely Germany and the UK. This is reflected in other dimensions, where the three southern European countries tend to behave more environmentally friendly than Germany and the UK.

Equally, respondents in Italy, Spain, and France trust more both self and third-party certified product claims on packaging, and tend to have less greenwashing beliefs than German and British respondents.

As for eco-labels on product packaging, more than half respondents reported to know the meaning behind eco-labels. Interestingly, respondents affirmed they would like to have eco-labels on packaging to show along their primary information also what private benefits they would get from consuming or using that product. However, in aggregate terms, eco-labels are persuasive in influencing consumer purchasing behaviour only for one-third of respondents. When examined by country, Italians are more likely to be influenced than British or German respondents.

Half of the respondents know what a life cycle assessment and the EU Product Environmental Footprint are. However, only a small percentage of respondents affirmed that they seek for more information. When they do so, they would like environmental information to be communicated with a scale ranging from best to worst as a primary choice.

## REFERENCES (SECTION 1)


- Akerlof, G. A. (1978). The market for "lemons": Quality uncertainty and the market mechanism. In *Uncertainty in economics* (pp. 235-251). Academic Press.
- Alchian, A. A., & Demsetz, H. (1972). Production, information costs, and economic organization. *The American economic review*, *62*(5), 777-795.
- Arvola, A., Vassallo, M., Dean, M., Lampila, P., Saba, A., Lähteenmäki, L., & Shepherd, R. (2008). Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour. *Appetite*, *50*(2-3), 443-454.
- Ashforth, B. E., & Gibbs, B. W. (1990). The double-edge of organizational legitimation. *Organization science*, *1*(2), 177-194.
- Awad, T. A. (2011). Environmental segmentation alternatives: buyers' profiles and implications. *Journal of Islamic Marketing*.
- Ba, S., & Pavlou, P. A. (2002). Evidence of the effect of trust building technology in electronic markets: Price premiums and buyer behavior. *MIS quarterly*, 243-268.
- Barbarossa, C., & Pastore, A. (2015). Why environmentally conscious consumers do not purchase green products. *Qualitative Market Research: An International Journal*.
- Borin, N., Cerf, D. C., & Krishnan, R. (2011). Consumer effects of environmental impact in product labeling. *Journal of Consumer Marketing*.
- Chen, Y. S., & Chang, C. H. (2012). Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust. Management Decision, 50(3), 502-520.
- Cosmetica Italia (2018) Evoluzione Del Fenomeno "Green" Nel Cosmetico. Accessibile su: https://www.cosmeticaitalia.it/export/sites/default/centro-studi/beauty-trend-watch/BTW-Marzo-2018-green.pdf [Visualizzato il: 08/11/2018]
- Cottrell, S. P., & Graefe, A. R. (1997). Testing a conceptual framework of responsible environmental behavior. *The Journal of Environmental Education*, *29*(1), 17-27.
- Crompton, T. (2010). Common cause: The case for working with our cultural values.
- Darnall, N., & Aragón-Correa, J. A. (2014). Can ecolabels influence firms' sustainability strategy and stakeholder behavior?.
- Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. California management review, 54(1), 64-87.
- Dickson, M. A., & Littrell, M. A. (1997). Consumers of clothing from alternative trading organizations: Societal attitudes and purchase evaluative criteria. *Clothing and Textiles Research Journal*, *15*(1), 20-33.
- Ellen, P. S., Webb, D. J., & Mohr, L. A. (2006). Building corporate associations: Consumer attributions for corporate socially responsible programs. Journal of the academy of Marketing Science, 34(2), 147-157.

- European Commission, 2017. Eurobarometer 2017 Eurobarometer surveys on public attitudes to the environment, available at: http://ec.europa.eu/environment/eurobarometers_en.htm [Last accessed May 2020]
- Gigerenzer, G. and Todd, P.M., 1999. Simple Heuristics That Make Us Smart.
- Gosselt, J. F., van Rompay, T., & Haske, L. (2019). Won't get fooled again: The effects of internal and external CSR ECO-labeling. *Journal of business ethics*, *155*(2), 413-424.
- Hustvedt, G., & Dickson, M. A. (2009). Consumer likelihood of purchasing organic cotton apparel. *Journal of Fashion Marketing and Management: An International Journal*.
- Jiang, P., Jones, D. B., & Javie, S. (2008). How third-party certification programs relate to consumer trust in online transactions: An exploratory study. *Psychology & Marketing*, *25*(9), 839-858.
- Kang, J., Liu, C., & Kim, S. H. (2013). Environmentally sustainable textile and apparel consumption: the role of consumer knowledge, perceived consumer effectiveness and perceived personal relevance. International Journal of Consumer Studies, 37(4), 442-452.
- King, A. A., Lenox, M. J., & Terlaak, A. (2005). The strategic use of decentralized institutions: Exploring certification with the ISO 14001 management standard. *Academy of management journal*, *48*(6), 1091-1106.
- Mishra, A. K., & Spreitzer, G. M. (1998). Explaining how survivors respond to downsizing: The roles of trust, empowerment, justice, and work redesign. Academy of management Review, 23(3), 567-588.
- Mohr, L. A., Webb, D. J., & Harris, K. E. (2001). Do consumers expect companies to be socially responsible? The impact of corporate social responsibility on buying behavior. *Journal of Consumer affairs*, *35*(1), 45-72.
- Moon, S., Aller, H., Yellin, E., Knox, K., & Schumacher, J. (2013). U.S. Patent No. 8,412,623. Washington, DC: U.S. Patent and Trademark Office.
- Munksgaard, J., Wier, M., Lenzen, M., & Dey, C. (2005). Using input-output analysis to measure the environmental pressure of consumption at different spatial levels. *Journal of Industrial Ecology*, *9*(1-2), 169-185.
- Newton, J. D., Tsarenko, Y., Ferraro, C., & Sands, S. (2015). Environmental concern and environmental purchase intentions: The mediating role of learning strategy. Journal of Business Research, 68(9), 1974-1981.
- Nielsen Company. (2015) "Consumer-goods' brands that demonstrate commitment to sustainability outperform those that don't". Scaricabile dal sito https://www.nielsen.com/eu/en/press-room/2015/consumer-goods-brands-that-demonstrate-commitment-to-sustainability-outperform.html
- Niinimäki, K. (2010). Eco-clothing, consumer identity and ideology. *Sustainable development*, *18*(3), 150-162.

- Ottman, J. A., Stafford, E. R., & Hartman, C. L. (2006). Avoiding green marketing myopia: Ways to improve consumer appeal for environmentally preferable products. Environment: Science and Policy for Sustainable Development, 48(5), 22-36.
- Ottman, R. (1995). Gene-environment interaction and public health. American Journal of Human Genetics, 56(4), 821.
- Parguel, B., Benoît-Moreau, F., & Larceneux, F. (2011). How sustainability ratings might deter 'greenwashing': A closer look at ethical corporate communication. *Journal of business ethics*, *102*(1), 15.
- Pelsmacker, P. D., Janssens, W., Sterckx, E., & Mielants, C. (2006). Fair-trade beliefs, attitudes and buying behaviour of Belgian consumers. *International Journal of Nonprofit and Voluntary Sector Marketing*, *11*(2), 125-138.
- Ramayah, T., Lee, J. W. C., & Mohamad, O. (2010). Green product purchase intention: Some insights from a developing country. *Resources, conservation and recycling*, *54*(12), 1419-1427.
- Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental psychology*, 38, 104-115.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of environmental psychology*, 29(3), 309-317.
- Solomon, M. R., & Rabolt, N. J. (2004). Consumer behavior: In fashion. Prentice Hall.
- Tanner, C., & Wölfing Kast, S. (2003). Promoting sustainable consumption: Determinants of green purchases by Swiss consumers. *Psychology & Marketing*, *20*(10), 883-902.
- Taufique, K. M. R., Polonsky, M. J., Vocino, A., & Siwar, C. (2019). Measuring consumer understanding and perception of eco-labelling: Item selection and scale validation. *International journal of consumer studies*, *43*(3), 298-314.
- Taufique, K.M.R., Vocino, A., Polonsky, M.J. (2017). The influence of eco-label knowledge and trust on pro-environmental consumer behaviour in an emerging market. *Journal of Strategic Marketing, 25* (7), pp. 511-529.
- Thøgersen, J., de Barcellos, M. D., Perin, M. G., & Zhou, Y. (2015). Consumer buying motives and attitudes towards organic food in two emerging markets: China and Brazil. *International Marketing Review*.
- Trivedi, R. H., Patel, J. D., & Acharya, N. (2018). Causality analysis of media influence on environmental attitude, intention and behaviors leading to green purchasing. *Journal of Cleaner Production*.
- United Nations Environment Programme (UNEP), 2019. Global environment outlook 6: Healthy planet, healthy people. Cambridge, UK: University Printing House.
- Vanhamme, J., & Grobben, B. (2009). "Too good to be true!". The effectiveness of CSR history in countering negative publicity. *Journal of Business Ethics*, *85*(2), 273.

- Vermeir, I., & Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer "attitude–behavioral intention" gap. *Journal of Agricultural and Environmental ethics*, *19*(2), 169-194.
- Wheale, P., & Hinton, D. (2007). Ethical consumers in search of markets. *Business Strategy and the Environment*, *16*(4), 302-315.
- Zhang, J., Liu, H., Sayogo, D. S., Picazo-Vela, S., & Luna-Reyes, L. (2016). Strengthening institutional-based trust for sustainable consumption: Lessons for smart disclosure. *Government Information Quarterly*, *33*(3), 552-561.

