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CONSUMER PERSPECTIVES TOWARDS SUSTAINABILITY INFORMATION IN THE HOUSEHOLD APPLIANCE MARKETING: AN EXPLORATORY STUDY

Gabriella Francesca Amalia Pernice[1], Valeria Orso[1,2] and Luciano Gamberini[1,2]
[1]*Department of General Psychology, University of Padova, Padova, Italy*
[2]*Human Inspired Technology Research Center, University of Padova, Padova, Italy*

ABSTRACT

In recent years, there has been a noticeable shift in how consumers receive information when purchasing household appliances, with a strong focus on environmental aspects. As consumers become more aware of their negative impact on the environment, companies have adapted their marketing strategies to emphasize sustainability and energy efficiency. However, this influx of information can overwhelm consumers during the decision-making process. Companies use "green marketing" to convey environmental information about their own products, while governments provide this kind of information through standardized data, the energy labels. Nevertheless, effectively communicating this information remains a challenge because consumers often struggle to comprehend overly technical details or assess the reliability of these sources. Moreover, when the information is insufficient or difficult to access, it can lead to negative consumer attitudes, resulting in a phenomenon known as green scepticism. This scepticism can hinder the translation of consumer awareness into actual sustainable behaviors and exacerbate their concerns about companies' unsustainable practices known as "greenwashing". Although awareness of green scepticism in sustainable marketing is growing, existing research is still limited. This study aimed to understand the perspectives of 16 Italian consumers regarding the purchase of highly energy-efficient household appliances. These were well-educated, working-age adults who had bought a household appliance in the last six months. We explored their attitudes and beliefs about the sustainable information in the household appliances market. Preliminary findings reveal that these well-educated consumers care about the environment and consider themselves knowledgeable about energy efficiency. However, they have doubts about the information provided during the purchase phase by companies and industry experts. The lack of clear and transparent information could influence not only their purchase decisions but also their daily use of energy-efficient household appliances. This study offers insights for companies and researchers on how to address the issue related to sustainability information and encourage energy-saving behaviors.

KEYWORDS

Energy Efficiency, Green Scepticism, Energy Label, Household Appliance, Eco-Anxiety, Green Washing

1. INTRODUCTION

The household appliances market is experiencing significant growth and accounts for a substantial portion of European energy consumption, exceeding 25% of the overall energy utilization (Gupta, 2016; Russo et al., 2018; Meehan et al., 2014). It became urgent adopt environmentally responsible solutions within the household appliance industry to address the environmental consequences associated with energy-intensive appliances and meeting consumer preferences for eco-friendly options (Schuitema & De Groot, 2015; Dagher & Itani, 2014). The promotion of sustainable and high energy-efficient household appliances has become a primary aim for both governmental regulatory bodies and marketing entities.

However, consumers encounter a multitude of information during the purchase of a household appliance, and increasing the number of options and attributes related to the sustainability could be overwhelmed (Gershoff et al., 2001). Moreover, customers may be uncertain when the data they access is of low quality, incomplete, or contradictory (Al Mamun et al., 2018) and could be translated in lack of confidence in the accuracy and reliability of the information (Gershoff et al., 2001).

Previous research in this field has predominantly concentrated on identifying the positive factors influencing green purchasing behaviour. The aim of this preliminary study is to shift the research focus towards understanding the barriers that hinder the adoption and effective use of environmentally friendly products, especially within the household appliance sector. Our aim is to investigate how consumers perceive sustainability information related to household appliances and explore the complexities of their decision-making processes. In addition, the household appliance sector has only recently begun receiving attention in this context. Consequently, there is a need for comprehensive research into consumer scepticism, particularly regarding companies' environmental claims, with a specific emphasis on areas such as energy efficiency (Raska & Shaw, 2012; Matthes & Wonneberger, 2014; Butt et al., 2022; Asif et al., 2022). Moreover, understanding the primary issues and concerns that real consumers encounter during the purchase phase could be crucial for developing effective strategies aimed at promoting sustainability and encouraging energy-saving behaviours, not only during the purchase phase but also in daily use.

