



OPEN Experimental evidence on consumers' willingness to pay in the sustainable fashion industry

Alessandro Cascavilla¹✉, Rocco Caferra^{1,2}, Andrea Morone^{3,4} & Piergiuseppe Morone^{1,4}

This paper provides experimental evidence on consumer purchase intention and willingness to pay (WTP) in the context of sustainable consumption. Grounded in the theory of planned behavior, the literature on the intention–behavior gap, and Lancaster's model of product attributes, we examine how social and environmental preferences, alongside perceptions of quality and production costs, shape both purchase intention and revealed WTP. Using three versions of innovative sustainable products with increasing levels of circularity, we show that pro-social and pro-environmental values significantly drive purchase intentions, which are, in turn, positively associated with higher WTP. Moreover, perceptions of higher production costs and improved quality—both material and visual—further reinforce WTP for the most circular product. These findings underscore the importance of integrating behavioral factors, prior consumer experience, and product attributes when analyzing demand for sustainable goods, offering policy insights for the promotion of circular economy strategies.

Keywords Willingness to pay, Sustainable behavior, Economic experiment

The fashion industry is widely recognized for its significant environmental impact, primarily due to high water and energy consumption, inefficient supply chains, and substantial waste generation. These factors position it as one of the leading contributors to industrial pollution, globally^{1–3}. However, growing consumer awareness of these environmental and social externalities is driving a shift in purchasing behavior, with an increasing number of consumers opting for sustainable fashion items. Consequently, understanding the intentions and practices behind sustainable fashion consumption is becoming increasingly important⁴.

Recent research indicates that approximately 66% of the global population is willing to pay a premium for environmentally friendly products⁵—a figure slightly lower than that observed at the European level (72%)⁶. Generally, environmentally conscious consumers demonstrate a willingness to pay more for sustainable (e.g., bio-based) products^{7,8}. Their purchasing behavior is influenced by a range of factors, including perceived individual benefits⁹, environmental impact¹⁰, imitation of observable green behaviors¹¹, a perceived need to change consumption habits to foster positive environmental outcomes¹², and personal values and ethical motivations¹³. Despite these promising market signals, a significant share of consumers fails to follow through with sustainable purchases, even when expressing positive attitudes toward such products^{14,15}. This inconsistency is referred to in the literature as the “attitude–behavior gap” and it is attributed to both individual (e.g., habits, personal values, trust, knowledge) and situational factors (e.g., price, product availability, product features and quality, brand image)¹⁶.

Consumer predispositions and sensitivities to various impacts—including social impacts—are also essential in driving sustainable purchasing behavior. In this regard, examining “pro-social” predispositions at both individual and corporate levels (i.e., attitudes toward social responsibility, empathy, moral reasoning, and altruism) may provide insight into the socio-value dimensions of consumer behavior. Such examinations may include, for instance, exploring the correlation between purchase intention and interpersonal generosity¹⁷. More generally, integrated analyses of environmental and social behaviors—two fundamental pillars of sustainability^{18–20}—are crucial for developing a comprehensive understanding of sustainable consumer behavior.

Drawing on a hypothetical survey and a laboratory experiment, this paper provides experimental evidence on individual-level purchase intention (PI) and willingness to pay (WTP) for three different versions of a small leather bag. Specifically, we consider:

¹Department of Economics and Law, Unitelma Sapienza University of Rome, Rome, Italy. ²Department of Economics and Finance, University of Bari, Bari, Italy. ³Department of Economics, Management and Business Law, University of Bari, Bari, Italy. ⁴Corvinus Institute for Advanced Studies (CIAS), Corvinus University of Budapest, Budapest, Hungary. ✉email: ale.cascavilla@unitelmasapienza.it

- I) Bag A: a conventional leather product (CP) produced by a major brand in the fashion industry, generating unused leather scraps in line with a take-make-dispose production model;
- II) Bag B: a recycled leather product (RP) produced by a social enterprise using leather scraps from the mainstream fashion industry, thereby improving the production chain;
- III) Bag C: a re-recycled product (RRP) made from a new sustainable composite material primarily composed of shredded leather scraps sourced from the social enterprise's value chain, further reducing leather waste and effectively closing the loop.

Since the third typology (RRP) closes the leather system loop, leather is fully reintroduced into the value chain. Although this represents an efficient and desirable production model from economic, environmental, and social sustainability perspectives, it is essential to understand how consumers perceive this process and how such perceptions may vary depending on the information available about other consumers' behavior.

Building on the survey findings, we investigate consumer WTP for bags produced through sustainable processes, using the multiple-price list²¹ for the RP bag and two variants of the RRP bag, each featuring different aesthetic attributes. The products analyzed (RP and RRP) are provided by Cartiera, an Italian social enterprise (cooperative) committed to environmental and social sustainability. Founded with the mission to train labor and close the loop in leather production, Cartiera repurposes leather scraps from major Italian producers through a circular design process. This approach maximizes material reuse by transforming waste into high-quality new products. Cartiera's innovative production line consists of several stages. Initially, approximately 60% of leather scraps are upcycled into new designs, while the remaining 40% is set aside. In a subsequent phase—currently at the prototype stage—these leftovers are shredded and processed into a new material, enabling 85% of the scraps to be converted into new bags and reducing waste to just 15%. Beyond its environmental contributions, Cartiera also advances social sustainability by providing employment opportunities to asylum seekers, supporting their training, integration, and inclusion in society.

The structure of the paper is as follows: Sect. 2 provides a literature review on consumer behavior in the fashion industry; Sect. 3 presents the experimental design and methodology; Sect. 4 reports the data and results; and Sect. 5 concludes with policy implications.

Literature review on sustainable purchasing behavior

Theoretical background

Consumer choices in sustainable fashion are complex, as they are shaped by not only economic factors, but also psychological, social, and experiential dimensions. From an economic perspective, traditional demand theory assumes that consumers derive utility from goods as wholes. However, Lancaster²² introduced the idea that utility stems from the attributes of products (e.g., quality, design, sustainability), rather than the goods, themselves. In the context of consumer behavior, Ajzen²³ proposed the theory of planned behavior (TPB), which posits that intentions significantly drive behavior, shaped by attitudes, subjective norms, and perceived behavioral control. Over time, TPB has been extended to include moral norms and self-identity, particularly in the context of pro-social and pro-environmental behavior^{24,25}. However, evidence consistently shows that consumption intentions do not always translate into actual behavior, leading to the well-known “intention–behavior gap”^{26–28}.

In the context of sustainable consumption, consumers often declare a willingness to support environmentally and socially responsible products (i.e., pay a green premium). However, actual purchase rates remain modest^{29,30}. This gap can be attributed to both situational barriers (e.g., price, availability, product attributes) and individual-level constraints (e.g., habits, lack of trust, limited self-efficacy). Indeed, consumption choices reflect not only purchasing preferences but also a broader range of moral and social values³¹. As every citizen is also a consumer, the choices we make and the characteristics of the goods we decide to consume represent a crucial form of “voting with our wallet,” shaping future trajectories and overall sustainability. While purchasing intentions may reflect these virtuous values, the penetration of “green” products remains limited, representing only a niche within the broader product market³². Several contributing factors can be identified. On the supply side, companies may face challenges in making green investments³⁴. On the demand side, the heterogeneity of consumer preferences may fail to translate into sustainable purchasing behavior. Within this context, the literature identifies the intention–behavior gap as a key distortion in consumer choice. In other words, consumers do not always buy what they intend to buy—their sustainable intentions do not always materialize as sustainable actions¹⁵.