# 2. THE EXPERIMENTAL STUDY

## 2.1. CONTEXT

In the last 30 years, the discussions about climate change have highlighted the importance of a transition towards more sustainable patterns of production and consumption. This has greatly increased the offer of products that advertise themselves as green (Delmas & Burbano, 2011). However, many different researchers have found that a large proportion of these "sustainable claims" are fallacious. This phenomenon, called green-washing, consists of providing consumers with false, exaggerated or incomplete information about the product's environmental performance in order to gain market-share in the niche of green consumers (Dahl, 2010).

This type of abuse calls for clearer and stricter guidelines for sustainability performance communication. In this context, two main pillars should be considered to shape these rules: (1) information reliability: using certified methods to calculate the environmental impacts of the products. In here, Life Cycle Assessment (LCA) emerges as probably the most accepted technique to rely on, widely used throughout the world (Hauschild et al., 2018); (2) communication style, comprising how and how much information should be disclosed to consumers.

If in one side having a LCA as a referential methodology sorts out the information reliability pillar, its intrinsic complexities represent a challenge for the communication process.

First, LCA's outcomes are displayed in essentially technical units. Climate change, for example, is presented in $CO_2$ equivalents. Therefore, it is hard to believe that the majority of the consumers will be able to picture what these numbers represent in practical terms. Would their evaluation of a certain product change if, for example, the performance was converted to the number of kilometers a high-speed train would have to cover to emit an equivalent amount of $CO_2$?

Second, a LCA study outputs 16 impact categories. Naturally, companies are bound to communicate only the most relevant ones. Still, even if they were reduced to 3, a comparative analysis involving other products would be considerably complex. What would the consumer's choice be when confronted with 3 products, each of them standing out in one different impact category and leveled amongst them on the others?

Finally, LCA protocols vary from product to product. Thus, it is possible – not to say likely – that products only slightly different, that tend to be competitors (e.g. coffee and tea, beer and wine) will disclose different impact categories. This might originate a situation in which consumers will have to confront products with missing information. How would they decide in a missing info scenario?

In order to answer these questions, we used data derived from LCA studies to design an online discrete choice experiment. In the next section we describe it in detail.

## 2.2. EXPERIMENTAL DESIGN

The data was collected through an online platform left active for approximately one month between April and May of 2020. The same experiment was ran for two different products: ground coffee (250 g package) and hand soap (300 ml dispenser). The idea behind including different categories of relatively cheap products that could mimic hedonic (coffee) and utilitarian (hand soap) acquisitions was to extend the external validity of our findings. The authors grant that ground coffee would hardly be classified as a hedonic acquisition in most parts of the world. However, in the Italian context, the act of drinking coffee encompasses rituals and traditions that greatly approximates it to what is generally considered hedonic consumption, i.e. an experiential and sensational practice (Lu et al., 2016). In this report, for the sake of simplicity, we will present only the results obtained for coffee. The reason for that is simple: there were no significant differences between them.

In the first interaction of the experiment, 6 brands of coffee were presented to the participants. We asked them to give each of these brands a rating from 0-10. After, the prices of these products were also revealed and we asked the participants to rank them according to their preference of acquisition (thus, considering price and quality). *Figure 44* brings a representation of what respondents saw.

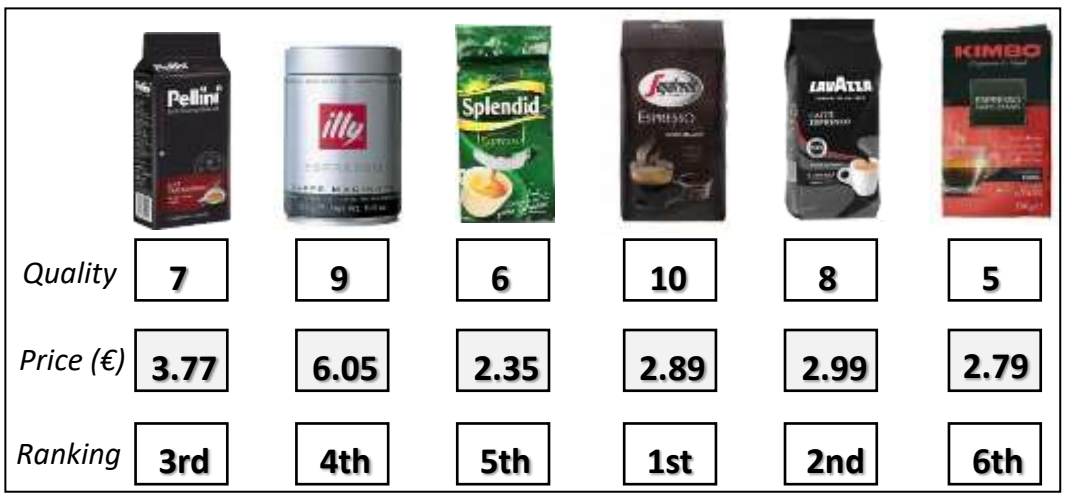


**Figure 44. Different brands of coffee presented to participants to rate quality and rank[1].**

[1] **Note:** Prices were disclosed only after the quality was rated. Quality ratings and rankings presented in this figure are for illustrative purposes only.)

So far, so good. Products left aside for a moment, from here on participants were asked to rank 6 different environmental profiles (EPs) according to their overall impact. These profiles were carefully thought to uncover three patterns on the participant's decision-making logic: (1) rationality; (2) preference for a LCA impact category; (3) perception of missing-information. The environmental profiles featured 3 impact categories as shown in *figure 45*.

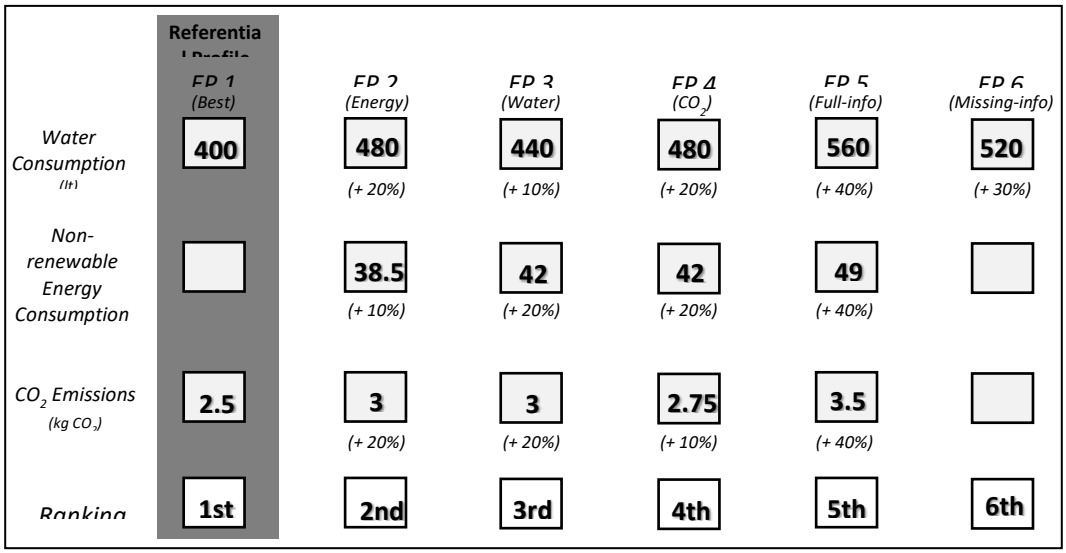


**Figure 45. Representation of the environmental profiles presented to the participants using Standard LCA communication style and "Water only" missing info-pattern.[2]**

The first pattern – rationality – can be analyzed by checking transitivity. The following rule necessarily has to hold for an answer to be considered rational: EP1 > EP2, EP3, EP4 > EP5, where ">" means that the environmental profile on the left should be better ranked than the one(s) on the right. The second, can be visualized by how EP2, EP3 and EP4 are ordered amongst them. Note that they tie in two impact categories and each of them stand out in one different category. Finally, the third is verified by the position given to the profile in which only one impact category is communicated.

If all the participants were submitted to this design, we would be able to answer properly only the second question we have posed in the introduction. As we can see, the environmental impacts are being communicated in standard LCA units and the "missing-info" profile (EP6) displays *a particular missing-info pattern* – i.e. missing "Non-renewable energy consumption" and "$CO_2$ emissions" – which would render impossible to say if the answers are related to this particular pattern of missing information or to any possible missing information pattern.

[2] **Note:** Variations in percentage are calculated with the referential profile in the numerator. Rankings present in this figure are for illustrative purposes only. The names in parenthesis below designate how we will refer to these profiles in this text to make the comprehension easier.

To sort these problems out, we employed a 3 x 3 design, randomly distributing participants in the resulting 9 different groups, each of them with a combination of communication style (Standard LCA units, units converted to daily life references and a year versus year performance comparison) and missing information pattern (only "$CO_2$ emissions", only "Non-renewable energy consumption" and only "Water consumption").

Reintroducing the products in the discussion, we tried to evaluate how do consumers make trade-offs involving price, quality and sustainability information. To do so, two questions were asked:

(1) Imagine that the product you have ranked first has the environmental profile you have ranked last. For which product and environmental profile would you change your initial choice to (if any)?