1.1 Related Work

The significant technological advancements have enabled the production of high energy-efficient household appliances (Cabeza et al., 2018; Hua & Yang, 2019). These household appliances consume less energy while maintaining or even enhancing their functionality. In a competitive market where many products offer similar functions or features, consumers face the challenging task of selecting the right product. To make this decision, consumers consider various factors, including the product's price, overall quality and performance, design, aesthetic appeal, and energy efficiency (Pini et al., 2023). These attributes collectively influence consumers' decision-making processes, guiding them in choosing products that align best with their needs and preferences.

Nowadays, companies focus more on the sustainability of their household appliances, also driven by the rise of consumer awareness and concern about environmental issues (Dagher & Itani, 2014; Taufique & Vaithianathan, 2018). Companies have adopted marketing strategies aimed at highlighting the sustainability and energy efficiency of their products, resulting in an increased volume of environmental information. The goal is also to become attractive in the market, drawing in environmentally conscious consumers and encouraging them to make sustainable purchasing decisions. However, individuals have limited information processing capacity, and as the volume of information they encounter grows, they invest more effort in processing it. When the amount of information exceeds their processing capacity, it leads to information overload, which can decrease response rates (Tang et al., 2003). In the case of sustainability information, consumers must exert extra effort to critically evaluate and trust the accuracy of the claims made (Do Paço & Reis, 2012; Vlachos et al., 2016; Bhardwaj et al., 2023).

In this context, it becomes evident that consumers' growing awareness of the significance of verifying the credibility and reliability of the information they receive is particularly pronounced when they are making eco-conscious choices. To achieve this, we examined both the environmental information provided by the brand or manufacturer and the data issued by the European Committee.

1.1.1 Brand's Sustainability Information

Brand-provided information, known as green marketing, is often tailored to promote the product, highlighting its positive attributes (Bhardwaj et al., 2023; Schwartz et al., 2020). This approach involves emphasizing the product's environmentally friendly features, such as energy efficiency, reduced carbon footprint, use of eco-friendly materials, or adherence to sustainable manufacturing processes.

However, the accuracy and transparency of this information can vary and green marketing initiatives often face challenges due to consumers' increasing scepticism about companies' environmental claims (Leonidou & Skarmeas, 2017; Goh & Balaji, 2016). This phenomenon, referred to as green scepticism, is characterized by consumers' distrust of "green" products and their assumptions about a company's values, ultimately reducing their willingness to make purchases (Nyilasy et al., 2014; Akturan, 2018; Taufique et al., 2017). The increase in consumer scepticism is closely tied to the potential practice of 'greenwashing' by companies. Greenwashing refers to a deceptive marketing strategy employed by companies or organizations to create a misleading impression of their products, services, or corporate image as environmentally responsible or sustainable, even when their actual environmental performance or practices do not align with the portrayed eco-friendly claims (Mitchell & Ramey, 2011; Polonsky et al., 2010). This practice involves using vague or exaggerated environmental messaging, false advertising, or selective presentation of information to create a deceptive perception of environmental responsibility, with the ultimate goal of appealing to environmentally conscious consumers (Al Mamun et al., 2018). Greenwashing raises ethical concerns as it can mislead consumers and hinder the advancement of responsible environmental practices. Unfortunately, environmental regulations are not always adequately enforced, further contributing to consumer scepticism regarding companies' green initiatives.

1.1.2 Government's sustainability information

Governments have made significant efforts to offer a standardized and objective tool to provide consumers with data regarding household appliances' energy performance and efficiency. The energy label serves as a dependable resource for consumers to compare different products, and make them aware during their decision-making process. On March 1, 2021, the European Commission updated the energy label for selected household appliances with the aim of furnishing consumers with vital information about appliance energy performance and efficiency, thereby assisting them in making energy-saving choices. A model of the energy label is illustrated in Figure 1.

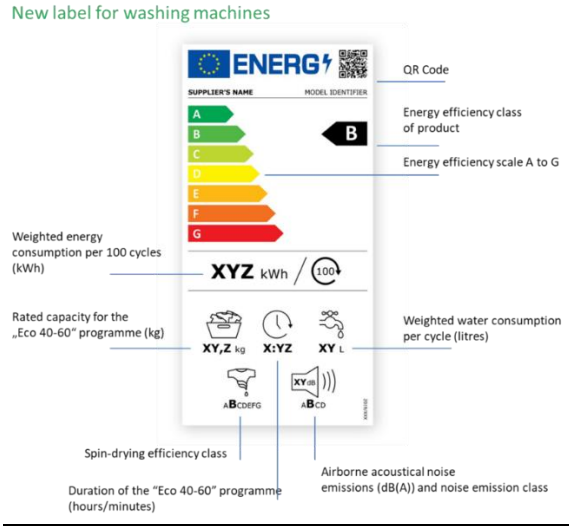

Figure 1. New energy label characteristics
(Retrieved from: https://www.label2020.eu/the-new-label/product-groups/washing-machines/)