While the TPB emphasizes intentions, empirical evidence shows that past behavior and prior experience can also drive future actions, particularly when habits reduce uncertainty^{34,35}. Veldhuizen et al.³⁶, in the context of blood donation, showed that experience (e.g., self-efficacy) significantly influenced both intentions and behaviors, moderating their relationship. Similarly, in the sustainable fashion context, prior exposure to circular products (e.g., the purchase of recycled or sustainable items) and habits related to fast fashion consumption have been shown to influence whether intentions to buy sustainable goods translate into actual purchases. Consumer acceptance of sustainable products has also been linked to broader theories of innovation adoption. According to Rogers' diffusion of innovations theory³⁷, consumers differ in their propensity to adopt new products, ranging from innovators and early adopters to laggards. This framework has been applied to sustainable consumption, showing that adoption is influenced by not only product attributes, but also risk aversion, openness to change, and trust in novel product categories. Therefore, while intentions may be driven by social and environmental values, actual behavior may depend on a combination of product attributes, past experiences, and individual heterogeneity in innovation adoption. Our empirical strategy was based on this theoretical framework: a survey was administered to capture how social and environmental preferences shaped respondents' purchase intentions, while the experiment allowed us to test whether these intentions were reflected in actual WTP, taking into account not only classical economic variables, but also the Lancasterian model of product attributes and

the role of past experience (i.e., how frequently consumers purchased slow or fast fashion products), within the framework of the TPB.

While prior studies have tended to rely on large-scale surveys^{39,40} to assess the market penetration of new sustainable products, the present study adopted experimental techniques to analyze actual willingness to buy, within a controlled laboratory environment. In this regard, the literature distinguishes between revealed preference approaches—with participants making real monetary decisions for actual products—and stated preference approaches—with participants deciding on hypothetical choices via surveys or field experiments⁴¹. The latter are subject to hypothetical bias due to the absence of financial consequences⁴², whereas revealed preference methods substantially mitigate this issue, producing more reliable WTP estimates⁴³. Within the experimental economics tradition, one of the most established revealed preference tools is the lottery method⁴⁴, later adapted in other designs⁴⁵. Researchers have increasingly adopted artefactual field experiments, which retain the control and incentive compatibility of laboratory experiments while embedding them in more realistic contexts, thereby enhancing external validity^{46,47}. These approaches have been widely employed to investigate environmental and sustainability-related issues and to elicit consumer WTP for sustainable products²¹. Furthermore, several studies have directly compared WTP elicitation methods, highlighting the challenges posed by hypothetical bias and the importance of methodological choices. For instance, Voelckner⁴³ compared auctions, contingent valuation, and conjoint analysis in both real and hypothetical settings, finding substantial differences and showing that partial real payment mechanisms can reduce overstatement. Blumenschein et al.⁴⁹, in a field experiment, tested different treatments to elicit demand for a novel health program, finding that the certainty approach effectively removed hypothetical bias, whereas cheap talk did not. Silva et al.⁵⁰ combined field auctions and conjoint analysis to measure consumer WTP for grapefruit with novel attributes, confirming that hypothetical bias existed across methods but that real auctions yielded more conservative values. More recently, evidence from an Italian case study⁵⁰ shows that using a BDM-type lottery both ethical certification and additional information significantly increased WTP for Fairtrade sugar, though heterogeneously across consumers.

Research hypotheses

Building on the theories and evidence discussed earlier, the study had two main goals: first, to identify the key drivers of purchase intentions; and second, to examine how these intentions did—or did not—translate into actual purchasing decisions. We considered both product-specific and individual characteristics in this analysis.

While much research has explored the factors shaping purchase intentions, a parallel body of work has highlighted the existence of an intention–behavior gap, demonstrating that stated intentions often fail to align with real-world choices. If intentions were to directly translate into behavior, we would observe a perfect match between the two—but this is rarely the case.

Our study investigated the shift from hypothetical intention to real, incentivized purchasing behavior, with “real” implying actual consequences (e.g., monetary payment, product acquisition). The literature shows that this gap may be influenced by product-level factors, and that even consumers with positive attitudes toward sustainability may undervalue key product attributes (e.g., quality, price, the visibility of eco-friendly features), leading to a disconnect between intention and action.

Accordingly, we first assessed the role played by green purchase intention, and examined whether product characteristics accounted for the unexplained variance in behavior. We also considered the role played by experience with green purchasing, which, according to the TPB, can influence both intention and action. Specifically, we focused on the effect on actual behavior, particularly WTP. Inexperience, or “green neophobia,” may discourage the purchase of less familiar sustainable products, while experienced consumers may feel more confident and capable in making such choices. From an operational perspective, we therefore distinguished between two sets of research questions. The first investigated the drivers of purchase intention, while the second examined the extent to which these intentions predicted real, incentivized purchase decisions, taking into account both product-specific characteristics (e.g., perceived quality, environmental/social sustainability attributes) and consumer-specific factors (e.g., prior experience with green consumption). This allowed us to test for a potential positive spillover effect, with previous green consumption reducing psychological barriers and perceived costs—particularly when compared to early adopters encountering such products for the first time.

Based on this framework, we proposed the following hypotheses:

H1. Individual attitudes toward ecological and social preferences represent significant drivers of purchase intention. These include both demand-side variables (e.g., individual environmental and social concerns) and supply-side variables (e.g., attention to, and expectations of, producers’ environmental and social practices).

H2. In the incentivized purchase of the three product alternatives, an intention–behavior gap will occur, moderated by product-specific attributes and consumer characteristics (e.g., prior experience). When product attributes are not significant, intention will serve as the primary determinant of behavior; however, when attributes are significant, intentions alone will not fully explain purchasing decisions, and product-level factors will become essential.

Within this context, prior experience with sustainable products may generate economies of scale and positive behavioral spillovers, reducing the risk associated with misjudging product attributes. In this sense, experience may mitigate the impact of uncertainty and facilitate green purchasing behavior.

Furthermore, our analysis allowed us to assess whether, and to what extent, product attributes might explain additional variance beyond intention. Specifically, we examined how individuals ranked key attributes such as environmental impact, perceived quality, and perceived cost, to gain insight into the green premium: if environmental attributes consistently ranked lower than quality or cost, then WTP a premium for sustainability was undermined.

Finally, due to the incentivized nature of our experiment, we were able to observe revealed preferences and actual behavior. This represents a strength relative to previous survey-based studies, which have largely relied solely on stated preferences.

In our case study, the first source of heterogeneity lay in the product's production process. We began by analyzing WTP for a bag made using sustainable methods, aimed at reducing environmental impact (as described in the previous section). This analysis focused on the materials used in its production. Subsequently, we examined WTP for a bag that not only employed sustainable materials and methods but also incorporated circular economy principles—using production waste from other products to create the final item. In this context, we investigated the market shift toward sustainability, aiming to identify variations in WTP (and thus purchasing decisions) for goods produced under both sustainable and non-sustainable criteria but aligned with circular economy practices. Within this second type of market, we introduced an additional layer of heterogeneity related to the aesthetic characteristics of the product.

The visual appeal of a product may significantly influence purchasing decisions, as is well-documented in the literature⁵¹. Consumers may be drawn to products with standard aesthetic features that closely resemble a conventional reference version, or they may prefer niche products with more distinctive, unconventional visual elements.