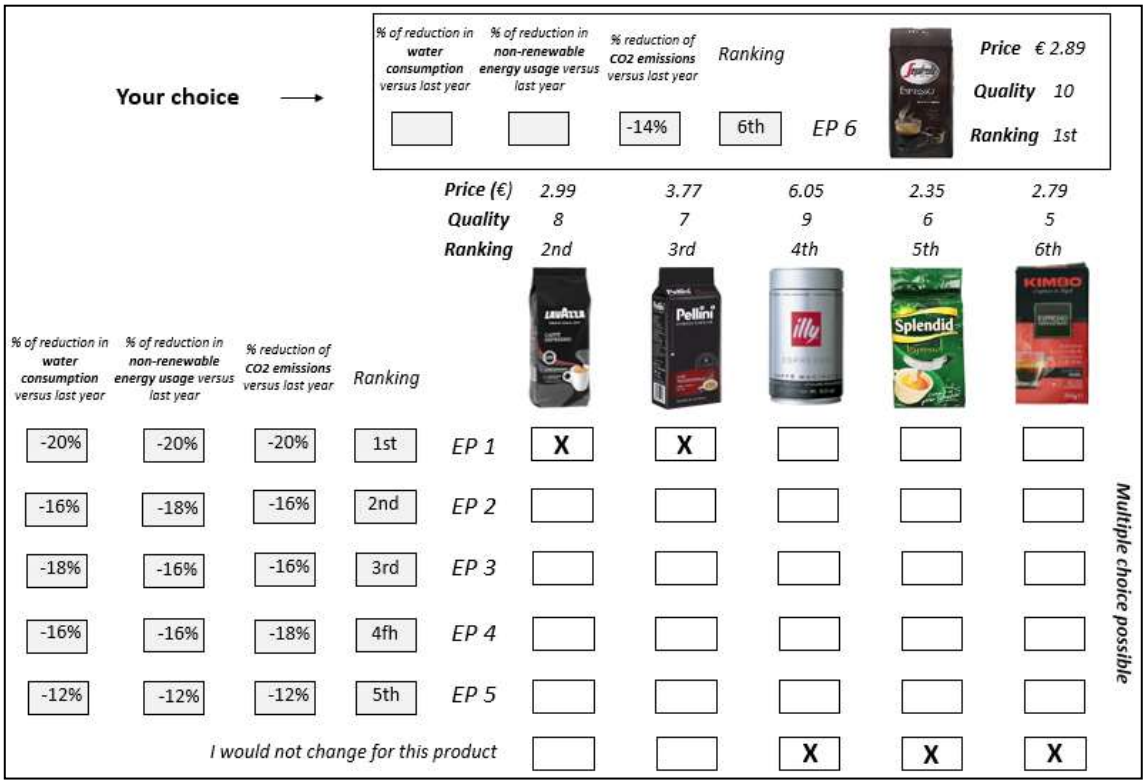


**Figure 46. Representation of the trade-off question using the "year vs. year" communication style and the "CO2 only" missing information pattern[3].**

(2) Imagine that the product you have ranked first has the environmental profile you have ranked first. What is the minimum discount the other products with other environmental profiles would have to offer for you to change you initial choice (if any)?

[3] **Note:** Quality ratings, rankings and choices present in this figure are for illustrative purposes only.

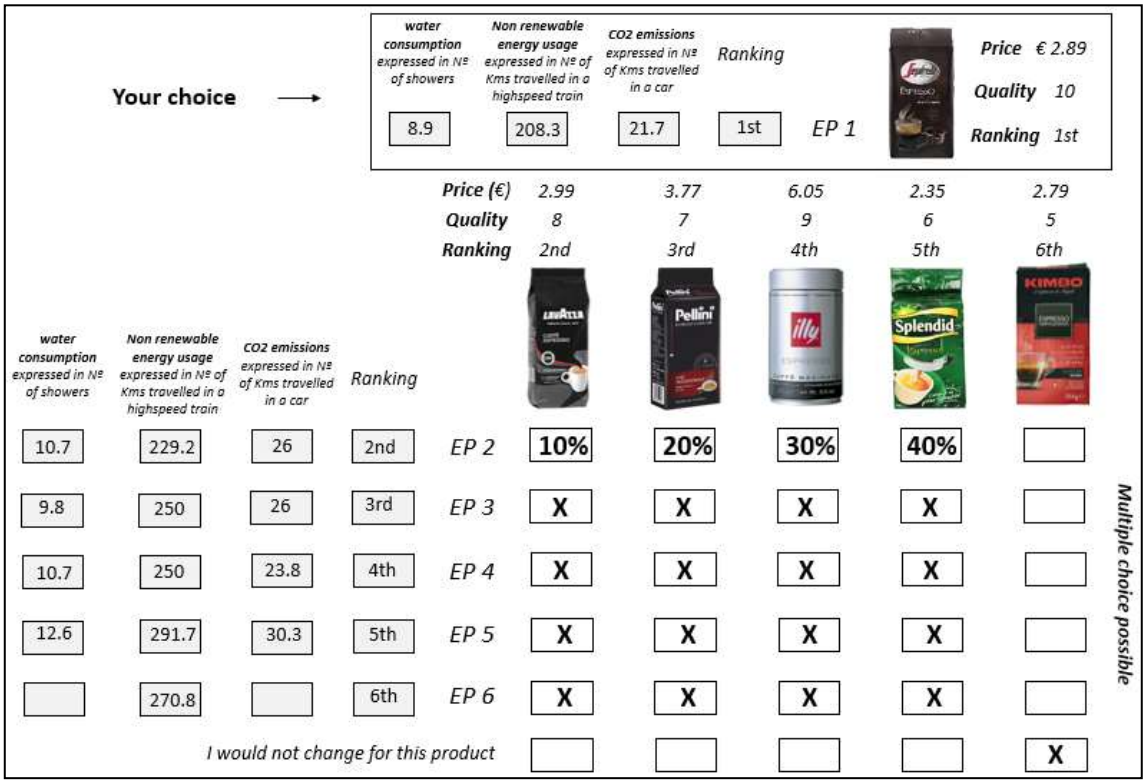


**Figure 47. Representation of the second trade-off question using the "Units converted to daily life references" communication style and the "Non-renewable energy only" missing information pattern[4].**

With that, we would be able to capture interesting insights about their trade-off behaviors across different communication styles and missing info-patterns, as well as the elasticity of their answers according to changes in prices or environmental performance.

Before diving into the results, it is important to introduce the logic behind the decisions made by the participants. With that, we will be able to conduct a more accurate assessment of the effects of each of the independent variables used in this experiment.

[4] **Note:** participants could choose 10% or more, 20% or more, 30% or more, 40% or more or no trade-off (X). Quality ratings, rankings and choices present in this figure are for illustrative purposes only

## 2.3. DIFFERENT LOGICS BEHIND THE DECISIONS

### 2.3.1. Irrational decisions

The idea that decision-makers are not fully rational (Simon, 1955) is well established in social sciences as a building block of behavioral economics. Additionally, it is also known that a large proportion of the participants recruited to online surveys/experiments are not engaged with the task (Petrik et al., 2016), so their answers frequently make no sense at all.

In this experiment, we have a check to identify this group of respondents, i.e. the transitivity. Up to 49% of the respondents have provided irrational answers and they were all excluded from the analyses presented below. The reason for that is simple: their answers display no identifiable trend that can be associated to any of the independent variables. In other words, for this portion of the respondents, it really does not matter how and how much information is communicated. Therefore, the reader should keep in mind that all the conclusions taken from this work apply to as much as 50% of the consumers.

### 2.3.2. Rational decisions

When companies are designing a marketing strategy, they generally make a market segmentation to approach each group of consumers with the most effective campaign. This procedure is based on the idea that there are relatively homogenous clusters that share values, beliefs and attitudes and, consequently, tend to be impacted in a similar way by the information they receive. The analysis of the rational portion of our sample was done using the same principle. We identified two distinct "logics of decision-making":

1. Cartesians: this group of respondents always rank profile EP1 (Best) in the 1$^{st}$ position, profiles EP2 (Energy), EP3 (Water) and EP4 ($CO_2$) are mixed in 2$^{nd}$ , 3$^{rd}$ and 4$^{th}$ and profiles EP5 (Full-info) and EP6 (Missing-info) dispute the last two spots. We call them Cartesians because their logic is the standard one. They represent 30% of the total sample
2. Gamblers: This group of respondents always ranks EP5 (full-info) in the last position. The first two positions are disputed by EP1 (best) and EP6 (missing-info). The main difference between this logic and the previous one is that the missing-info profile (EP6) is never considered for the last two positions in here. We call them Gamblers because, when asked to assess a missing info profile alongside full-info profiles, they prefer to bet it has a superior environmental performance, instead of being suspicious about the fact that the information was not provided. They represent 21% of the total sample.

All the analysis will be done for these two groups, followed by an overall statement.

## 2.4. RESULTS

### 2.4.1. Sample description

Our sample is composed by 921 respondents and it fits nicely with the Italian population in terms of age, gender and distribution throughout the country.