An important addition to the updated labels is the inclusion of a QR code positioned at the top. This QR code grants consumers access to the EPREL (European Product Registry for Energy Labelling) database, where suppliers must register their products (European Commission, 2022). It provides consumers with comprehensive information about energy-labeled products that is not displayed on the physical energy label itself. For instance, while the energy label of a washing machine may provide data on energy consumption per 100 cycles in kWh, scanning the QR code reveals additional details, including that these parameters are calculated based on the Eco 40-60" program. Furthermore, the QR code offers insights into other crucial aspects, such as noise emissions, warranty details, spare part availability, and product support.

Energy labels serve the purpose of providing consumers with an easy way to access information about the energy consumption of different product options, facilitating more informed decision-making (Heinzle & Wüstenhagen, 2012). The reliability of energy labels is highly valued by consumers, as they rely on the information provided as a reference point during their purchasing decisions (Si-Dai et al., 2021). However, research in the field has shown that

consumers can often find it challenging to fully comprehend the technical details presented on these labels (d'Adda et al., 2021) and this could make the decision-making process more challenging. For instance, data like energy consumption in kilowatt-hours (kWh) can be difficult for consumers to grasp, potentially leading to inefficient household appliance use in daily life and discouraging pro-environmental behavior (Schuitema & De Groot, 2015; Schwartz et al., 2020).

1.1.3 The Theory of Planned Behaviour

The Theory of Planned Behavior (TPB) a social-psychological framework developed by Ajzen (1991), is often used to study green behavior. TPB suggests that behavioral intentions can be predicted by three sociocognitive variables: attitudes, subjective norms, and perceived behavior control. In the framework of TPB, attitudes represent an individual's positive or negative feelings toward a specific behavior. It assesses whether an individual has a favorable or unfavorable view of performing a particular behavior. Subjective norms, on the other hand, encompass the perceived social pressures and influences from significant others, such as friends, family, or colleagues, regarding the performance of a specific behavior. It assesses whether an individual perceives that others important to them expect them to engage in the behavior and whether they care about meeting those expectations. Lastly, perceived behavioral control refers to an individual's self-perception of their capability to effectively carry out a behavior successfully. It takes into account factors like perceived ease or difficulty of performing the behavior, self-efficacy (belief in one's own ability to perform the behavior), and perceived barriers or obstacles that may hinder or facilitate the behavior. Attitude, subjective norms and perceived behavior control are influenced by external and internal factors, impacting an individual's belief in their ability to act and their intention to buy green products (López-Mosquera et al., 2014; Chen & Tung, 2014).

Moreover, eco-knowledge and self-efficacy contribute to shaping attitudes towards green products. As consumers' eco-knowledge increases, so does their concern for eco-friendly purchases and subsequent behavior (Zhao & Zhong, 2015; Tseng & Hung, 2013). Research indicates that individuals with a strong green identity, a belief in the environmental impact of their consumption, and a positive self-concept are more likely to buy eco-friendly products (Schuitema & De Groot, 2015). However, despite environmental concerns, consumer attitudes don't always translate into green purchases due to ambivalence towards such products and the companies behind them (Al Mamun et al., 2018).

Building on these theoretical foundations, our preliminary study employed both qualitative and quantitative methods to explore the attitudes of working-age adults during the purchase of high-energy-efficient household appliances. We focused on their perceptions of greenwashing, their scepticism toward sustainability information, and their levels of eco-anxiety regarding climate change, an aspect that has received limited attention in the context of green purchases (Yang et al., 2021). Additionally, we aimed to assess their actual understanding of energy efficiency and appliance usage, which has been found to differ significantly from their perceived knowledge in previous research (Pernice et al., 2022). Finally, we sought to empirically determine the most important attributes for consumers when purchasing household appliances.

