Generational shifts: understanding the role of green self-identity, social norms and cohort differences in consumer intentions to purchase stigmatised recycled products

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Abstract

Purpose – This study aims to investigate the moderating role of social norms and generational differences on the relationship between green self-identity and purchase intention towards a particular product category: recycled absorbent hygiene products.

Design/methodology/approach – An online survey was conducted, and structural equation modelling was used to examine the hypothesised relationships based on data from 1,113 Italian consumers. In addition, a small qualitative study was carried out among Millennials to confirm and further contextualise some of the observed effects.

Findings – This study finds a positive relationship between green self-identity and attitudes towards recycled absorbent hygiene products, influencing purchase intention. Social norms moderate this relationship, with their effect varying across generational cohorts. Social norms negatively influence the relationship between green self-identity and attitudes towards recycled products only for Generation Y. In contrast, for Generation X and Generation Z, social norms do not significantly affect this relationship.

Research limitations/implications – This study's cross-sectional design and non-probabilistic sampling may limit the generalizability of the results. The findings related to a specific country: Italy. In addition, reliance on self-reported data may introduce some biases.

Practical implications – Marketers can attract eco-conscious consumers by aligning branding with sustainability values and emphasising eco-friendly product offerings. Furthermore, businesses should actively work to challenge negative perceptions of recycled products, particularly those related to quality or hygiene. Promoting positive social norms through targeted campaigns and collaborating with eco-conscious influencers can reshape public perceptions and encourage more consistent eco-friendly purchasing behaviour.

Originality/value – To the best of the authors' knowledge, this study is one of the first to explore the moderating role of social norms and generational differences in shaping the relationship between green self-identity and consumers' purchase intentions towards recycled products. By highlighting how these factors interact, this research offers fresh insights into the literature on sustainable consumer behaviour, enhancing the understanding of the complex influences that drive eco-friendly purchasing decisions.

Keywords Green self-identity, Social norms, Generation cohort, Recycled products, AHPs, Purchase intention

Paper type Research paper

Introduction

As society advances towards sustainability, recycling has become a central topic in discussions and research. A substantial body of research explores recycling behaviour, focusing on factors like motivations and barriers to recycling (Fogt Jacobsen *et al.*, 2022), the impact of individual psychological attributes (Phulwani *et al.*, 2020) and the influence of personal norms, environmental concerns and ethical ideologies on willingness to engage in responsible recycling practices (Hosta and Zabkar, 2021).

Among the extensive studies in this field, previous research has highlighted the concept of green self-identity (GSI),

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defined as the degree to which individuals perceive themselves as environmentally conscious. Literature suggests that individuals with a strong GSI are more inclined to buy recycled products and engage in sustainable consumption behaviours (Whitmarsh and O'Neill, 2010). This effect can be attributed to how GSI enhances intrinsic motivation and a sense of personal responsibility, reinforcing positive attitudes towards recycled goods (Van der Werff *et al.*, 2014). In a few words, consumer GSI shapes attitudes, fostering green behaviours (Patel *et al.*, 2020).

However, the relationship between GSI and purchase intentions for recycled products may be affected by other factors, such as the influence of others. Generally, our behaviour is deeply influenced by social norms (SN) – those unwritten rules that guide what is considered acceptable or desirable within a group or society. These norms shape our intentions and actions, dictating how we interact with others and make decisions (Ajzen, 1985). While SN lack the formal power of laws, they are potent drivers of individual behaviour, subtly guiding us to conform to societal expectations (Cialdini and Trost, 1998). In the context of green practices, such as recycling, SN are positive predictors of pro-environmental behaviours. Research shows that when buying recycled products becomes a widely accepted social norm, individuals are more likely to view them as the socially responsible choice over traditional products (Al-Swidi *et al.*, 2014; Fielding *et al.*, 2008; Hui and Khan, 2022). This strengthening effect occurs because individuals feel supported by their peers and communities, which reduces the fear of social disapproval and encourages them to align their actions with collective expectations (Cialdini *et al.*, 1990; White and Simpson, 2013).