**Table 2. Comparison between sample and referential population[5]**

| Category | Group | Nº | Sample | Population |
|---|---|---|---|---|
| Gender | Female | 464 | 50,38% | 50,34% |
| | Male | 457 | 49,62% | 49,66% |
| Age | 18-24 | 93 | 10,10% | 10,14% |
| | 25-34 | 147 | 15,96% | 16,24% |
| | 35-44 | 182 | 19,76% | 19,86% |
| | 45-54 | 219 | 23,78% | 24,22% |
| | 55-70 | 280 | 30,40% | 29,54% |
| Area | Northwest | 243 | 26,38% | 26,66% |
| | Northeast | 174 | 18,89% | 19,31% |
| | Center | 208 | 22,58% | 22,62% |
| | South | 296 | 32,14% | 31,41% |

**Sources:** Istat (2019) and Population pyramid (2019)

There are no significant differences between the 9 groups concerning any of these features.

### 2.4.2. Environmental profile choices and its determinants

*Figure 48* shows the ranking given to each of the environmental profiles by Cartesians, Gamblers and by the two groups combined.

[5] **Note:** For gender and age, proportions were calculated for the population within the age interval encompassed by the study (18-70). For area, we used numbers for the entire population due to the absence of stratified statistics.

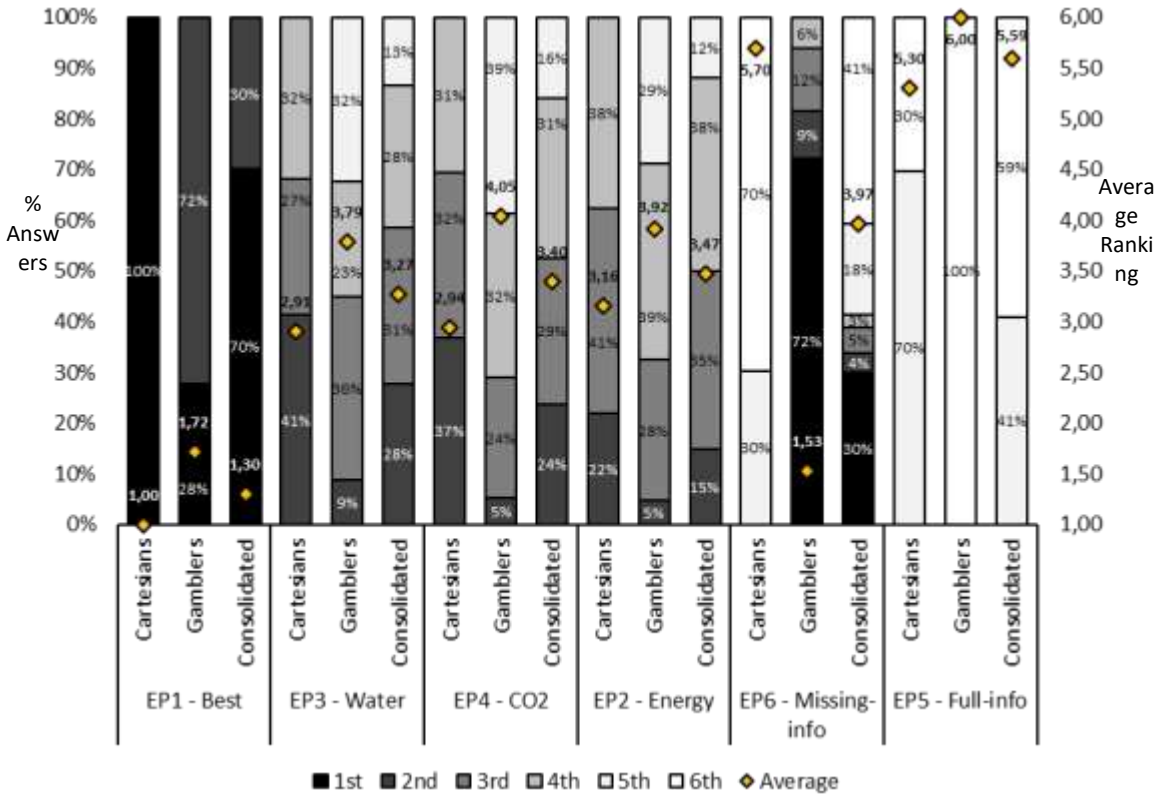


**Figure 48. Distribution of answers and average ranking given to each EP by Cartesians, Gamblers and All rational respondents (Cartesians + Gamblers).**

The first thing that captures our attention is the fact that, for the Gamblers, the missing-info option outperformed even the best performing full info profile (Best). Moreover, as much as 30% of the Cartesians would give a chance to the missing-info option and rank it in the 5th position, leaving the more transparent profile to the last one. Overall, the missing-info profile is largely preferred over the full-info profile (PA5). This suggests that, when confronted with a situation in which they have to make decisions with incomplete information, even consumers that have shown a clear capacity to make rational decisions tend to make choices that, although justifiable, are very unlikely to be on their best interest.

We analyzed if this behavior was more associated with any of the missing-info patterns tested. If such a situation was verified, this would indicate that the effect is less related to missing information in general and more associated with the absence of a particular type of information. The analysis displayed in *figure 49* shows that the behavior is consistent across all missing information patterns and, thus, confirm that these findings are generalizable to any type of missing information profile.

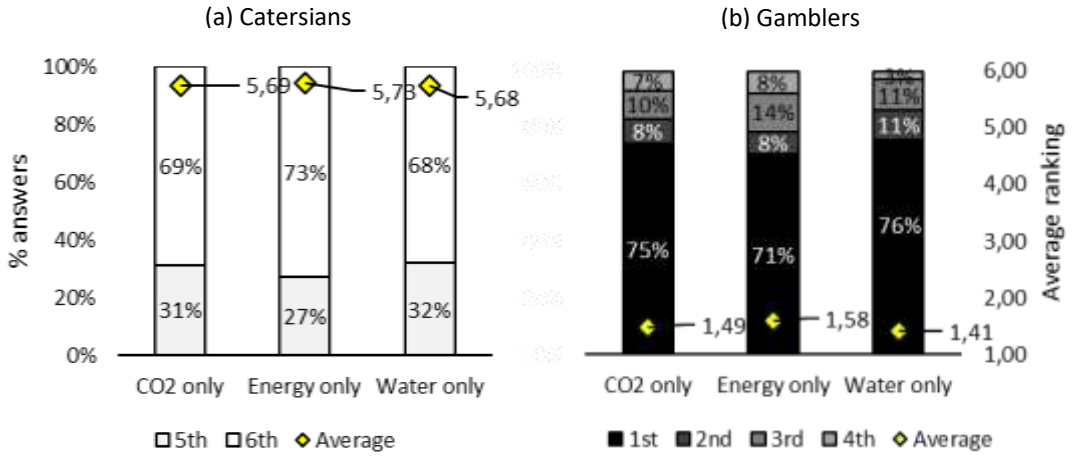


**Figure 49. Ranking of the missing-info profile (EP6) across different missing-patterns for Cartesians (a) and Gamblers (b).**

This research also identified an alternative to reduce the overrating of missing-information profiles. Our analyses have shown that the communication style seems to greatly influence the decision logic used by consumers. Consequently, it has an important impact on how people rank the missing information profile. *Figures 50 and 51* bring, respectively, the distribution of decision logics according to the communication style and the average ranking given to each of the environmental profiles according to the same variable.