2. MATERIALS AND METHODS

2.1 Materials

This exploratory investigation adopted a mixed-method approach, integrating qualitative and quantitative data analysis techniques following established research guidelines (Creswell & Plano Clark, 2007). This methodological choice aligns with recommended practices for conducting comprehensive studies (Johnson et al., 2007), allowing for the triangulation of insights from diverse sources and perspectives, facilitating a more nuanced and in-depth analysis of the research problem.

2.1.1 Semi-Structured Interview

The study conducted semi-structured interviews via the Zoom.us platform to ensure flexibility during the interview process. Prior to these interviews, the researcher developed a set of open-ended questions that could be adapted based on participants' responses and areas of interest. To ensure a diverse array of perspectives, the study aimed for a target sample size ranging from 9 to 17 interviews, recognised as optimal for achieving comprehensive insights and a thorough understanding of the research topic (Hennink & Kaiser, 2022).

The topics covered during the interviews encompassed several key areas:

(i) how they made the choice and the main factors that had influenced the purchase;

(ii) their awareness and engagement with environmental impact information related to the household appliances provided by the company;

(iii) their awareness about the energy-efficiency of their household appliances and energy label.

2.1.2 Questionnaires

A total of two questionnaires were conducted online. A brief description of both questionnaires follows.

First questionnaire and related sections: *Green attitude and green scepticism*

The questionnaire comprised 69 items grouped into five sections: Demographics, Attitude towards high energy-efficient household appliances, Green scepticism toward sustainability information regarding those appliances, Concerns about climate change, and Energy-efficiency actual knowledge. The Demographic section explored participants' backgrounds, including gender, age, education, job position, monthly income, household size, prior engagement in other household appliance purchases, and willingness to purchase household appliances online (8 items).

The second section explored the respondents' attitudes and knowledge about high energy-efficient household appliances. Items were completed on a 7-point scale Likert ranging from 1 “totally disagree” to 7 “totally agree”:

- **Attitude (ATT)**; The degree of consumer’s favourable or unfavourable evaluation of the high energy-efficient household appliance (6 items adapted from Hossain et al., 2022).
- **Subjective Norms (SN);** Social pressure exerted on consumers from the surrounding environment to perform, or not, a certain behaviour related to a high energy-efficient household appliance (4 items adapted from Issock and colleagues, 2018).

- **Perceived Behavior Control (PEB);** Individual's degree of having the opportunity and ability to perform a "green" behaviour using high energy-efficient household appliances (5 items adapted from Bhutto and colleagues, 2020).
- **Perceived Ecoknowledge (PEK);** Consumer knowledge of energy efficiency issues (6 items adapted from Waris and Hameed, 2020).

The third section explored respondents' perceptions of sustainability information, their scepticism toward the sustainability information of high energy-efficient appliances and the social actors who can drive this information. On a 7-point scale ranging from 1 "completely disagree" to 7 "absolutely agree," respondents rated the following items:

- **Greenwashing (GW);** The perception that the information regarding the sustainability of high energy-efficient household appliances is a tactic to manipulate consumers (6 items adapted from Nguyen and colleagues, 2016).
- **Green scepticism toward Shop assistants, Companies, and Experts (GS)**; Untrusting the sustainability information that a shop assistant (4 items), a company (2 items), an expert (2 items) shares about the household appliances (adapted from Akturan, 2018).

The fourth section explored respondents' climate change worries using a standardised questionnaire (ECOANX). Items were scored using a 7-point scale Likert ranging from 1 "never" to 7 "always" (10 items from Innocenti, 2022).

In the final section, we aimed to explore participants' actual knowledge of energy efficiency by designing 8 *ad-hoc* true or false items. The items covered general information about energy efficiency, such as "*Energy efficiency is the use of less energy to perform the same task or produce the same result"* (4 items, of which 2 were true). We also included more specific information about how to use household appliances efficiently. One example statement was "*Laundry is only completely clean at temperatures above 30°C"* (4 items, of which 2 were true). These statements were based on information provided by the European Union in 2022.

Second questionnaire: *Users' preferences during the purchase phase*

The study utilised a pairwise comparison approach to investigate consumer choices concerning household appliances (Figure 2). Pairwise comparison is a widely used method in sustainability research for investigating consumer preferences (Kinoshita, 2020). This method involves asking respondents to compare two options at a time and select their preferred one based on predictor variables, known as attributes and their levels. The goal of pairwise comparison is to assess the contributions of these attributes and their levels in the purchase decision.