Nonetheless, the influence of SN can vary significantly across different product categories, particularly those associated with certain stigmas. Recycled absorbent hygiene products (AHPs) are often subject to critical perceptions due to their association with bodily fluids and waste, which may lead to social discomfort or disapproval. AHPs encompass a range of disposable items, including baby diapers, sanitary pads, adult incontinence products and wipes, all of which have become indispensable in daily life, with their usage steadily increasing. Like many other consumer products, AHPs typically enter the solid waste stream after use. Approximately 30 million tonnes of used AHPs are generated annually, most ending up in landfills or incinerated (Arnold *et al.*, 2023). This volume of waste is expected to grow as AHP usage rises, posing a significant waste management challenge. For instance, diapers are infrequently recycled and are often discarded improperly (Schenck *et al.*, 2023). However, some companies are beginning to recycle AHPs (see e.g. Puntillo *et al.*, 2021; Routray, 2022). Through their recycling efforts, used AHPs can be transformed into crutches, clothespins, plastic chairs, industrial packaging cartons and even new absorbent products or recycled AHPs, which is the focus of this study.

Despite AHPs being vital for promoting hygiene and preserving dignity for women, older adults, individuals with health needs, parents and caregivers, they are frequently associated with cultural taboos and stigmas – such as their connection to menstrual blood and other bodily fluids (Laborda *et al.*, 2023; Roxburgh *et al.*, 2020). These associations can impact consumer perceptions, as individuals may fear judgement from others when using or purchasing such products. Consequently, the SN surrounding AHPs can significantly influence consumer attitudes and behaviours.

In addition to the above, the generational cohort is another key factor that may influence the relationship between GSI, SN and attitude towards recycled products in general. Prior literature suggests that consumer pro-environmental behaviour varies across generations. Younger generations, such as millennials and Generation Z, are more likely to have positive attitudes towards sustainability and environmental protection than older ones (Yamane and Kaneko, 2021). Generation Z, in particular, has shown a greater commitment to social activism, ethical consumption and sustainability (Djafarova and Foots, 2022). Despite this heightened concern for climate change, these younger cohorts are sometimes less likely to purchase sustainable products than older generations (Casalegno *et al.*, 2022). Furthermore, these generational differences may also extend to SN, with older generations like Generation X tending to be more conformist, value social rewards and often adhere to unwritten rules, while Millennials and Generation Z are generally more individualistic and inclined to challenge both established written and unwritten norms (Twenge *et al.*, 2010).

Despite the growing emphasis on sustainability and consumer behaviour, the literature has yet to thoroughly investigate how GSI, SN and generational differences – particularly their interactions – affect consumers' intentions to purchase recycled products, especially regarding potentially stigmatised products such as AHPs. Most existing research on AHPs primarily concentrates on waste management or related business practices (e.g. Puntillo *et al.*, 2021; Velasco Perez *et al.*, 2021). Studies examining consumer behaviour about AHPs remain scarce (Slekiene *et al.*, 2024).

This paper addresses the above gap and contributes to the marketing field in several ways. Besides confirming the relationship between GSI and attitude, it reveals that SN can negatively influence this connection, particularly concerning recycled AHPs. Additionally, the study shows that the impact of SN differs across generational cohorts. Beyond its theoretical implications, the research holds significant contextual relevance as Italian firms increasingly convert AHPs like diapers and sanitary napkins into recycled alternatives (Puntillo *et al.*, 2021). Understanding how SN and generational differences shape consumer attitudes and behaviours is becoming critical with this growing market trend. Extending this research line will help better understand the complex relationship between attitudes and behaviours towards recycled products. Furthermore, the findings of this study provide valuable insights to firms, enabling them to craft more effective strategies that promote sustainable consumer behaviours and support the adoption of recycled products.

Theoretical background and hypothesis development

Attitude–behaviour link in green consumption

The current study is theoretically grounded in the attitude–behaviour theory (Fishbein and Ajzen, 1975), which has been widely applied in sustainable consumption research to highlight how individual beliefs influence, for instance, recycling behaviours (see e.g. Appendix A1 in supplementary

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material). A particularly relevant framework within this context is the theory of planned behaviour (TPB) (Ajzen, 1991), an extension of the theory of reasoned action (Fishbein and Ajzen, 1975), designed to explain behaviour across various situations. According to TPB, an individual's intention to engage in a behaviour is shaped by three constructs: attitude (the personal evaluation of the behaviour as favourable or unfavourable), subjective norms (the perceived social pressure to engage in or avoid the behaviour) and perceived behavioural control (PBC) (the ease or difficulty of performing the behaviour, as perceived by the individual) (Ajzen, 1991).