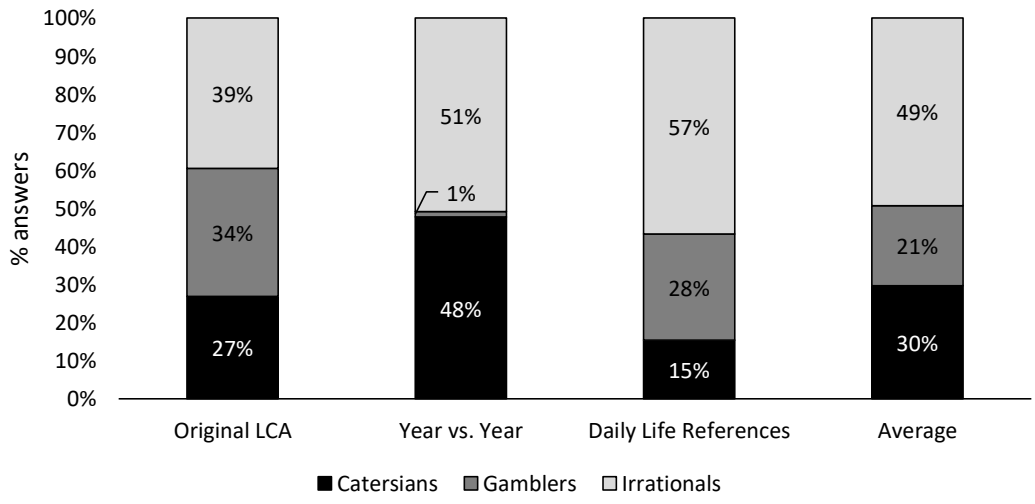


**Figure 50. Share of respondents' logic by communication style**

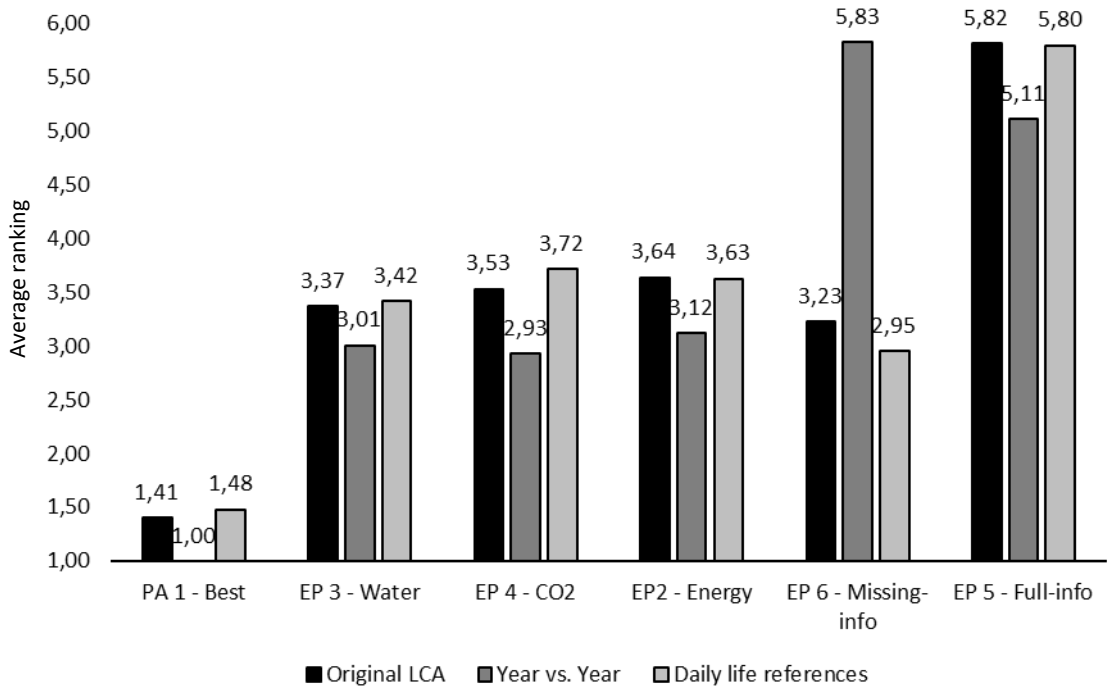


**Figure 51. Average ranking given to each of the EPs by communication style for all rational respondents (Cartesians + Gamblers)**

As shown in *figure 50*, "Year vs. Year" communication style practically prevents the Gambler decision logic from occurring, bringing the missing-info profile to the last position when figures are communicated in comparison to the previous year (figure 8). We hypothesize that this effect occurs because respondents tend to be more suspicious about missing information when the figures are reported relative to another referential value, especially if the only value(s) communicated are positive (like in our example, where PA6 reports a reduction compared to the previous year). This probably conveys the idea that the missing values were negative and that the company has intentionally dropped them to mislead consumers. With absolute values, the identification of these numbers as "negative" is less immediate (sometimes, even impossible) and essentially dependent upon the consumers' interest in finding it out.

*Figure 50* brings another surprising finding. Contrarily to what we have thought, when the communication is done with the original LCA units, respondents tend to display a more rational behavior. We suspected that translating these figures into more comprehensible indexes would make them more comfortable with the numbers, hence decisions would be more accurate. But, as it turns out, it is precisely the contrary. The only explanation for this behavior we can think of is that, once technical numbers are more difficult to understand, participants tend to make a more detailed analysis of them, reducing the rate of senseless responses. The opposite effect would occur when numbers are translated into daily life drivers.

Finally, water is slightly preferred over the other impact categories. Although this preference is rather weak, it is consistent across all logics of decision-making and two of the communication styles. This calls for further research in this field to confirm if this tendency happens with different samples and products.

### 2.4.3. Trade-off behaviour

The last two questions of the experiment aimed to evaluate how open are the consumers to change their initial choice for alternative products that have either a better environmental performance or a better price (discount). Analyzing their answers can give us useful insights about the elasticity of their choices, the difference between the elasticity for money and environmental performance and if the specificity of the product (i.e., its ranking) plays a more important role than any of these two factors. Table 2 brings the rate of change by product and environmental profile when the respondent's initial choice is hypothesized to have the worst ranked environmental profile.

**Table 3. Proportion of the respondents that would change their initial choices (product ranked 1st with EP ranked 6th) by each combination of alternative product and environmental profile[6].**

| | Environmental Profile | | | | | |
|---|---|---|---|---|---|---|
| Product | Ranked1 | Ranked2 | Ranked3 | Ranked4 | Ranked5 | Average |
| Ranked 2 | 42,9% | 18,8% | 10,7% | 6,8% | 6,8% | 17,2% |
| Ranked 3 | 34,8% | 21,2% | 14,7% | 9,0% | 6,8% | 17,3% |
| Ranked 4 | 31,6% | 19,2% | 11,5% | 11,8% | 5,6% | 15,9% |
| Ranked 5 | 32,1% | 16,9% | 9,6% | 6,6% | 11,5% | 15,3% |
| Ranked 6 | 29,9% | 13,0% | 5,8% | 8,3% | 10,7% | 13,5% |
| Average | 34,3% | 17,8% | 10,5% | 8,5% | 8,3% | 15,9% |

As we can see, the rate of acceptance falls abruptly for all products as the environmental profile of the alternative offered gets worse. On the other hand, the product does not some seem to play a capital role in the decision to switch, once the average rate of acceptance is only slightly different for the second and sixth ranked products.

The main message we receive from these data is that up to 30% of the consumers would change their initial choice for any other product if the initial choice had the worst environmental profile and one of the alternatives had the best.

[6] **Note**: This table features the answers to the question displayed in figure 3. For example, of all rational respondents, 42,9% stated they would change the product they ranked in the first position (1st) for the product they ranked in the second (2nd) if the 1st had the worst EP and the 2nd had the best.

When it comes to their willingness to change their initial choice for a discount, Table 3 shows the rates of change are considerably higher, meaning people's choices are still more elastic for price reduction than for environmental improvements.

**Table 4. Proportion of the respondents that would change their initial choices (if the alternative product(s) offered a discount) by each combination of alternative product and environmental profile.[7]**

| | Environmental Profile | | | | | |
|---|---|---|---|---|---|---|
| Product | Ranked2 | Ranked3 | Ranked4 | Ranked5 | Ranked6 | Average |
| Ranked 2 | 61,5% | 61,3% | 57,3% | 53,2% | 45,1% | 55,7% |
| Ranked 3 | 58,5% | 60,3% | 57,3% | 52,6% | 45,3% | 54,8% |
| Ranked 4 | 57,1% | 56,6% | 54,1% | 51,3% | 44,7% | 52,7% |
| Ranked 5 | 54,5% | 53,4% | 50,6% | 45,1% | 41,2% | 49,0% |
| Ranked 6 | 50,0% | 48,3% | 46,4% | 42,3% | 40,4% | 45,5% |
| Average | 56,3% | 56,0% | 53,1% | 48,9% | 43,3% | 51,5% |

This elasticity, however, will not come without a very bitter cost for the environmentally inefficient companies that are seeking for it. Table 4 shows that consumers require, on average, a 25% discount on price to accept this environmentally detrimental change.

**Table 5. Average discount required to change initial choice (when it has the best ranked environmental profile) for each combination of alternative product and environmental profile.[8]**

| | Environmental Profile | | | | | |
|---|---|---|---|---|---|---|
| Product | Ranked2 | Ranked3 | Ranked4 | Ranked5 | Ranked6 | Average |
| Ranked 2 | 20,4% | 22,5% | 24,9% | 27,6% | 29,3% | 24,6% |
| Ranked 3 | 21,6% | 23,2% | 24,7% | 26,7% | 28,4% | 24,7% |
| Ranked 4 | 21,8% | 23,5% | 25,1% | 27,0% | 28,4% | 25,0% |
| Ranked 5 | 22,6% | 23,1% | 24,1% | 27,0% | 29,4% | 25,0% |
| Ranked 6 | 24,7% | 25,8% | 26,4% | 27,1% | 28,9% | 26,5% |
| Average | 22,1% | 23,6% | 25,0% | 27,1% | 28,9% | 25,1% |

[7] **Note**: This table features part of the answers given to the question displayed in figure 4. For example, of all rational respondents, 40,4% stated they would change the product they ranked in the first position. (1st) for the product they ranked in the sixth (6th) for a discount, even if the 1st had the best EP and the 6th had the worst.

[8] **Note**: This table features part of the answers given to the question displayed in figure 4. For example, respondents required, on average, a 28,9% discount to change the product they ranked in the first position (1st) for the product they ranked in the sixth (6th), if this change implied going from the best EP to the worst.

Regardless of which is the alternative product, the discounts get higher as the environmental profile gets worse.

Finally, neither the 2 logics of decision making nor the 3 missing-info patterns differ among each other when it comes to the trade-off behavior. On the other hand, when data was communicated in comparison with the previous year, the rate of change for better environmental performance is 28% higher than the average of the other two communication styles. The same does not hold for discounts, where the rate of change for "year vs. year" is only 5% higher. This suggests this communication style makes people more open to changing their initial choice for more sustainable products.

## 2.5. CONCLUSIONS

These results have major implications from a policy-making point of view. First, clear rules to communicate environmental performance seem to be absolutely necessary. If policy-makers want consumers to make informed and reasonable decisions, they have to enforce the disclosure of the same type of information for products within the same category (and perhaps even for those with interchangeable, neighboring categories).

If setting these kind of rules proves too complicated, establishing "Year vs. Year" communication style as the standard should be considered an option. However, caution is recommended, once the "Year vs. Year" style is a relative index, i.e. indicates only how the product's environmental performance has changed over time (not its absolute impact). Besides, this communication style still displays a considerably higher rate of irrational responses when compared to the original LCA units.