Market penetration may also depend on these factors. The structure of the analysis is as follows: Sect. 3 describes and justifies the methodology used, while Sect. 4 presents the results and outlines the main conclusions. As will be shown, the purchase of bags made from recycled materials depended not only on purchase intention, but also on perceived quality, cost, and specific preferences for products incorporating recycled materials. We observed a generally lower WTP for this type of bag, regardless of the aesthetic features, which did not appear to introduce significant heterogeneity in consumer choices.

Thus, while bags made from recycled materials have a market, this market appears to be primarily composed of individuals with a strong orientation toward environmental issues and circular economy principles. This highlights the need for targeted awareness and advertising campaigns to engage a broader range of consumers and support market development for such products.

Experimental design and methodology

To elicit the hypothetical impact of social and environmental preferences on purchase intention, we first conducted a large-scale survey. Subsequently, we carried out an incentivized laboratory experiment to determine WTP for the bags.

Large-scale survey for purchase intention

Based on the considerations above, this section analyzes the impact of social and environmental preferences—both at the individual level and in relation to corporate social and environmental sustainability—on purchase intention for Bags B and C. To investigate this relationship, we administered a questionnaire via the Qualtrics platform to a sample of 191 respondents representative of the Italian working-age population. In accordance with the literature²⁷, the questionnaire was structured into the following four sections to capture the variables of interest:

- 1) Environmental preferences:
 - a. Corporate: Participants were asked to indicate, on a scale from 1 (*not at all*) to 5 (*a great deal*), the importance they assigned to environmental sustainability (e.g., environmentally friendly production) in their fashion product purchasing decisions. This measure captured consumers' valuation of firms' ability to offer sustainable products.
 - b. Individual: Participants were asked to rate, on a scale from 1 (*never*) to 5 (*always*), how frequently they engaged in various environmentally friendly behaviors, such as: using public transportation, avoiding disposable products, sorting waste properly, following a predominantly vegetarian or vegan diet, purchasing products with minimal packaging, conserving water and electricity, joining environmental volunteer organizations, buying products that respect biodiversity, storing and consuming food to avoid waste, and avoiding frequent clothing purchases.

- 2) Social preferences:
 - a. Corporate: Participants were asked to indicate, on a scale from 1 (*not at all*) to 5 (*a great deal*), the importance they assigned to social sustainability (e.g., respect for workers' rights or the absence of child exploitation) in their fashion product purchasing decisions. This question is widely used in the literature as a measure of individual preferences regarding corporate social responsibility⁵².
 - b. Individual: Drawing on the concept of prosocial behavior,²⁸ participants were asked to indicate, on a scale from 1 (*completely disagree*) to 5 (*completely agree*), how strongly they identified with the following statements: "It is important to listen to people who are different from you. Even when I disagree with them, I still try to understand them"; "I think it is important that all people in the world are treated equally"; "It is important for me to be loyal to my friends"; "It is important for me to earn the respect

of others”; “It is very important for me to help people close to you”; and “I believe that everyone should have the same opportunities in life.”

- 3) Purchase intention: Participants were asked to indicate their purchase intention by responding to the following question, “Would you be willing to purchase the following types of bags? Please indicate your answer on a scale of 1 (*not at all*) to 10 (*a great deal*),” for the following options:
 - a. Bag made entirely of leather (Bag A).
 - b. Bag made of recycled leather (Bag B).
 - c. Compound bag made of re-recycled leather (Bag C).

Before answering, participants were shown a stylized diagram summarizing the production processes of the three bags, specifying the differences between leather (A), recycled leather (B), and re-recycled leather (C), as illustrated in the following image (Fig. 1):

- 4) Sociodemographic information: Participants were asked to provide basic personal information, including gender, age, presence of children in the household, and average gross income level.

Lab experiment for willingness to pay

The scientific literature shows that WTP can be measured using either real (i.e., involving actual monetary transactions, as in revealed preference approaches) or hypothetical (i.e., involving no real payments, as in stated preference approaches) methods⁴¹. In the revealed preference approach, participants use real money to purchase actual products, generating more accurate and unbiased estimates of WTP. However, such market data are often scarce²¹. As shown by Schmidt and Bijmolt’s⁴² meta-analysis, the introduction of a real-world context in which participants make purchasing decisions based on their stated reservation prices significantly reduces the bias associated with hypothetical, non-incentivized choices. Simply put, when participants are required to choose between keeping their money or spending it to buy a product, the scenario more closely replicates real market behavior.

In the present study, we adopted a real-incentive approach to measure WTP. Among the available methods, the lottery mechanism is one of the most widely used in experimental economics⁴⁴. We implemented a variant of this method, replicating the design used by Morone et al.²¹ to assess WTP for various types of sustainable products. The experiment was conducted on March 5, 2024, in the Laboratory of Experimental Economics at the University of Bari (Italy), with a total of 90 student participants. This sample size exceeded the minimum required, as determined by an a priori power analysis for a paired-sample mean difference test (i.e., two



Fig. 1. Bag production process.

dependent observations). The calculation assumed a medium effect size (0.5), a significance level of 1%, and statistical power of 95%, indicating a minimum required sample of 75 participants.

The experiment consisted of two parts:

- Part 1 elicited participants' WTP for Bag B (the base product) and two versions of Bag C, both made from the same shredded leather components. In the first version, the new material was left in its natural state (Bag C1; see Fig. 2 – center), while in the second version, the material was coated with a glossy finish (Glossy Bag C2; Fig. 2 – right). Participants were shown the physical bags and allowed to view and touch them.
- Part 2 consisted of a series of questions on sociodemographic characteristics, product purchase intentions, perceptions of product attributes, and general purchasing habits.

As previously mentioned, Part 1 assessed WTP using the multiple-price list (MPL) methodology, following the approach used in Morone et al.²¹ The method is based on a series of repeated choices by subjects, as reported in Fig. 3, below. As the name suggests, each participant is asked to make a decision for every row in a multiple-price list, with each row involving a binary choice between a fixed monetary amount and a product (in the present study, a bag; see Table 1 for an example list for a generic bag). In the present study, each participant completed this task separately for all three bags. For each row, they indicated whether they preferred to receive the monetary amount or the bag. After all choices were made, one of the 21 rows was randomly selected. If, in that row, the participant had chosen the bag, they received the bag; otherwise, they received the corresponding monetary amount. Since three bag prototypes were used in the experiment, three participants were randomly selected for actual payment, one for each bag type.

In this context, it was important to identify an appropriate range of price variability. We selected a range of €0–€50, considering that the potential market price of the basic bag was approximately €30. This allowed us to explore the existence of a “green premium” (offering participants the opportunity to pay above the average market price) or, conversely, a discount effect (offering the possibility of paying less). As is widely demonstrated in the literature, this method is among the most effective for studying reservation prices and consumption choices, while minimizing bias, as the mechanism encourages participants to reveal their true preferences. For example, if a participant values a bag at €20, they will choose to receive the bag up to the €20 row; beyond that point, they will opt for the monetary amount. We use such “switching point” as a measure of the WTP (i.e., reservation price). Since the consequences of their choices are real and financially binding, they have no incentive to misrepresent their preferences.

After analyzing the distribution of the response variable and estimating the demand curve, we examined the determinants of reservation price. In this phase, we drew on various microeconomic theories of optimal consumer choice. According to neoclassical models, consumers make decisions based on economic constraints, product price, and individual preferences. In later theoretical developments, Lancaster³¹ proposed that utility is derived from the attributes and characteristics of a product, rather than from the good itself.