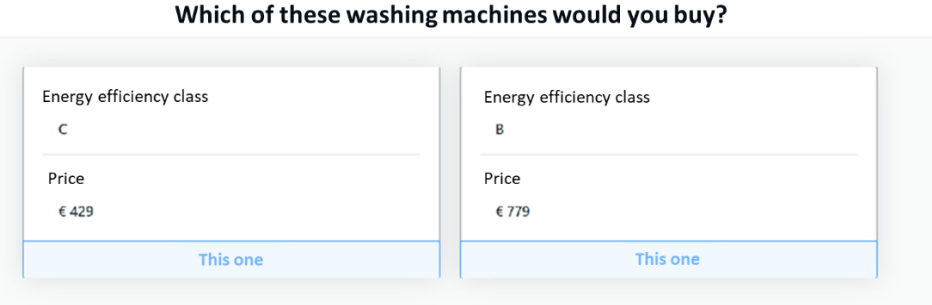

Figure 2. Example of pairwise comparison used in the study

In this study, respondents were asked to choose between two alternative washing machines (the most common appliance in Italy (according to Statista, 2023) based on several attributes, such as price, capacity, energy class, CO2, kWh, brand and their levels (Table 1).

These attributes and their levels were identified from existing literature (i.e., Sonnenberg at al, 2011; Pernice et al., 2022). To ensure alignment with current market demands, we conducted a systematic web analysis using RStudio (R Core Team, 2021) on the three main Italian e-commerce platforms, eliminating unrealistic options. Each participant was presented with an average of 30 pairs of alternatives.

Table 1. Pairwise comparison attributes and levels

Attribute	Levels
Energy class	A; B; C
Price	€ 829; € 779; € 429; € 379
kWh	175; 160; 145; 130
CO2	1500; 1000
Brand	Unknown; Known
Capacity	9 kg; 7 kg

2.2 Participants

The inclusion criteria to be part of the study were having purchased at least one large household appliance (e.g., dishwasher, refrigerator, washing machine) in the past six months and being of working age. The sample comprised 16 respondents (10 female, 6 male) with an average age of 39.31 years (SD = 12.55). Concerning education, 25% of the respondents had a high school degree, 18.75% had a bachelor's degree, and 56.25% had a master's degree. With regard to income, 25% of the respondents had a monthly income below 1000€, 50% had a monthly income between 1000€ and 1499€, and 25% had a monthly income above 1500€. The majority of employed respondents worked in the private sector (31.25%) or public sector (37.5%), while 25% were freelancers and 6.25% were small entrepreneurs. In terms of living arrangements, 37.5% of the respondents lived alone, 25% lived with one other person, and 37.5% lived with multiple people. Participants reported having bought at least one large household appliance in the last six months, with 56.25% purchasing a refrigerator, 37.5% purchasing a dishwasher, 31.25% purchasing a washing machine, and 18.75% purchasing an oven. Regarding their intention to buy household appliances online, 37.5% of the respondents preferred to buy online, 31.25% had no clear preference, and 31.25% preferred not to buy online.

Only the 18.75% purchased their household appliances online for economic reasons (i.e., a refrigerator, a washing machine and a dishwasher); while the 43.75% of them bought in a big chain. The 37.5% chose family chain stores because they trusted the owner and were regular customers.

2.3 Procedure

The study was conducted from December 2022 to January 2023. To recruit participants, researchers initially contacted acquaintances who had purchased large household appliances in the past six months. Once eligibility was confirmed, participants received a link to download a comprehensive Informed Consent document. After reading it, they had the option to accept

participation through a brief form on Qualtrics. Participants were then invited to engage in a Zoom interview, followed by the completion of two questionnaires. The questionnaires were pre-tested to minimize errors and potential misunderstandings. Additionally, participants were given the opportunity to refer other eligible individuals to the study. Participation was voluntary, and no compensation was provided. The study received approval from the local Ethical Committee.