Another conclusion that can be taken from this study is that converting values to make them more comprehensible to consumers can have backfiring effects. Based on our results, this would be worst communication style if the intention is to encourage informed decisions. If policy-makers want to consider it as a possible way for communication environmental performance, they must build very straightforward frameworks for their communication to avoid "quick and wrong" answers.

Finally, the analysis of the trade-offs shows there is still more people willing to sacrifice the environment in the name of their wallets than the opposite. "Year vs. Year" communication style seems to bridge this gap a little bit, favoring pro-environment decisions. This reinforces this communication style as an option to be considered, maybe communicated alongside absolute values in order to avoid assessments based exclusively on relative numbers.

## REFERENCES (SECTION 2)


- Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. California management review, 54(1), 64-87.
- Dahl D. 2010. Do you know what you're buying? Environmental Health Perspectives 118(6): A246–A252.
- Hauschild, M. Z., Rosenbaum, R. K., & Olsen, S. (2018). Life cycle assessment. Springer.
- Istat. (2019). Popolazione residente al 1º gennaio 2019. Available in: http://dati.istat.it/Index.aspx?DataSetCode=DCIS_POPRES1
- Lu, J., Liu, Z., & Fang, Z. (2016). Hedonic products for you, utilitarian products for me. Judgment & Decision Making, 11(4).
- Petrik, O., Silva, J. D. A. E., & Moura, F. (2016). Stated preference surveys in transport demand modeling: disengagement of respondents. Transportation Letters, 8(1), 13-25.
- Population Pyramid (2019). Italy's population pyramid in 2019. Available in: https://www.populationpyramid.net/pt/it%C3%A1lia/2019/
- Simon, H. A. (1955). A behavioral model of rational choice. The quarterly journal of economics, 69(1), 99-118.

## APPENDIX A – THE QUESTIONNAIRE

- **CONSUMER IDENTITIES**

**1) To which extent do the following statements represent your consumer identity?**

Answer the question using a scale from 1 = totally disagree to 6 = totally agree.

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I buy products which have a low impact on the environment | | | | | | |
| I buy products made in safe and healthy workplaces (e.g. fair trade) | | | | | | |
| I do my best to buy local products | | | | | | |
| I'm an impulsive consumer, if a product appeals to me, I buy it | | | | | | |
| I follow trends | | | | | | |
| I love shopping | | | | | | |
| I frequently change my preferences | | | | | | |
| I carefully plan my purchases | | | | | | |
| I respect my budget limits | | | | | | |
| I buy only what I need and don't replace it unless It's necessary | | | | | | |
| I buy energy-efficient products (e.g. lamps, appliances with low energy consumption) | | | | | | |
| I look for the best value for money | | | | | | |
| I look for bargains | | | | | | |

- **ENVIRONMENTAL CONCERN**

**2) What is your opinion regarding the following statements?**

Indicate a score on a scale from 1 (strongly disagree) to 6 (strongly agree).

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I am extremely worried about the state of the world's environment and what it will mean for the future generations. | | | | | | |
| The increasing destruction of the environment is a serious problem | | | | | | |
| We are not doing enough in this country to protect our environment. | | | | | | |
| The environment is one of the most important issues facing the world today. | | | | | | |

- **OTHER PRO-ENVIRONMENTAL BEHAVIOURS**

**3) Please report your frequency of participation in each of these behaviours on a scale with the following options:**

1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Often, 5 = Very often/always.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Recycled paper, plastic and metal | | | | | |
| Conserved water or energy in my home | | | | | |
| Bought environmentally friendly and/or energy efficient products | | | | | |
| Talked to others in my community about environmental issues | | | | | |
| Cooperated with others to address an environmental problem or issue | | | | | |
| Participated as an active member in a local environmental group | | | | | |
| Voted to support a policy/regulation that affects the local environment | | | | | |
| Signed a petition about an environmental issue | | | | | |
| Donated money to support local environmental protection | | | | | |
| Wrote a letter in response to an environmental issue | | | | | |

- **LIFE CYCLE PURCHASING AND POST-PURCHASING BEHAVIOUR**

**4) Please report your frequency of execution of each of these behaviours on a scale with the following options:**

1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Often, 5 = Very often/always

| **Purchasing behaviour** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| When I buy soap for personal care, I choose the one with the lowest environmental impact | | | | | |
| When I buy a laundry detergent, I choose the one with the lowest environmental impact | | | | | |
| When I buy paper products, I always choose the ones made with recycled paper | | | | | |
| When I buy groceries, I choose food with a low environmental impact | | | | | |
| When I buy vegetables, I look for local produce | | | | | |
| When I buy biscuits or similar products, I choose the ones with recyclable packaging | | | | | |
| When I buy bottled beverages, I look for recycled packaging | | | | | |
| When buying food, I carefully evaluate the amount I need to avoid waste | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| I usually buy food closer to its expiration date to help supermarkets avoid waste | | | | | |

| **Post-purchasing behaviour** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| When I use a shampoo, I use the amount indicated on its packaging | | | | | |
| When I finish a liquid hand-soap I usually refill its bottle | | | | | |
| When I finish a shower-gel I recycle its bottle | | | | | |
| When I do my laundry, I follow the recommended dosage on the detergent packaging | | | | | |
| When I prepare my meals I carefully evaluate the quantity I need to avoid food waste | | | | | |
| If a product I have is closer to the expiration date, I eat it first | | | | | |
| When I finish a packaged food product, I try to reuse the packaging if possible | | | | | |
| I eat food even after the “best before” date | | | | | |
| When I finish a packaged food product, I carefully separate the packaging for recycling | | | | | |

- **ECOLSCALE**

**5) Eco-labels are an official symbol that shows that a product has been designed to do less harm to the environment than similar products.**

*For the following statements, express a score from 1 to 7, where 1 means "Strongly Disagree" and 6 "Strongly Agree"*

| **Consumer knowledge** | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I know the meaning of the term “recycled”. | | | | | | |
| I know the meaning of the term “eco-friendly”. | | | | | | |
| I know the meaning of the term “organic”. | | | | | | |
| I know the meaning of the term “energy-efficient”. | | | | | | |
| **Consumer awareness & involvement** | | | | | | |
| I have heard about the term ‘eco-label’. | | | | | | |
| To evaluate a product, I look for any logo or label on it or on its packaging | | | | | | |
| I consider myself informed about eco-labels. | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| I consider myself an expert in terms of my knowledge of eco-labels. | | | | | | |
| I feel that I am fully involved with eco-labels. | | | | | | |
| **Credibility of environmental quality** | | | | | | |
| Products endorsed by eco-labels comply with quality environmental standards. | | | | | | |
| Eco-labels inform consumers about the environmental safety of a product. | | | | | | |
| Products endorsed by eco-labels are credible. | | | | | | |
| Eco-labels are a reliable source of information about the environmental quality and performance of a product. | | | | | | |
| **Design & visibility** | | | | | | |
| Most eco-labels do not look appealing to me. | | | | | | |
| I only pay attention to visually pleasing eco-labels. | | | | | | |
| **Persuasiveness** | | | | | | |
| I have a more favorable opinion of products that feature an eco-label. | | | | | | |
| My attitude towards products is more positive when those products feature an eco-label. | | | | | | |
| Eco-labels influence my buying habits. | | | | | | |
| **Private benefits** | | | | | | |
| Eco-labels should report benefits such as tasting good and being healthier that directly satisfy my personal needs | | | | | | |
| Eco-labels should show some product benefits that would make me want to use the product | | | | | | |

- **GENERAL TRUST**

**6) Generally speaking of trust, which of the following statements would you say is closer to your opinion?**

*Use a number from 1 to 6, where 1 means is fully in agreement with the first sentence and 6, on the contrary, means is fully in agreement with the second sentence. You can use the other numbers to make intermediate evaluations.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Most people deserve trust | 1 | 2 | 3 | 4 | 5 | 6 | No one can rely too much on people |
| Trusting is good | | | | | | | Not trusting is good |
| I am willing to trust | | | | | | | I am reluctant to trust |
| Those who trust in people live more serene | | | | | | | Those who put trust in people are often disappointed |
| Most people would try to be fair | | | | | | | Most people would try to take advantage of you |

- **TRUST IN THIRD PARTY CERTIFICATION**

**7) Third-party certifications are certifications released by independent entities on a voluntary basis that attest the commitment of the certified company for a specific cause (e.g. environmental commitment). "Ecolabel" is one of these third-party certifications.**

*So, based on your personal agreement with the following statements, please reply to these questions marketing a score between 1 and 6: (1 = strongly disagree, and 6 = strongly agree).*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I pay much attention to whether a product is certified by a third parties | | | | | | |
| I specifically look for third-party certification symbols. | | | | | | |
| I generally have faith in third-party certification. | | | | | | |
| I generally trust third parties. | | | | | | |

- **TRUST IN SELF DECLARED CLAIMS**

**8) Firms tend to express their commitment to social causes through self-declared claims. Self-declared claim (e.g.: "produced by 100% organic flour") is a spontaneous claim not certified by other entities but the company itself.**

*So, based on your personal agreement with the following statements, please reply to these questions marking a score between 1 and 6: (1 = strongly disagree, and 6 = strongly agree).*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Self-declared claims on products' packaging are genuinely committed to environmental protection | | | | | | |
| Most of what self-declared claims on products' packaging say about products is reliable. | | | | | | |
| If a self-declared claim makes a claim about a product, that claim is probably true. | | | | | | |