While useful, the TPB has limitations in its predictive power (Mason *et al.*, 2022). Individuals might face barriers or have motives to engage in behaviour that may not be relatable to the three constructs mentioned above. Ajzen (1991, p. 191) also acknowledged this limitation, stating that "[TPB] is, in principle, open to the inclusion of additional predictors if it can be shown that they capture a significant proportion of the variance in intention or behaviour after the current variables of the theory have been taken into account". Consequently, several scholars have extended or modified the TPB to improve its explanatory power (e.g. Hosta and Zabkar, 2021; Yazdanpanah and Forouzani, 2015; Zamparo *et al.*, 2023). In line with this approach, our study modifies the original TPB by excluding the construct of PBC and including the construct of GSI.

The exclusion of PBC from our model is grounded in both contextual evidence and theoretical reasoning, as the significance of PBC can vary substantially across behaviours and contexts (Ajzen and Fishbein, 2004; De Cannière *et al.*, 2009). Studies have shown that PBC becomes less relevant in contexts where individuals encounter few obstacles or barriers to the behaviour in question. In consumer research, empirical studies indicate that PBC may sometimes function more as a proxy for actual control rather than a direct antecedent of intention (Hagger *et al.*, 2002). For example, in dietary choices, Jenkins and McKenzie (2011) found that attitudes and subjective norms were the primary drivers of intentions, with PBC contributing minimally. Similar results were reported by Akbari *et al.* (2019), Pakpour *et al.* (2011) and Vesci and Botti, 2019). Moreover, Ajzen (1991) suggests that PBC conditions individuals' desires, intentions and behaviour. Thus, it is highly likely that behavioural control may get less influential when it is easy to perform a behaviour. This consideration holds practical relevance in our study context – Italian consumers' intentions to buy AHPs. These products are increasingly accessible in Italy, reducing perceived purchase barriers. In light of all the above, we have decided to exclude PBC from our model.

Conversely, the inclusion of GSI in our model is justified, as it reflects an individual's internal commitment to environmental values. People with a strong GSI are more likely to make choices that align with their environmental beliefs (Barbarossa *et al.*, 2017; Barbarossa and De Pelsmacker, 2016; M. Chen, 2020; Confente *et al.*, 2020). Nonetheless, we also propose that GSI interacts with another TPB component: SN. While prior research highlights that SN directly affect sustainable behaviours, such as choosing recycled products (e.g. Corsini *et al.*, 2024), they may also interact with one's green consumer identity, as some evidence suggests (Rimal, 2008; Yun and Silk, 2011). The rationale for this will be explored in the following sections.

Self-identity and attitude towards recycled products

GSI has become a key concept in studies concerning recycling behaviour, referring to the extent to which individuals see themselves as environmentally conscious (Confente *et al.*, 2020). People with a solid GSI are more likely to engage in sustainable actions, such as choosing eco-friendly products and supporting recycling initiatives (Ogiemwonyi and Jan, 2023). This self-identity fosters pro-environmental attitudes, making, in general, individuals more inclined to adopt sustainable practices (Barbarossa *et al.*, 2017; Barbarossa and De Pelsmacker, 2016)

In addition to shaping attitudes, GSI mediates the relationship between personal values and pro-environmental behaviour (Barbarossa *et al.*, 2017). Essentially, individuals with a robust GSI are motivated by their values to make environmentally conscious choices and adopt eco-friendly behaviours, such as waste sorting or adopting electric vehicles. For example, Mehmood *et al.* (2024) found that those with an environmental self-identity were more willing to reduce plastic consumption.

The TPB provides a valuable framework for understanding how GSI influences attitudes towards pro-environmental actions. By positioning self-identity as an antecedent to attitudes, the TPB highlights how individuals' perceptions of themselves as environmentally responsible shape their attitudes towards sustainable products and actions (Smith *et al.*, 2008). This study, therefore, investigates the role of GSI in shaping consumer attitudes towards sustainable practices, emphasising how this identity drives positive behavioural changes towards the environment through attitudes towards sustainable market offerings, such as AHPs. Accordingly, the following hypothesis is proposed:

H1. Green self-identity has a significant positive relationship with attitude towards recycled products.