3. ANALYSIS AND RESULTS

3.1 Interviews

Semi-structured interviews were conducted, and subsequently, the recorded interviews were transcribed and subjected to thematic analysis (Edwards and colleagues 2006). This approach aimed to highlight participants' experiences and perspectives, resulting in a nuanced and comprehensive understanding of the research topic. Through open coding, initial categories were identified, which were then organized into overarching themes. To ensure the rigour of the analysis, two independent judges, both experts in qualitative data analysis, were tasked with reviewing the transcripts and identifying emerging codes that could be grouped into distinct categories. The analysis ultimately yielded four prominent themes: (i) factors influencing household appliance purchases; (ii) consumer awareness and engagement with environmental impact information provided by brands; (iii) energy-efficiency awareness and energy label.

The results of the interviews with users provide valuable insights into their decision-making processes when purchasing household appliances.

(i) Factors influencing household appliance purchases. This theme explores the nature of consumer decision-making, highlighting the impact of external advice and specific product attributes on household appliance purchases. Notably, participants' decisions were significantly influenced by external sources of guidance, with 11 individuals seeking advice from partners, shop assistants, friends, or parents. Additionally, the significance of online research was underscored, as all participants extensively visited various websites, scrutinized reviews, and conducted thorough product comparisons. Regarding decision criteria, physical attributes, particularly dimensions and design, emerged as dominant factors for 14 respondents. This underscores the importance of aesthetics and functionality in appliance selection. While energy efficiency was considered, price played a crucial role in the final decision for all participants. Nine respondents emphasized their preference for cost-effective options, choosing to replace appliances when they break down. They noted that modern household appliances are often challenging and costly to repair, leading to higher long-term expenses. Consequently, selecting a more affordable appliance may be a practical choice in anticipation of potential future breakdowns and repair costs. In contrast, seven consumers reported that while economic convenience is important, they find that breakdowns are not common with reliable and trustworthy brands.

(ii) Consumer awareness and engagement with environmental impact information provided by brands. This theme revolves around participants' awareness and engagement with specific environmental impact information that companies could provide. We inquired whether consumers actively sought information related to the Life Cycle Assessment (LCA) before purchasing a high-energy efficient household appliance. LCA is a comprehensive methodology used to assess the environmental impacts associated with a product throughout its entire life cycle, covering aspects from raw material extraction to manufacturing, use, and disposal. This assessment includes factors such as resource consumption, energy usage, emissions, waste generation, and potential ecological impacts. Remarkably, none of the participants actively sought information about LCA, indicating that these environmental considerations were not a priority in their decision-making. In addition, while 6 participants explicitly expressed disinterest in LCA, the others 10 reported that the LCA was not a factor they considered during the selection process. Although they acknowledged its potential value for making more informed and environmentally responsible choices in the future.

Finally, we inquired whether participants had considered refurbished appliances as an alternative to purchasing new ones. Refurbished appliances are previously owned household items, such as refrigerators, washing machines, or dishwashers, that undergo a rigorous inspection, repair, and restoration process to bring them back to like-new or nearly-new condition. These appliances are typically tested to ensure they meet specific quality and functionality standards before being resold. One of the key advantages of refurbished appliances is their lower price compared to brand-new ones, making them an attractive option for cost-conscious and environmentally conscious consumers. Interestingly, only 3 participants actively explored the possibility of buying refurbished appliances. However, despite their initial interest in these remanufactured products, they ultimately chose to purchase new ones. Their decision was driven by concerns about the trustworthiness and reliability of refurbished items. In contrast, the majority of the sample (13) did not come across or actively seek information about refurbished appliances during their appliance purchases, whether through online research or in physical stores. These participants expressed the possibility of considering refurbished options in the future but indicated a current preference for buying new appliances. This hesitation to embrace refurbished products may be linked to uncertainties regarding their quality and performance, which significantly influenced participants' decision-making processes.

(iii) Energy-efficiency awareness and energy label. This theme delves into the participants' level of awareness and understanding of energy efficiency. To explore deeply the energy label we asked for two household appliances in particular, such as washing machines and dishwashers. In fact, all the participants bought one of these appliances after the introduction of the new energy label, and the majority of them (68.75%) did the purchase in the last 6 months. Throughout the appliance purchasing process, it became evident that all participants heavily relied on the energy label as a critical factor guiding their decision-making. However, while they expressed familiarity with the new energy label and its displayed information, a deeper exploration of their knowledge revealed crucial gaps.