In our context, consumer choices were driven not by the intrinsic value of the good, but by its sustainable features and other product-specific attributes. Using regression analysis, we investigated how purchase intention (serving as a proxy for social and environmental preferences), perceived product cost and quality, and specific features (e.g., the presence of recycled materials) influenced the utility derived from the product, and consequently WTP.



Fig. 2. The three bags included in the experiment.

Monetary amount (€)	Bag
0 €	
2,5€	
5 €	
7,5€	
10 €	
12,5€	
15 €	
17,5€	
20 €	
22,5€	
25 €	
27,5€	
30 €	
32,5€	
35 €	
37,5€	
40 €	
42,5€	
45 €	
47,5€	
50 €	

Fig. 3. Multiple price list for a generic bag.

Variable	Mean	Std. Dev.	Min	Max
Intention to purchase bag B	5.948	2.764	1	10
Intention to purchase bag C	5.963	2.864	1	10
Corporate environmental preference	2.874	1.229	1	5
Individual environmental preference	3.501	0.602	1.727	5
Corporate social preference	2.864	1.224	1	5
Individual social preference	4.306	0.594	2.667	5
Income	2.812	1.865	1	7
Gender	1.445	0.539	1	3
Age	33.471	9.053	20	66
Minors in the household	1.435	0.915	1	5

Table 1. Descriptive statistics.

Ethics statement

Given that the research was based on a voluntary survey, no formal ethical approval was required. The study complied with the legal obligations of the General Data Protection Regulation (GDPR) (EU) 2016/679. No personal or sensitive data that could identify respondents were collected. Additionally, informed consent was obtained from all participants prior to their involvement in the survey, through an electronic consent form included in the online questionnaire. All procedures were conducted in accordance with relevant ethical guidelines and were fully compliant with applicable regulations, which do not require ethical approval for research involving minimal risk⁵³.

Data and results

Analysis of social and environmental preferences

Table 1 presents the descriptive statistics of the variables used in the Purchase Intention dataset from the large-scale survey. As shown, the mean purchase intention for Bags B and C were similar, at 5.95 and 5.96, respectively, on a 10-point Likert scale. This suggests that, at least hypothetically, respondents expressed comparable interest in both bags, regardless of the differences in their production characteristics.

Regarding environmental preferences, respondents rated individual behavioral preferences (mean = 3.50) as more important than preferences related to firm behavior (mean = 2.87). To examine the influence of these variables on purchasing behavior, a categorization was conducted based on respondents' environmental preferences—both individual and enterprise-related. Specifically, a dummy variable was constructed to indicate whether a respondent exhibited above-average environmental concern ("Environmental preference: high" = 1) or concern less than or equal to the average ("Environmental preference: low" = 1).

Based on the data described thus far, we conducted a descriptive analysis of the distribution of purchase intention according to corporate and individual social preferences. As previously noted, prosocial preferences appear to be a key driver influencing purchase intention¹⁷.

Figure 4 illustrates this relationship for Bag B, displaying purchase intention by level (low = blue, high = orange) of both corporate and individual social preferences. Respondents with higher levels of social preferences consistently demonstrated significantly greater purchase intentions. This pattern held true for both corporate (left bars) and individual (right bars) social preferences.

A similar trend was observed for Bag C, as depicted in Fig. 5. Again, higher social preferences were associated with greater purchase intention, while lower preferences corresponded with reduced interest. While this suggests a potential relationship between social and environmental preferences and purchase behavior, it is necessary to examine the correlations between these preference dimensions. These correlations are presented in Table 2.

The results indicated a positive and significant correlation (0.597) between individual and corporate environmental attitudes, suggesting that individual environmental concerns were reflected in both purchasing choices and expectations regarding market supply. Similarly, individual and corporate social attitudes were positively correlated (0.189), underscoring the importance of considering both dimensions within the broader context of sustainability and decision-making drivers. Notably, a strong correlation (0.91) was observed between corporate social and environmental preferences, indicating that these two factors were closely interrelated in shaping corporate strategies. Therefore, it was essential to treat them as distinct determinants in the regression analysis to more accurately capture hypothetical market behavior and decision-making dynamics.

To gain deeper insight into the purchase intentions for Bags B and C, we conducted a linear regression analysis using the ordinary least squares (OLS) estimator. This method allowed us to assess the isolated effect of each

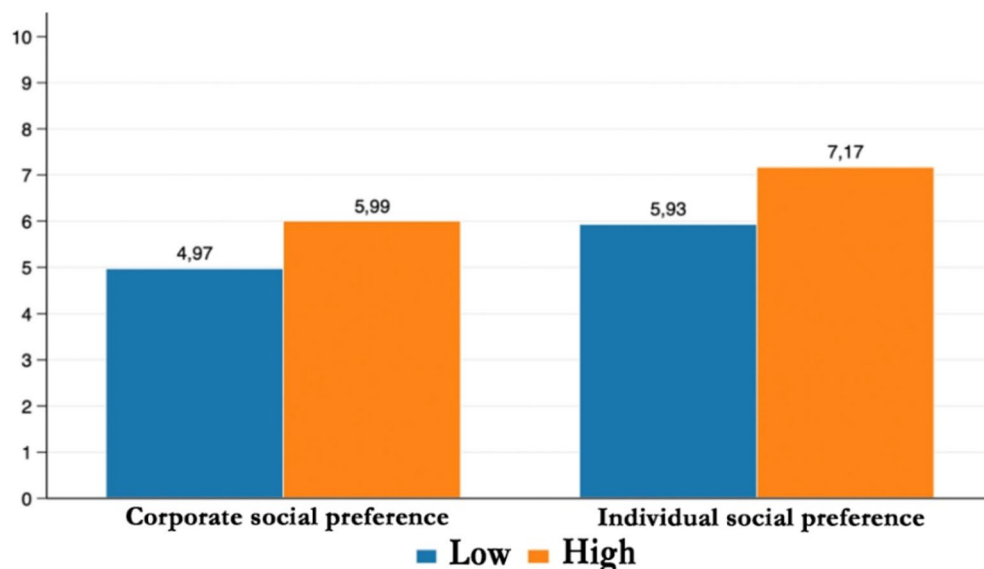


Fig. 4. Purchase intention for Bag B.

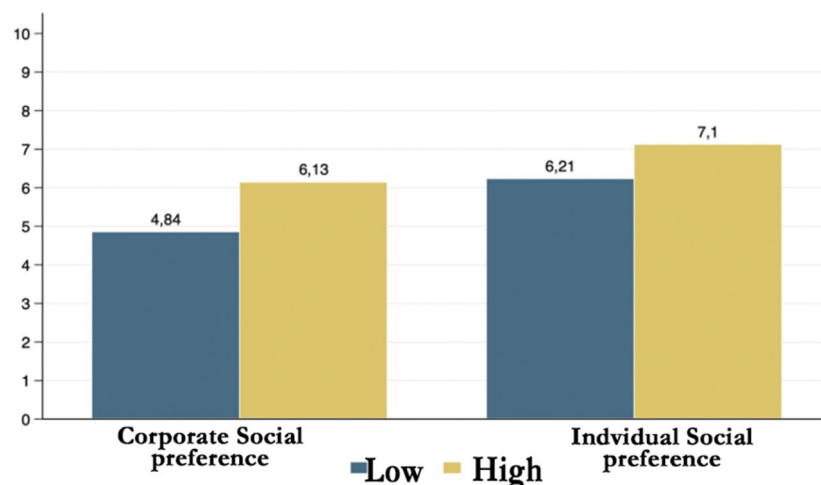


Fig. 5. Purchase intention for Bag C.