Social norms as a moderator between green identity and attitude

SN, defined as the perceived social pressures to engage in or avoid certain behaviours (Ajzen, 1991), are often seen as positive drivers of pro-environmental actions (Corsini *et al.*, 2024; Culiberg and Elgaaied-Gambier, 2016; Nguyen-Van *et al.*, 2021). In addition, research also shows that socially excluded individuals tend to conform to prevailing SN for acceptance, potentially increasing their adherence to sustainable practices (Hui and Khan, 2022). Hence, when SN are supportive, they can help translate positive attitudes towards eco-friendly products, such as recycled items, into actual behaviours (Al-Swidi *et al.*, 2014; Fielding *et al.*, 2008).

However, SN can also act as barriers to certain behaviours. For instance, while they may deter smoking by undermining positive attitudes, they can similarly discourage sustainable choices when such choices are socially perceived as inferior or undesirable. Dissanayake (2022) found that consumers often hesitate to exchange apparel items, and Italian consumers show reluctance towards selecting r-PET water bottles

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(De Marchi *et al.*, 2020). Recycled materials can be perceived as lower quality, deterring purchases as consumers may not want to be seen buying something considered cheap or unpleasant (Gåvertsson *et al.*, 2020).

SN can also interact with self-identity. When aligned with one's values and identity, SN can motivate pro-environmental behaviours, as conforming both reinforces self-identity and fosters social belonging (Fielding *et al.*, 2008). Additionally, Yun and Silk (2011) suggest that individuals with a strong self-identity (e.g. as exercisers) may act independently of SN, while those with weaker self-identity are more influenced by them. Similarly, Rimal (2008) found that SN had a stronger influence on the intention to consume alcohol among those with a strong self-identity as drinkers. In sustainable consumption, Anand and Sharma (2023) highlight that SN moderate the link between attitudes and intentions to adopt sustainable products, with environmental orientations shaped by perceived SN.

A similar mechanism may apply to AHPs (e.g. diapers, sanitary napkins); however, SN and GSI may not align, negatively impacting attitudes. As noted in the introduction, AHPs often carry social stigmas, which may deter individuals with a strong GSI from purchasing them due to social disapproval. Therefore, while GSI and SN usually enhance positive attitudes, their effect can vary based on the product category. If prevailing SN are negative, they may hinder favourable attitudes, even with GSI.

In this study, we expect SN to moderate the relationship between GSI and attitudes towards recycled products. While we hypothesise that GSI will reinforce positive attitudes toward pro-environmental behaviours (*H1*), we also anticipate that SN may negatively moderate this relationship due to the specific social perception of AHPs as less desirable within certain social circles. Even those with a strong GSI may find it challenging to form favourable attitudes towards these sustainable choices. Accordingly, we hypothesise:

H2. Social norms will negatively moderate the relationship between green self-identity and attitude towards recycled products.

Moderating role of generational cohort

The moderating role of SN on the link between GSI and attitudes, as proposed in *H2*, is likely to differ among various age groups, given their unique characteristics and motivations. Generational cohorts – Generation X, Millennials (Generation Y) and Generation Z – comprise individuals whose similar ages and shared life experiences influence their values and behaviours. These cohorts are shaped by distinct historical, cultural and technological contexts that affect how they perceive and engage with green practices (Bengston and Black, 1973; Dimock, 2019).

Generation X, born between 1965 and 1980, matured during economic change and a growing focus on environmental issues. This generation, characterised by its independence and self-reliance, came of age as environmental matters gained visibility in political and social conversations. They became early advocates for social, political and ecological change, paving the way for later generational activism (Pinho and Gomes, 2024).

In comparison, Millennials (born roughly between 1981 and 1996) show strong environmental awareness, often influenced by their upbringing in supportive family environments. Frequently described as self-directed, ambitious, individualistic and high in expectations (Pinho and Gomes, 2024), Millennials make purchasing choices with sustainability and corporate social responsibility in mind (Bedard and Tolmie, 2018). Studies indicate that Millennials tend to engage more actively in eco-friendly behaviours and support sustainability efforts (Jia *et al.*, 2015; Mason *et al.*, 2022). Their prolific social media usage further enhances their exposure to peer-driven norms that promote environmentally conscious actions (Bedard and Tolmie, 2018; Han and Cheng, 2020).

Generation Z, born from approximately 1997 onwards, is notably invested in climate issues and environmental protection. Raised in a time when climate discussions are urgent and prominent, Gen Z strongly prefers sustainable brands, with many willing to pay more for eco-friendly options (Firstinsight, 2020). This cohort highly values environmental responsibility, expecting firms to prioritise sustainability (Ewe and Tjiptono, 2023; Yamane and Kaneko, 2021). However, economic constraints can sometimes limit Gen Z's ability to fully act on their environmental ideals (Aisyah *et al.*, 2023). Their environmental activism frequently occurs online, using social media to organise support and raise awareness on climate topics (Tyson *et al.*, 2021).