Surprisingly, none of the participants knew the exact energy consumption of their appliances, even though 14 of them reported periodically reading their energy meters to gain insights into their energy usage. Furthermore, none had ever scanned the QR code on the label to gain a deeper understanding of their appliance's functionality. Coherently, they were all unaware that the energy label data specifically pertained to the eco 40-60° cycle. This information had not been effectively communicated by sales assistants or prominently displayed on the labels themselves. A noteworthy revelation was the preference expressed by 12

participants for quick cycle programs over the eco program, as they believed the former to be a more environmentally responsible choice. Their preference was primarily rooted in the belief that quick cycles, with their shorter durations, resulted in reduced energy and water consumption. Participants collectively emphasized the need for clearer access to this information during the purchase phase, but they would like also to have suggestions and recommendations during their daily use.

3.2 Questionnaire

All analyses were conducted using the software Rstudio (R Core Team, 2021). Non-parametric analyses were performed and the Benjamini & Hochberg (Benjamini and Hochberg, 1995) correction was applied.

To analyse participants' attitudes toward the energy-saving of household appliances and the perceived scepticism toward household appliance sustainable information, a series of one-sample Wilcoxon tests were run. In particular, we compared the scores that participants assigned to each dimension with the median value of the scale (Mdn= 4), which indicates a neutral attitude (Table 2).

Table 2. Values of one-sample Wilcoxon tests comparing score with median (Mdn=4); values means, standard deviations and medians

Dimension	V	p (BH)	M	SD	Mdn
PEB	120	<0.01	5.93	0.99	6.1
ATT	136	<0.01	5.83	0.81	5.91
SN	128	<0.01	4.87	0.71	4.87
PEK	130	<0.01	5.12	0.94	5.33
GW	88	0.059	4.45	0.96	4.58
GS Shop assistants	53	0.665	3.96	1.46	4.12
GS Companies	69	<0.01	5.03	1.37	5.25
GS Experts	115	<0.01	4.55	0.99	4.45
ECOANX	92	<0.05	4.55	0.99	4.45

Generally, the participants believed in their ability to make energy-saving choices (PEB), reporting to prefer buying high energy-efficient household appliances (ATT). They believed that they influence and were influenced by others (SN). They also reported to search for information about high energy-efficient household appliances and other sustainability-related information, such as CO2 and water consumption (PEK). They did not perceive the sustainability-information regarding the high energy-efficient household appliances as a marketing strategy to manipulate the consumers (GW). However, participants reported a lack of confidence in both appliance companies and experts (GS: companies and experts), while their beliefs toward shop assistants seemed neutral (GS shop assistants). Finally, they reported high worry about climate change (ECOANX).

Exploring participants scoring based on their sociodemographic characteristics, we performed a between-subject analysis based on income, and whether or not they were actively engaged in other household appliances purchase. For the sake of brevity, we only reported the analyses that showed significant differences. The Kruskal-Wallis test was performed between

the levels of monthly income (low VS medium VS high). The test identified that the PEB was significantly higher in those with high income compared to those with medium income ($\chi2$ (2) = 6.84, p = .03). Surprisingly, GS towards experts was significantly higher in those with low income compared to those with high income, and medium income compared to those with high income ($\chi2$ (2) = 6.88, p = .03). The Mann-Whitney tests was performed considering whether or not they were actively engaged in other household appliances purchase (yes VS no). Those who were not actively engaged had significantly higher scores of ECOANX (W=41.00, p= .04). GW and GS towards the brand was higher in those who were engaged (W= 3.5, p= .01; W=4.5, p= .02) compared to those who were not. GS toward experts was significantly higher in those who were not engaged (W=42.50, p= .03). Frequencies and proportions were first calculated to describe the respondents' actual knowledge. We set the sufficient threshold to 50%, meaning that participants had to answer correctly to at least 50% of the items. Results show that 53% of participants did not know how to manage household appliances to the highest level of efficiency. Additionally, 77% of them were not aware about the negative environmental impacts associated with the waste of energy.

Finally, we analysed respondents' preferences concerning the characteristics of household appliances. An overall importance score was calculated to determine what the most important attributes were (Table 3).

The price was found as the most important within the attributes, while kWh was the less important attribute.