Variable	(1)	(2)	(3)	(4)
(1) Individual social preferences	1.000			
(2) Corporate social preferences	0.189*	1.000		
(3) Individual environmental preferences	0.210*	0.567*	1.000	
(4) Corporate environmental preferences	0.206*	0.909*	0.597*	1.000

Table 2. Correlations between social and environmental preferences. * $p < 0.5$.

explanatory variable on the dependent variable (hypothetical purchase intention), measured on a 10-point scale for both bags. The primary explanatory variables were social and environmental preferences at both individual and corporate levels. Given the high correlations observed among these variables, we opted to run separate regressions for each set of preferences for each bag. Specifically, Table 3 reports the econometric estimates as follows: columns 1 and 2 present the estimated coefficients of social preferences (corporate and individual) on purchase intentions for Bags B and C, while columns 3 and 4 report the coefficients for environmental preferences (corporate and individual) for the same bags. Additionally, we included sociodemographic controls (income level, gender, age, presence of minors in the household) to evaluate their influence on purchase intention. This analysis provided a clearer understanding of the factors shaping consumer purchasing decisions and revealed significant associations among the variables considered.

As shown in columns 1 and 2, social preferences emerged as a significant determinant of purchase intentions for Bags B and C. Among these, preference for corporate social sustainability practices (e.g., fair labor conditions, absence of exploitative practices) emerged as the most influential factor. Notably, the coefficient was slightly higher for Bag C (1.445, compared to 1.372 for Bag B), indicating greater consumer sensitivity to the socially responsible attributes associated with this product.

The analysis also indicated that individual social preferences (e.g., prosocial behavior) had a positive impact on purchase intention for Bag C, albeit at the 10% level of statistical significance. This suggests that consumer sensitivity to social factors varied depending on the specific product. In contrast, sociodemographic variables did not significantly account for variation in purchase intention for either bag within the sample.

Turning to columns 3 and 4, the findings revealed that environmental preferences, like social preferences, significantly influenced purchase intention for both Bags B and C. Preference for corporate environmental sustainability (e.g., environmentally friendly production) emerged as the most relevant factor, with statistical significance at the 5% level. Again, the coefficient was higher for Bag C, suggesting heightened consumer awareness of this product's environmental features. However, individual pro-environmental behaviors did not exhibit a statistically significant impact on purchase intention. This may be due to the fact that the products in question were already perceived as environmentally sustainable. As with social preferences, sociodemographic variables again failed to significantly explain variation in purchase intention.

Results of the lab experiment

This section analyzes the determinants of reservation prices for the three bags. Following the methodology proposed by Morone et al.²¹, we examined both average WTP for each bag and the aggregate demand curve.

Table 4 presents the descriptive statistics of the variables used in the experiment. Among the three bags, the basic model made from recycled material showed the highest average WTP (approximately €15). Bag C1 ranked second (average WTP of approximately €12), followed by Bag C2. Regarding product characteristics,

	Social preferences		Environmental preferences	
	(1)	(2)	(3)	(4)
Dependent variable: Purchase intention	Bag B	Bag C	Bag B	Bag C
Corporate social preferences	1.372*** (0.427)	1.445*** (0.438)		
Individual social preferences	0.786 (0.544)	0.963* (0.559)		
Corporate environmental preferences			0.934** (0.472)	1.107** (0.484)
Individual environmental preferences			0.217 (0.455)	0.333 (0.466)
Income	-0.086 (0.107)	-0.128 (0.110)	-0.059 (0.109)	-0.094 (0.112)
Gender (female)	0.205 (0.371)	0.249 (0.381)	0.273 (0.376)	0.310 (0.385)
Age	0.011 (0.022)	0.010 (0.023)	0.016 (0.022)	0.017 (0.023)
Minors in the household	0.083 (0.219)	0.354 (0.225)	0.069 (0.223)	0.355 (0.229)
Constant	5.031*** (0.790)	4.683*** (0.811)	4.673*** (0.846)	4.153*** (0.866)
Observations	191	191	191	191
R-squared	0.073	0.089	0.040	0.063

Table 3. OLS regression results for purchase intention of bags B and C, with respect to social preferences (Columns 1 and 2) and environmental preferences (Columns 3 and 4). Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Variable	Obs	Mean	Std. Dev.	Min	Max
WTP Bag B	90	15.222	11.867	0	50
WTP C2	90	10.583	11.218	0	52.5
WTP C1	90	12.194	11.329	0	50
Purchase intention Bag B	90	5.278	2.219	1	10
Purchase intention Bag C1	90	3.811	2.694	1	10
Purchase intention Bag C2	90	2.844	1.931	1	10
Cost Bag B	90	4.567	2.648	1	10
Cost Bag C2	90	4.167	2.079	1	10
Cost Bag C1	90	5.944	2.159	2	10
Buy fast fashion	90	1.522	0.502	1	2
Perceived quality C1	90	2.5	1.351	1	5
Perceived quality C2	90	2.033	1.075	1	5
Perceived quality Bag B	90	3.433	1.039	1	5
Buy recycled	90	1.6	0.493	1	2
Income	90	2.644	1.737	1	7
Gender	90	1.567	0.498	1	2
Minors in the household	90	1.522	0.768	1	5

Table 4. Descriptive statistics.

participants were asked to evaluate their purchase intention, perceived product quality, and perceived cost using a 10-point Likert scale.

With regard to purchase intention, a similar pattern emerged: Bag B received the highest rating, followed by Bags C1 and C2. Bag B was also rated as having the highest perceived quality, while Bag C1 was perceived as slightly more expensive than the others.

Among the product attributes assessed, we included potential utility or disutility associated with being a fast fashion product or being made from recycled materials. To determine the salience of these aspects to consumers, we asked whether participants typically sought out fast fashion clothing (1 = no; 2 = yes) and whether they sought

goods made from recycled materials (1 = no; 2 = yes). We then used these two indicators as proxies for prior experience with sustainable products, expecting a positive relationship between such experience and WTP, as discussed in Sect. 2.

With regard to sociodemographic variables, we collected data on seven household income categories, gender, and household composition (specifically, the presence of minors). We did not collect information on age or education, as all respondents were university students of similar age and educational background.

We continued the analysis by assessing the statistical significance of differences between the distributions of WTP, as shown in Fig. 56(left). To this end, we performed a Kolmogorov–Smirnov test to compare the cumulative distribution functions. Bag 1.0 was found to be statistically different from all other bags at the 1% significance level. In contrast, no statistically significant difference was detected between Bags C1 and C2. Regarding purchase intention (Fig. 6, right), a divergence emerged, as Bag C1’s distribution of purchase intention was statistically superior to that of Bag C2.

This analysis thus supported the conclusion that Bag 1.0 commanded a higher WTP, while Bags C1 and C2 appeared to share a comparable market position, irrespective of aesthetic differences.

Following Morone et al. (2020), we constructed demand curves for the three products by aggregating individual reservation prices. We then applied the local polynomial regression fitting (LOESS) method to estimate smoothed demand curves by bag type. The results indicated a broadly similar distribution of WTP across the products, with Bag 1.0 again displaying higher values in the average WTP range.