- **GREENWASHING BELIEF**

**9) How much do you agree with the following statements?**

*Express a score from 1 to 7, where 1 means "Strongly Disagree" and 6"Strongly Agree"*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Most companies mislead with words about the true environmental impact of their products | | | | | | |
| Most companies mislead with visuals or graphics about the true environmental impact of their products | | | | | | |
| Most companies provide vague or seemingly un-provable environmental claims for their products | | | | | | |
| Most companies overstate or exaggerate the real environmental benefits of their products | | | | | | |
| Most companies leave out or hide important information about the real environmental impact of their products | | | | | | |

- **PERCEIVED CONSUMER EFFECTIVENESS (PCE)**

**10) How much do you agree with the following statements?**

*Express a score from 1 to 7, where 1 means "Strongly Disagree" and 6 "Strongly Agree"*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| It is worth, as individual consumer, to make efforts to preserve and improve the environment | | | | | | |
| Since each individual can have any effect upon environmental problems, what I do can make meaningful difference; | | | | | | |
| By purchasing products made in an environmentally friendly way, each consumer's behavior can have a positive effect on the environment and society. | | | | | | |

- **EXTERNAL INFLUENCE**

**11) How much do you agree with the following statements?**

*Express a score from 1 to 7, where 1 means "Strongly Disagree" and 6 "Strongly Agree"*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I read documents / watched documentaries that claim that buying ecological products (i.e. that have a reduced impact on the environment) is a good way to protect nature | | | | | | |
| The press presents the purchase of ecological products as a positive thing | | | | | | |
| The news from the media (TV, radio, internet etc.) push me to consider the environmental information on the products during my purchases | | | | | | |
| The word of mouth of family / friends / acquaintances pushes me to look for environmental information on the products during my purchases | | | | | | |
| On social networks (e.g. Facebook, Twitter etc.) I happen to read news that pushes me to consider the purchase of products that have a reduced impact on the environment | | | | | | |

- **CRITICAL THINKING**

**12) Generally speaking about information, how much do you agree with the following statements?**

Express a score from 1 to 7, where 1 means "Strongly Disagree" and 6 "Strongly Agree"

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I am used to select information sources and to judge their relevance | | | | | | |
| It is easy for me to identify and avoid unreliable information sources | | | | | | |
| I never fall into the trap of considering as reliable an unreliable information source | | | | | | |
| I think I am capable of assessing the reliability of information sources | | | | | | |

- **REGULATORY FOCUS**

**13) Think about your attitude to the life.** Then, beside each following statement, indicate a number from 1 to 9, where 1 means “not at all true of me” and 9 “Very true of me”.

| | |
|---|---|
| In general, I am focused on preventing negative events in my life. | |
| I am anxious that I will fall short of my responsibilities and obligations. | |
| I frequently imagine how I will achieve my hopes and aspirations. | |
| I often think about the person I am afraid I might become in the future. | |
| I often think about the person I would ideally like to be in the future. | |
| I typically focus on the success I hope to achieve in the future. | |
| I often worry that I will fail to accomplish my academic/business goals. | |
| I often imagine myself experiencing bad things that I fear might happen to me. | |
| I frequently think about how I can prevent failures in my life. | |
| I am more oriented toward preventing losses than I am toward achieving gains. | |
| In general, I am focused on achieving positive outcomes in my life. | |
| I often imagine myself experiencing good things that I hope will happen to me. | |
| Overall, I am more oriented toward achieving success than preventing failure. | |

- **GENERAL KNOWLEDGE ON LCA (part 1)**

**14) About the product life-cycle assessment**, express a score from 1 to 6 to the following questions, where 1 means "Totally disagree" and 6 "Totally agree"

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I’m familiar with the concept of “product life cycle” | | | | | | |
| I’m familiar with the concept of “Life Cycle Assessment” (LCA) | | | | | | |
| I’m familiar with the concept of “Product Environmental Footprint” (PEF) | | | | | | |
| I’m familiar with the concept of “Carbon Footprint” | | | | | | |

- **ACCESSIBILITY TO FURTHER INFORMATION**

**15) About accessibility to further information**, please express a score from 1 to 6, where 1 means "strongly disagree" and 6 means "strongly agree"

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I feel safer when I see that a product offers further information (for example through a link to a web page) even if I do not search for it | | | | | | |
| Knowing that further information about a product is easily accessible "just in case" (for example through a link to a web page) makes me worry less about its quality | | | | | | |
| The availability of easily accessible further information about a product (for example through a link to a web page) increases my trust on its adequacy, regardless if I check it or not | | | | | | |
| Claims about further information about the product (for example through a link to a web page) make me feel more comfortable | | | | | | |

- **PREFERENCE ABOUT INFORMATION FORMAT**

**16) In what form, would you prefer to find environmental information on the product or on its packaging?**

*Multiple answers (maximum 3)*

- □ I would like environmental information expressed in numerical data (e.g. liters of water consumed, kg of carbon dioxide emitted into the atmosphere, content of recycled material, etc.)
- □ I would like environmental information that shows a comparison with the performance of other similar products (e.g. "This product saves 54 kg of C02 compared to a traditional product")
- □ I would like information expressed in percentage values that allow me to evaluate the improvement of product environmental performance (e.g. the percentage of CO2 reduction over time or the increase of recycled materials in the composition of the product)
- □ I would like information indicating the environmental characteristics of the product using the positioning on a scale that goes from the best to the worst option (e.g. energy class of appliances ranging from class A +++ to class G)
- □ I would like the information regarding environmental performance to be summarized on the product packaging and then there is a reference to more detailed information via QR-code or link to the website
- □ I would like environmental information to be communicated with intuitive logos/labels that certify certain levels of environmental performance without further detailed information

- □ I would like information expressed with the help of intuitive logos/labels that certify certain levels of environmental performance and with short explanatory sentences
- □ I would like environmental information to be turned into concepts that are closer to everyday life (e.g. “This product saves 54 kg of C02, equal to the emissions generated by an average Euro 4 petrol car to travel 260 km”)
- □ I would like environmental information to be communicated through the joint use of intuitive logos/label and numerical data (e.g. liters of water consumed, kg of carbon dioxide emitted into the atmosphere, content of recycled material, etc.)

- **INFORMATION FAMILIARITY**

**17) How much do you agree with the following statements?**

*Express a score from 1 to 6, where 1 means "Strongly Disagree" and 6 "Strongly Agree"*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Most eco-labels provide information using words that are technical. | | | | | | |
| Eco-labels do not provide enough information. | | | | | | |
| Most eco-labels are too complex. | | | | | | |

- **INFORMATION SEEKING**

**18) About the information seeking**, express a score from 1 to 7, where 1 means "Strongly Disagree" and 6 "Strongly Agree"

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I would search for more information about product’s realization process (e.g., manufacturing, country of origin, ingredients, environmental footprint) | | | | | | |
| I would seek information about product’s realization process from additional sources (e.g., websites, discussion groups, friends) | | | | | | |
| I would carefully examine all the information about the realization process of | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| the product provided on the packaging (e.g., eco-labels, certifications, ingredient details) | | | | | | |

- **NOVELTY SEEKING**

**19) How much do you agree with the following statements?**

*Express a score from 1 to 7, where 1 means "Strongly Disagree" and 6 "Strongly Agree"*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| I am always looking for new ideas and experiences | | | | | | |
| When things get boring, I like to explore new and unfamiliar experiences | | | | | | |
| I like to constantly change my activities | | | | | | |
| I like to introduce news and changes in my daily routine | | | | | | |

- **REASONS OF READING LABELLING**

**20) Express a score for each of the following reasons do you read products' label.** Mark a score from 1 to 5 (1=never; 2=rarely; 3=sometimes; 4=often; 5 always)

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Because it is a new product | | | | | |
| To check for ingredients that cause allergies / intolerances | | | | | |
| To know the nutritional information | | | | | |
| To know the country of origin | | | | | |
| To compare similar products | | | | | |
| To read the instructions for use | | | | | |
| To read information on environmental characteristics | | | | | |
| To verify the existence of certifications | | | | | |
| To check the expiration date | | | | | |

**21) For which of the following reasons do you NOT pay attention to products' label?** Express a score from 1 to 5 where 1 means "Strongly disagree" and 5 "Strongly agree

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Product brand confidence | | | | | |
| Lack of time | | | | | |
| Information displayed in the product labelling is difficult to understand | | | | | |
| Product labelling provided excessive information | | | | | |
| Lack of confidence on information displayed on the product labelling | | | | | |

- **GENERAL KNOWLEDGE ON LCA (part 2)**

**22) Based on what you know,** please answer the following questions indicating: True, False or I don't Know.

| | T | F | I don't know |
|---|---|---|---|
| A scientific methodology to calculate the impact a product has on the environment doesn't exist | | x | |
| Life Cycle Assessment (LCA) is a methodology to calculate the environmental impact of a product during its entire life cycle (from raw material extraction up to post-consumption waste treatment) | x | | |
| During use, consumers can contribute to reducing the impact the product has on the environment | x | | |
| The Product Environmental Footprint (PEF) is a European Commission methodology to calculate the environmental impact of a product during its entire life cycle (from raw material extraction up to post-consumption waste treatment) | x | | |
| A product's Carbon Footprint represents the quantity of coal extracted to produce the product | | x | |