Table 3. Pairwise comparison. Attributes, Levels and Relative importance

Attributes	Levels	Relative importance (equal 100% in total)
Price	429 €	25,93
Capacity	9 kgs	17,97
Energy Class	B	17,78
CO2	1000gr	12,98
Brand	unknown	12,77
kWh	145	12,54

4. DISCUSSION AND CONCLUSION

Nowadays, the complexity of the decision-making process became evident as participants encountered a multitude of product options and details, which could be overwhelming and challenging for consumers to make informed choices. Furthermore, if the provided information is unclear or difficult to access, consumers may develop negative opinions about these companies, as observed in our sample (Nyilasy et al., 2014; Akturan, 2018).

This study represents an initial investigation into consumers' perceptions of high energy-efficient household appliances and the sustainability information available to them during the purchase process. We considered two different source of information, the household appliances' brands and the European committee.

The consumers of this study were well-educated in the working age. They expressed a clear preference for purchasing high energy efficient household appliances and exhibited positive attitudes towards them. They also perceived eco-anxiety, that could play a significant role in shaping consumer choices and behaviors.

However, participants generally viewed sustainability information provided by manufacturers and experts as ambiguous, possibly influenced by commercial motives. In contrast, their attitudes towards the role of shop assistants in providing information on energy-efficient products remained relatively neutral. Coherently with their perceived scepticism towards sustainability-related information provided by companies and experts, consumers reported a lack of research in the Life Cycle Assessment (LCA) of household appliances or in the willingness to buy refurbished ones. Additionally, nine participants expressed their willingness to opt for a new household appliance rather than repairing an old one due to cost considerations, as they perceived modern household appliances as less reliable compared to older models.

Instead, the majority of consumers relied on their social circle when making purchasing decisions. This finding emerged also during their interviews. External social influences, such as Word of Mouth (WOM), played a significant role in gathering information and shaping energy-efficient habits. However, it's worth noting that WOM can also increase cognitive burden (Gershoff et al., 2001) and may not always offer accurate or helpful information for promoting energy-saving behaviors.

In line with the literature (Si-Dai et al., 2021) emerged that consumers rely on the sustainable information provided on the energy label during the purchase phase. This tool was recently updated by the European Commission on March 1, 2021; however, during the interviews, participants highlighted their familiarity with the information reported. However, during the purchase phase became evident that consumers trust on the energy scale of the energy label, without give much importance to the energy consumption of the household appliances. Coherently, is not surprising that in the pairwise comparison emerged that participants ranked kWh as the least preferred characteristic when purchasing a washing machine. This reflects on one hand the cognitive difficulty of trade-offs between different factors that they have to face out during a real purchase phase. On the other hand, this result underlined that the energy consumption is not a easily digestible information (Schuitema & De Groot, 2015; Schwartz et al., 2020). Despite this, consumers reported a high level of knowledge and familiarity regarding the energy label. They did not actively seek out additional information independently, relying on the information displayed on the physical label. However, this perception of knowledge highlights a potential gap in their awareness of energy efficiency that is reflected not only in the purchase phase but also in their daily use of household appliances. For instance, they were not aware that the energy consumption data provided on the label pertained specifically to the Eco program (40°-60°) for dishwashers and washing machines. Moreover, the consumers often choose quick program washes over eco-friendly ones, believing that the eco program, due to its longer duration, consumes more energy. All the participants reported that this critical piece of information had not been conveyed to them, for example, by shop assistants, and none of them were aware of the information provided in the QR code.

Paradoxically, consumers in this study express a strong demand for additional information, both during the purchase phase and in their everyday use of household appliances. This could suggest that despite their scepticism towards the current information, they are open to changing their behavior if provided with valuable, clear, and credible information, meaningful to them.

Previous research in this field has underscored the potential of raising consumer awareness about energy consumption to narrow the household energy efficiency gap (Gamberini et al., 2012). Overall, our preliminary findings suggest the importance for manufacturers, retailers, and policymakers to collaborate in providing clear and easily accessible information to consumers. Additionally, given the potential sensitivity of consumer attitudes in this context to sociodemographic characteristics, as implied by our findings, companies and marketers should tailor their messaging and communication efforts to cater to the distinct needs and demographics of their target audience. Furthermore, they should promote the value and reliability of alternative and sustainable options in the market, including refurbished appliances.

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