The overall similarity in the shape of the demand curves suggested comparable elasticities and consumer price sensitivities across all bag types (Fig. 7). Nevertheless, the lower average WTP for the re-recycled variants (C1 and C2) was confirmed, particularly in the central portion of the demand curves.

We next examined the determinants of individual WTP. As discussed in the preceding sections, social and environmental preferences were integral to explaining purchase intention, which, in turn, constituted a key variable in predicting WTP. Figure 8 provides initial graphical evidence by showing the relationship between high purchase intention (above average) and corresponding WTP levels for the three bags. T-test results revealed that high purchase intention was associated with a €10 increase in WTP for Bag B ($p < 0.01$), an €11 increase for Bag C1 ($p < 0.01$), and a €5 increase for Bag C2 ($p < 0.10$).

These findings align with the previous results: although recycled bags had similar WTPs, Bag C2 not only attracted lower purchase intention but also exhibited a weaker link between purchase intention and WTP. This may be attributed to aesthetic differences that distinguished it from the other models.

We incorporated all these aspects into an OLS regression model with robust standard errors. As previously noted, we included neoclassical factors influencing consumer choice, such as disposable income, perceived cost/price, and purchasing preferences—captured through purchase intention. In addition, we accounted for product attributes, including the use of sustainable materials (i.e., materials not associated with fast fashion), the search for recycled content, and perceived product quality. Sociodemographic controls were also included. The results are reported in Table 5.

The findings confirmed the previous insights: for Bags B and C1, purchase intention significantly and positively predicted WTP. However, this relationship did not hold for Bag C2, which was characterized by distinctive aesthetic features. Here, a gap between intention and behavior emerged, as higher purchase intention did not translate into increased WTP. This divergence suggests that aesthetic considerations may override behavioral intentions in certain cases. Perceived production costs were positively associated with WTP for both recycled bags, while perceived quality was a significant predictor of WTP only for Bag C1. Overall, sensitivity to product attributes was most pronounced in the case of Bag C1. Specifically, the presence of recycled materials—common to both C1 and C2—only led to a statistically significant increase in WTP for Bag C1, and not for the glossy version (C2), which underwent more radical aesthetic modifications. As the results show, prior experience played a significant role in shaping WTP for recycled products, but only in the case of the fully recycled bag. This suggests the presence of an “experience effect,” whereby familiarity with recycled products may increase consumers’ valuation of such goods. However, when additional attributes—particularly niche or unconventional

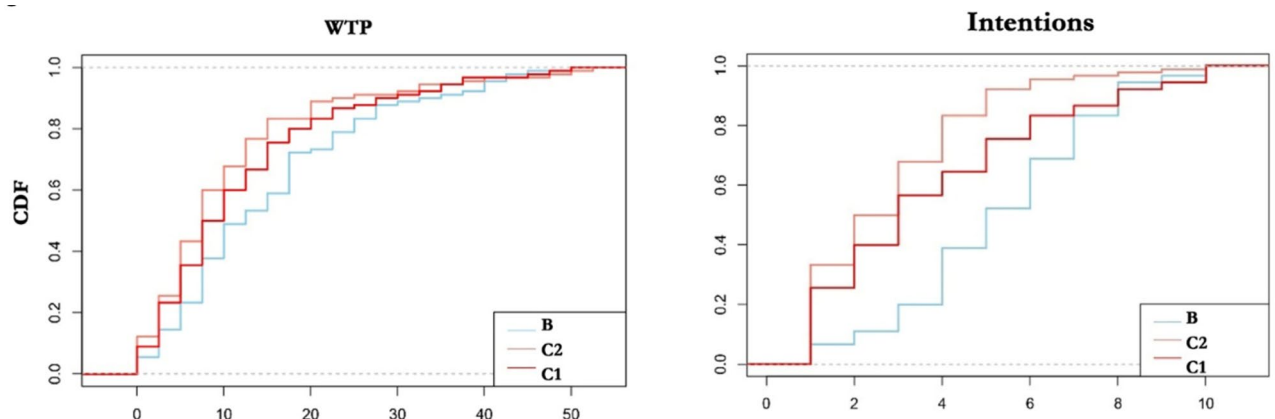


Fig. 6. Cumulative distribution of the 3 bags. WTP on the left and purchase intention on the right.

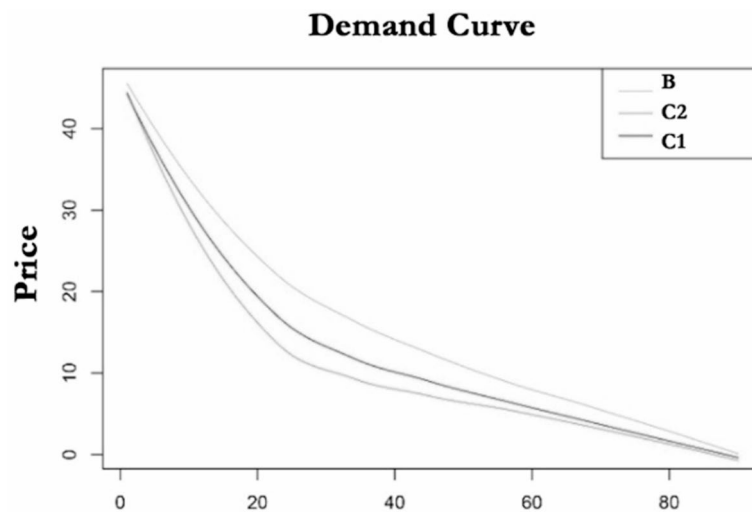


Fig. 7. Demand curve for the three bags (quantity on the x-axis).

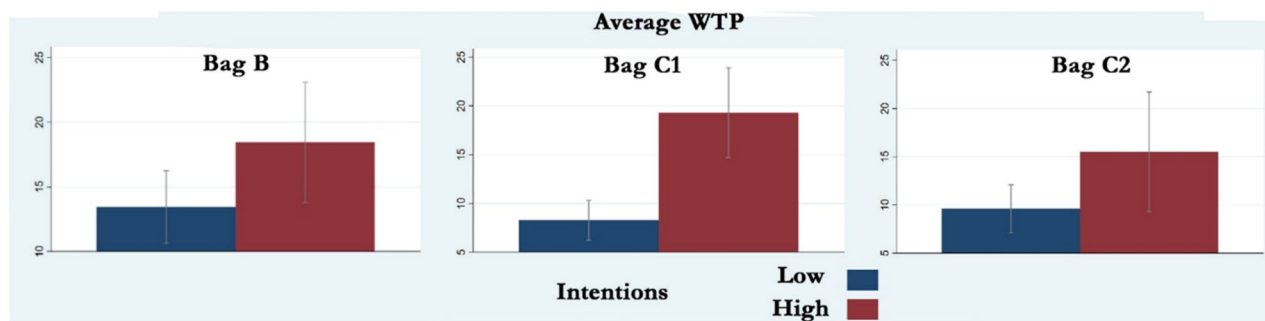


Fig. 8. Relationship between purchase intention and willingness to pay for the three types of bags. Differences are statistically significant for Bag 1.0 and Bag 2.0 at the 1% level (t-test), and for Bag 2.0 Glossy at the 10% level (t-test).

aesthetic features—were introduced, the experience effect diminished and became statistically insignificant. These more eccentric design elements appeared to have undermined the positive influence of prior experience. Thus, while experience may enhance the perceived value of specific product attributes, its impact may weaken in the presence of conflicting or polarizing elements, such as aesthetic risk.