## APPENDIX B – CORRELATION MATRIX

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cle n- | 1,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cle | 0,848 | 1,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cle od | 0,479 | 0,538 | 1,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cle | 0,471 | 0,480 | 0,307 | 1,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| st- n- | 0,565 | 0,608 | 0,541 | 0,356 | 1,000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| st- | 0,531 | 0,581 | 0,598 | 0,412 | 0,752 | 1,000 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0,042 | | -0,065 | 0,039 | | | 1,000 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0,053 | 0,069 | 0,064 | 0,056 | 0,061 | 0,091 | 0,100 | 1,000 | | | | | | | | | | | | | | | | | | | | | | | |
| | 0,427 | 0,455 | 0,393 | 0,244 | 0,450 | 0,476 | | 0,102 | 1,000 | | | | | | | | | | | | | | | | | | | | | | |
| | 0,619 | 0,654 | 0,382 | 0,339 | 0,432 | 0,419 | 0,037 | 0,046 | 0,475 | 1,000 | | | | | | | | | | | | | | | | | | | | | |
| | 0,206 | 0,218 | | 0,177 | 0,078 | 0,043 | 0,175 | 0,064 | 0,155 | 0,361 | 1,000 | | | | | | | | | | | | | | | | | | | | |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0,357 | 0,379 | 0,419 | 0,231 | 0,407 | 0,438 | -0,054 | | 0,400 | 0,520 | 0,073 | 1,000 | | | | | | | | | | | | | | | | | | | |
| | 0,109 | 0,148 | 0,252 | 0,170 | 0,240 | 0,316 | | | 0,313 | 0,270 | 0,167 | 0,486 | 1,000 | | | | | | | | | | | | | | | | | | |
| rs | 0,575 | 0,622 | 0,545 | 0,328 | 0,639 | 0,664 | | 0,076 | 0,522 | 0,508 | 0,077 | 0,460 | 0,308 | 1,000 | | | | | | | | | | | | | | | | | |
| rs<br>m) | 0,550 | 0,533 | 0,202 | 0,390 | 0,259 | 0,244 | 0,130 | 0,142 | 0,253 | 0,459 | 0,378 | 0,194 | | 0,294 | 1,000 | | | | | | | | | | | | | | | | |
| rs | 0,520 | 0,497 | 0,182 | 0,370 | 0,240 | 0,218 | 0,128 | 0,174 | 0,236 | 0,425 | 0,352 | 0,171 | | 0,262 | 0,814 | 1,000 | | | | | | | | | | | | | | | |
| -<br>lf- | 0,373 | 0,408 | 0,373 | 0,200 | 0,444 | 0,465 | | 0,070 | 0,443 | 0,399 | 0,151 | 0,380 | 0,318 | 0,507 | 0,188 | 0,158 | 1,000 | | | | | | | | | | | | | | |
| -<br>nd | 0,591 | 0,600 | 0,323 | 0,359 | 0,424 | 0,401 | 0,092 | 0,094 | 0,397 | 0,549 | 0,343 | 0,326 | 0,155 | 0,437 | 0,515 | 0,480 | 0,562 | 1,000 | | | | | | | | | | | | | |
| -<br>nd<br>n | 0,494 | 0,507 | 0,336 | 0,295 | 0,424 | 0,412 | 0,082 | 0,106 | 0,450 | 0,479 | 0,321 | 0,337 | 0,202 | 0,432 | 0,399 | 0,385 | 0,528 | 0,723 | 1,000 | | | | | | | | | | | | |
| -<br>of<br>nd | 0,175 | 0,151 | | 0,198 | 0,049 | | 0,104 | | 0,033 | 0,168 | 0,310 | 0,096 | 0,049 | | 0,298 | 0,302 | 0,039 | 0,241 | 0,196 | 1,000 | | | | | | | | | | | |
| - | 0,579 | 0,595 | 0,333 | 0,327 | 0,416 | 0,406 | 0,080 | 0,097 | 0,479 | 0,551 | 0,335 | 0,296 | 0,147 | 0,432 | 0,481 | 0,469 | 0,394 | 0,694 | 0,694 | 0,258 | 1,000 | | | | | | | | | | |
| -<br>of | 0,391 | 0,425 | 0,284 | 0,234 | 0,364 | 0,366 | 0,045 | 0,042 | 0,386 | 0,400 | 0,285 | 0,301 | 0,205 | 0,356 | 0,302 | 0,279 | 0,378 | 0,497 | 0,552 | 0,267 | 0,583 | 1,000 | | | | | | | | | |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | -0,063 | -0,089 | -0,051 | | -0,085 | -0,083 | | -0,055 | -0,067 | -0,058 | 0,034 | | 0,061 | -0,115 | -0,035 | | -0,076 | -0,050 | -0,101 | 0,158 | -0,083 | | 1,000 | | | | | | | | |
| rd | 0,494 | 0,491 | 0,233 | 0,303 | 0,303 | 0,279 | 0,108 | 0,101 | 0,313 | 0,483 | 0,351 | 0,254 | 0,104 | 0,293 | 0,475 | 0,465 | 0,285 | 0,578 | 0,545 | 0,290 | 0,618 | 0,433 | -0,047 | 1,000 | | | | | | | |
| lf- | 0,394 | 0,392 | 0,195 | 0,259 | 0,285 | 0,268 | 0,094 | | 0,267 | 0,406 | 0,361 | 0,251 | 0,134 | 0,262 | 0,385 | 0,365 | 0,262 | 0,477 | 0,552 | 0,307 | 0,519 | 0,419 | -0,074 | 0,600 | 1,000 | | | | | | |
| | 0,086 | 0,110 | 0,146 | 0,115 | 0,128 | 0,185 | | 0,034 | 0,177 | 0,125 | 0,093 | 0,206 | 0,214 | 0,128 | 0,117 | 0,104 | 0,202 | 0,146 | 0,096 | 0,229 | 0,109 | 0,214 | 0,222 | 0,115 | | 1,000 | | | | | |
| | 0,466 | 0,503 | 0,436 | 0,245 | 0,493 | 0,518 | | 0,083 | 0,623 | 0,469 | 0,147 | 0,364 | 0,247 | 0,540 | 0,263 | 0,249 | 0,483 | 0,462 | 0,524 | | 0,532 | 0,463 | -0,113 | 0,410 | 0,402 | 0,194 | 1,000 | | | | |
| e | 0,519 | 0,531 | 0,286 | 0,316 | 0,375 | 0,363 | 0,101 | 0,088 | 0,448 | 0,510 | 0,385 | 0,283 | 0,172 | 0,374 | 0,492 | 0,463 | 0,390 | 0,603 | 0,593 | 0,238 | 0,650 | 0,517 | -0,078 | 0,602 | 0,555 | 0,151 | 0,584 | 1,000 | | | |
| ng<br>) | 0,354 | 0,365 | 0,265 | 0,212 | 0,304 | 0,314 | 0,051 | 0,109 | 0,289 | 0,353 | 0,236 | 0,292 | 0,181 | 0,314 | 0,324 | 0,312 | 0,426 | 0,489 | 0,454 | 0,196 | 0,405 | 0,363 | | 0,404 | 0,373 | 0,244 | 0,406 | 0,475 | 1,000 | | |
| CA<br>) | 0,422 | 0,416 | 0,205 | 0,253 | 0,268 | 0,257 | 0,101 | 0,175 | 0,240 | 0,376 | 0,306 | 0,199 | 0,079 | 0,267 | 0,458 | 0,451 | 0,396 | 0,580 | 0,475 | 0,209 | 0,465 | 0,328 | -0,036 | 0,496 | 0,408 | 0,143 | 0,328 | 0,489 | 0,503 | 1,000 | |
| ity | 0,404 | 0,431 | 0,240 | 0,252 | 0,315 | 0,318 | 0,091 | 0,100 | 0,345 | 0,407 | 0,362 | 0,238 | 0,181 | 0,311 | 0,388 | 0,373 | 0,348 | 0,501 | 0,547 | 0,228 | 0,556 | 0,459 | -0,081 | 0,547 | 0,525 | 0,120 | 0,461 | 0,609 | 0,447 | 0,521 | 1,000 |
| | 0,103 | 0,115 | 0,094 | 0,117 | 0,128 | 0,147 | | | 0,171 | 0,141 | 0,178 | 0,195 | 0,174 | 0,106 | 0,115 | 0,117 | 0,099 | 0,081 | 0,092 | 0,327 | 0,112 | 0,243 | 0,152 | 0,133 | 0,149 | 0,401 | 0,169 | 0,184 | 0,162 | 0,071 | 0,186 |
| | 0,509 | 0,519 | 0,279 | 0,292 | 0,361 | 0,338 | 0,095 | 0,088 | 0,421 | 0,515 | 0,332 | 0,287 | 0,162 | 0,362 | 0,442 | 0,412 | 0,365 | 0,571 | 0,503 | 0,215 | 0,577 | 0,488 | -0,032 | 0,533 | 0,443 | 0,171 | 0,481 | 0,609 | 0,429 | 0,480 | 0,573 |
| | 0,357 | 0,366 | 0,198 | 0,261 | 0,243 | 0,246 | 0,128 | 0,122 | 0,275 | 0,359 | 0,429 | 0,162 | 0,179 | 0,244 | 0,379 | 0,342 | 0,305 | 0,444 | 0,404 | 0,233 | 0,428 | 0,368 | | 0,417 | 0,389 | 0,170 | 0,344 | 0,489 | 0,402 | 0,424 | 0,467 |

**d:**
tically significant coefficients displayed (p-value < 0.05)