Based on these findings, we concluded that sustainable attributes may be a secondary concern for consumers—considered only when perceived quality and cost are comparable. If this were the case, it would be essential to introduce products to the market that were not only sustainable, but that also featured specific design elements that enhanced consumer perception, thereby improve purchasing attitudes and supporting broader market adoption.

To validate this hypothesis, we consulted a group of expert stakeholders with a demonstrated interest in environmental sustainability, particularly in the context of sustainable fashion. These experts were involved in the PEACE project (“Protecting the Environment: Advances in Circular Economy”), funded by the Italian Ministry of University and Research under the PRIN initiative and supported by the European Union’s Next Generation EU fund. The PEACE project aims to identify policy pathways to advance the Sustainable Development Goals through a circular economy framework. The consulted stakeholders—primarily academics and industry professionals specializing in circular economy and sustainable innovation—participated in the project’s kick-off meeting held in Rome on November 8, 2024. Their involvement was tied to the fashion-related case study of the PEACE project, which investigates sustainable practices in the fashion sector, focusing on circular production models and their associated social and environmental impacts. During this scientific outreach event, we conducted a targeted survey with this expert group. After presenting three types of bags (Bags B, C1, and C2), we asked participants to evaluate various product attributes via a structured questionnaire.

The questionnaire, adapted from Dinh et al.⁵⁴, was administered using a Likert scale ranging from 0 (*completely disagree*) to 10 (*completely agree*). The instrument was designed to capture perceptions of the strengths and weaknesses of eco-design in sustainable products. To structure the evaluation, the attributes were organized into four main categories:

	(1)	(2)	(3)
	Bag B	Bag C1	Bag C2
Purchase Intentions	1.508* (0.777)	1.109* (0.629)	0.93 (0.704)
Perceived cost	0.446 (0.895)	0.693** (0.342)	1.636*** (0.504)
Perceived quality	0.32 (1.663)	3.159*** (1.084)	0.017 (1.521)
Buy fast fashion	-2.775 (2.911)	0.288 (2.245)	-0.001 (2.253)
Buy recycled	0.923 (2.702)	4.406* (2.553)	3.355 (2.634)
Income	0.183 (0.76)	-0.873 (0.619)	-0.492 (0.628)
Type	-1.907 (2.74)	2.016 (2.439)	-1.088 (2.5)
Minors	-0.108 (1.876)	-0.699 (1.455)	0.944 (1.984)
Constant	8.924 (10.795)	10.369 (9.864)	2.713 (8.642)
Observations	90	90	90
R-squared	0.139	0.399	0.204

Table 5. OLS regression for WTP. Robust Standard Errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

1. **1. Functional attributes (FUN):** assessing the product's functional characteristics.

- - **FUN01:** This product is easy to use.
- - **FUN02:** This product is durable.

2. **2. Aesthetic attributes (AES):** assessing the product's aesthetic qualities.

- - **AES01:** This product has a visually attractive design.
- - **AES02:** This product's color is pleasant.

3. **3. Eco-material attributes (MAT):** assessing the use of eco-friendly materials.

- - **MAT01:** This product is made from recycled materials.
- - **MAT02:** This product is made from biodegradable materials.
- - **MAT03:** Natural and green sources of raw material are used in the production of this product.
- - **MAT04:** This product is made using minimal materials.

4. **4. Eco-production attributes (PRO):** assessing attributes related to eco-friendly production.

- - **PRO01:** The production of this product causes no direct or indirect damage to the environment.
- - **PRO02:** This product is made using renewable energy/resources.
- - **PRO03:** New and advanced equipment is used to produce this product.

We received 33 valid responses to this questionnaire, offering valuable expert insights into the sustainable attributes of the bags under consideration. These responses helped to identify the perceived strengths and weaknesses of eco-design elements, contributing to a more nuanced understanding of how such attributes are evaluated in expert discourse. The results are presented in Fig. 9.

As shown by the mean values, expert perceptions of the bags' sustainable characteristics were generally high across product types (see, e.g., top row, first graph). In particular, Bags C1 and C2 were perceived as incorporating a greater use of recycled materials, in alignment with their actual design features (second row, fourth graph).

Notably, the results for aesthetic and functional attributes revealed a more nuanced pattern. Bag C2 was perceived as visually unattractive, with less appealing aesthetic features, such as color. Furthermore, it was rated lower in terms of quality and durability (second row, second graph).

These findings supported our hypothesis regarding the perceived inferiority of Bag C2, which appeared to influence rational consumer decision-making, particularly in terms of WTP. Participants showed a preference for products perceived as higher in quality, even when sustainability levels were held constant. This underscores the idea that the "green premium," describing consumers' additional WTP for environmentally sustainable products, may be conditional upon maintaining conventional product standards, particularly those related to quality and aesthetics.

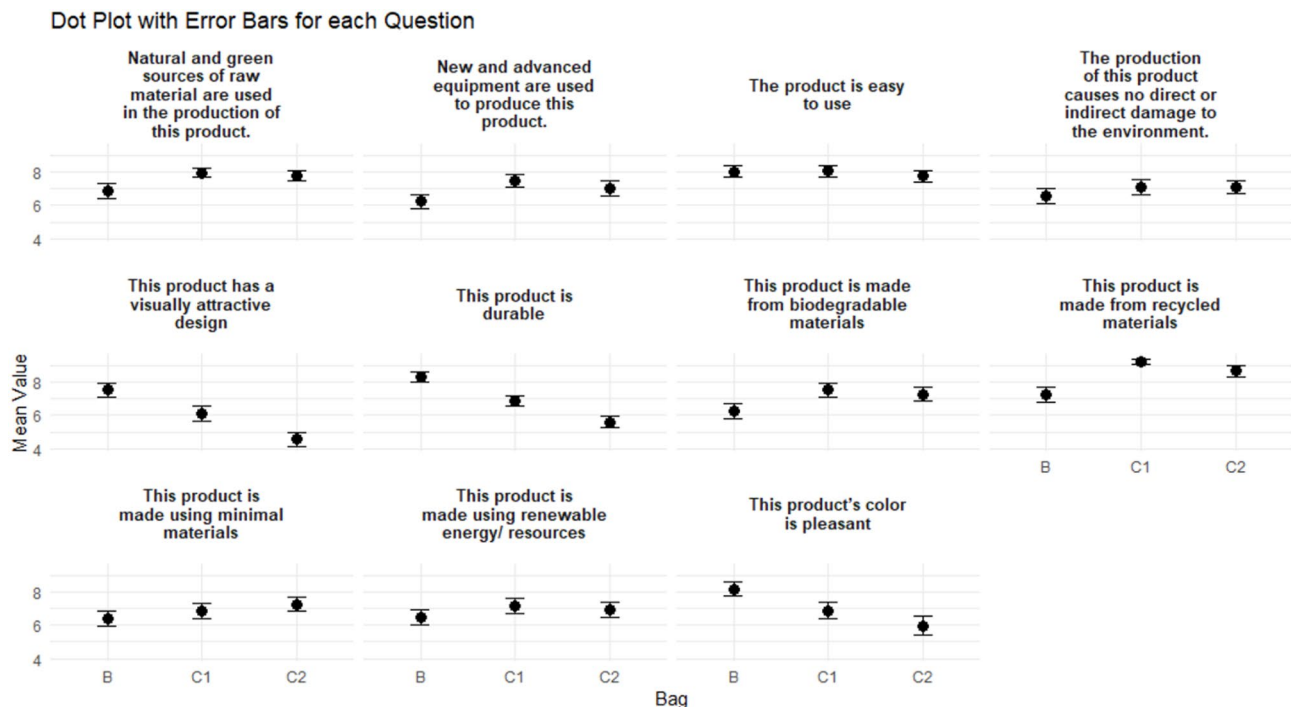


Fig. 9. Results of the expert survey.

Discussion and policy implications

The present study examined consumer behavior toward sustainable fashion products by analyzing purchase intention and WTP for items with varying levels of green and social attributes. The findings suggest that consumers may be motivated not only by environmental and social considerations, but also by perceived quality and production costs. Specifically, products made from recycled materials—both recycled and re-recycled—tended to elicit stronger purchase intention and higher WTP when companies clearly demonstrated a commitment to sustainability. This suggests that alignment between corporate sustainability practices and consumer values may represent a significant driver of demand for sustainable fashion.

Importantly, the perceived increase in production costs for environmentally friendly products also shaped consumer behavior. WTP a premium reflected broad acceptance of the higher costs associated with sustainable production, particularly when consumers recognized the positive environmental and social impacts of their purchases. This was especially evident in the case of the re-recycled bag, which commanded a higher WTP due to its perceived quality and the greater complexity of its production process.

However, the analysis also highlighted the critical role played by product design in shaping consumer choices. While consumers expressed strong preferences for environmentally and socially sustainable products, these preferences weakened when substantial aesthetic changes were made relative to the standard product. For instance, although the recycled versions of the bag generally received high purchase intention and WTP, the glossy version—which introduced notable aesthetic alterations—did not generate the same level of consumer commitment. This underscores that design elements remain a key factor in consumer decision-making, even when products possess desirable sustainable attributes.

The interplay between sustainability and design in fashion is a critical consideration for both researchers and industry professionals. The present findings suggest that, while sustainability is increasingly valued by consumers, it cannot fully substitute for other product attributes such as design and perceived quality. Therefore, companies marketing sustainable products must strike a balance between emphasizing environmental and social benefits and maintaining the aesthetic qualities that appeal to consumers.

The main takeaways from this study, including its strengths and limitations, may be summarized as follows:

- Research findings:** The results supported both research hypotheses while also uncovering valuable insights into consumer behavior toward sustainable fashion products. Regarding **H1**, both social and environmental preferences significantly influenced purchase intentions. Among supply-side attributes, social sustainability emerged as the most influential factor, with the strongest effect observed for recycled bags. Similarly, preferences for environmentally sustainable production processes were statistically significant predictors of purchase intention, with effects particularly pronounced for the proposed bags. However, individual-level behaviors (prosocial or pro-environmental) showed limited or no statistical significance—possibly due to a ceiling effect, as the products were already perceived as inherently sustainable. Regarding **H2**, the findings indicated the presence of an intention–behavior gap, particularly in the case of Bag C2, for which strong stated intentions did not translate into actual WTP. In contrast, for Bags B and C1, intentions were positive-

ly and significantly associated with WTP, indicating a stronger alignment between intention and behavior. Product-specific attributes—especially perceived production cost and perceived quality—played a key role in shaping consumer responses, but only in select cases. Notably, the use of recycled materials significantly increased WTP for Bag C1, but not Bag C2, for which aesthetic alterations appeared to override sustainability considerations. Thus, a key insight is that sustainable features may only drive consumer interest when other expectations, particularly design and quality, are also met. Finally, experience with sustainable products had a limited effect, reaching statistical significance only in the case of Bag C1. This suggests that the influence of prior green purchasing behavior may depend on specific product characteristics and be diminished by conflicting attributes, such as the aesthetic risk posed by unconventional design.

- **Practical implications:** The findings offer several important takeaways for businesses and policymakers promoting sustainable consumption. First, sustainability messaging must highlight social aspects alongside environmental benefits derived from both production and consumption processes. Bridging the intention-behavior gap requires more than sustainability claims alone, as products must also meet consumer expectations regarding design, quality, and perceived value. Indeed, aesthetics and functionality remain critical for green products to compete effectively in the marketplace, and green attributes by themselves are insufficient to justify a price premium unless perceived quality and cost are aligned. Producers should therefore avoid assuming that sustainable materials automatically warrant higher prices. Policy efforts and market strategies should focus on both raising awareness of sustainability and enhancing the perceived quality of eco-friendly products through thoughtful product design, innovation, and communication. The limited role played by consumer experience suggests that mere exposure to green products is not enough to drive behavioral change. Instead, positive product experiences must be intentionally designed to reduce psychological barriers and support long-term behavioral shifts.
- **Theoretical contribution:** The present study contributes to the literature on sustainable consumption and behavioral economics by demonstrating the value of incentivized experiments as a robust methodological tool for assessing market potential and consumer behavior in the sustainable fashion sector. While non-incentivized methods (e.g., surveys, stated preference techniques) can effectively capture purchase intentions, the present findings show that such intentions only partially explain actual consumer behavior. The experimental design, which simulates real market conditions through incentivized decisions and varies product attributes across multiple scenarios, provides a realistic and targeted assessment of WTP. This approach yields practical insights into which product features enhance market acceptance and which may require improvement, refinement, or removal. Notably, the experiment captures revealed preferences and enables a controlled analysis of how specific environmental, social, and aesthetic attributes influence purchasing decisions. As such, this methodology offers a valuable framework for conducting case studies and feasibility assessments, and equips producers and policymakers with clearer guidance for designing and promoting sustainable products with a greater likelihood of market success.
- **Limitations and future directions:** Despite its noted strengths, the study was limited in several respects. First, as a laboratory experiment, its external validity was inherently constrained. Scaling such experiments to broader populations presents challenges due to logistical and resource constraints. However, the methodological framework could be adapted for online experimental platforms, which offer a promising direction for future research by enabling access to larger and more diverse samples while maintaining experimental control. Second, the subject pool consisted primarily of university students, which limited the generalizability of the findings to the broader population. Nevertheless, this sample may also be viewed as a strategic choice, reflecting the views and preferences of the next generation of consumers—individuals who are not only future market participants but also among the most engaged and committed to environmental and social causes. In this context, the targeted nature of the sample can be understood to have yielded valuable insights into emerging trends in green consumption and the evolving expectations of younger, sustainability-oriented consumers. Future research should aim to replicate and extend these findings in field settings and among more demographically diverse groups, examining the dynamic interplay between consumer experience, information availability, and evolving sustainability narratives within the marketplace.

Overall, the findings underscore the complexity of consumer preferences in the sustainable fashion market. While consumers are increasingly willing to support sustainable practices, this support is contingent upon alignment with broader expectations regarding product quality and design. This suggests that the future success of sustainable fashion will rely not only on technological innovation in recycling and eco-friendly production, but also on the ability of firms to develop products that are both environmentally responsible and aesthetically appealing. These behavioral insights offer valuable guidance for future research and practice, reinforcing the need for integrated strategies addressing both sustainability goals and consumer demand within an increasingly competitive industry.

Data availability

The datasets used and/or analyzed during the current study are available from the authors upon reasonable request. Prof. Piergiuseppe Morone may be contacted at piergiuseppe.morone@unitelmasapienza.it.

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Author contributions

A.C., R.C., A.M., and P.M. jointly wrote and reviewed the manuscript.

Declarations

Competing interests

The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to A.C.

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