Given the distinct contexts and values that shape each generation, it is likely that they respond differently to SN and pressures. Thus, the moderating effect of SN on the relationship between GSI and attitudes towards recycled products may not be uniform across generations. While SN tend to strongly influence the pro-environmental behaviours of younger cohorts, particularly Millennials and Generation Z, older generations may be less susceptible to these social pressures. This variability may also extend to situations where SN are presumed to have a negative effect. For example, the moderating effect of SN could differ across generations in the case of recycled products that may be perceived as socially undesirable, such as ours. Younger generations may be more willing to challenge SN. In comparison, older generations may not want to conform, making the influence of SN on sustainability behaviours even more complex, for instance. In light of the above, we hypothesise:

H3. The moderating effect of social norms on the relationship between green self-identity and attitude will differ across generational cohorts.

Attitude and purchase intention towards recycled products

The positive relationship between consumer attitude and purchase intention towards recycled products has been a central focus in sustainability research, particularly within the TPB framework. Several empirical studies support this relationship. Alam *et al.* (2024) found that consumer attitudes significantly influenced the purchase intentions of recycled products in Malaysia. Similarly, Pisitsankkhakarn and Vassanadumrongdee (2020) showed that consumer attitudes towards purchasing remanufactured automotive products

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strongly and positively affected their purchase intentions in Thailand. Generally, a positive consumer attitude is linked to higher purchase intentions for recycled products. Building on this, we hypothesise:

H4. Attitudes towards recycled products will significantly and positively affect the intention to purchase recycled products.

Considering all the discussion above, the theoretical model underlying the current investigation is presented in Figure 1.

Methodology

Method and data collection

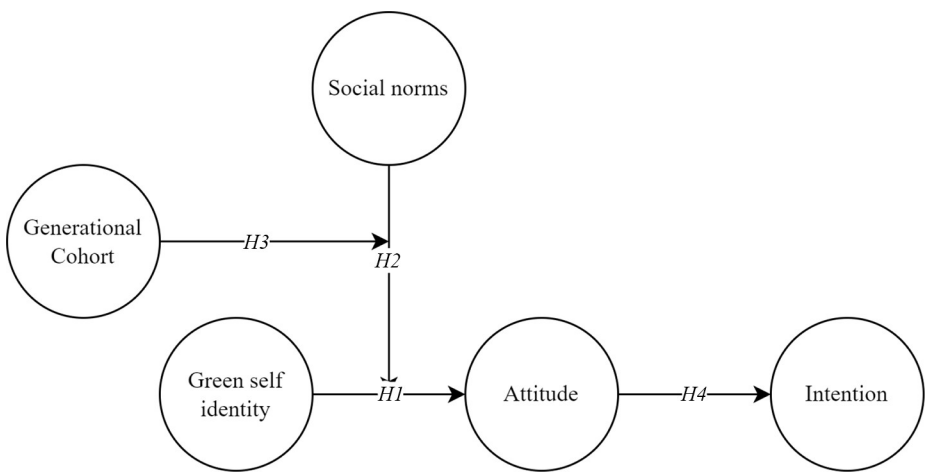
The data collection for the current investigation was conducted through an online survey in Friuli Venezia Giulia (northern Italy). The questionnaires were diffused using a snowball sampling technique. An initial pool of 15 research assistants participated in this project, which focused on studying green consumption practices around AHPs. These students, who took part in the initiative in exchange for course credits, distributed the survey among their peers and families, ensuring a broad and relevant sample. This product category was specifically chosen due to its unique associations already mentioned in this work: being items containing bodily fluids and materials, recycled AHPs can evoke hesitation or discomfort as users may consider potential judgments or SN associated with their use. This focus on SN and perceived social pressure was central to our study, addressing the idea of others' reactions to consuming what may be seen as products with sensitive or negative associations.

Before taking the survey, respondents were given an introduction to these recycled AHPs to ensure clarity. We also included some exclusion checks, asking respondents whether they usually purchase recycled products or practice some form of recycling. Those who answered "no" to the first question or declared indifferent towards recycling practices were excluded from the final sample. This screening helped refine our participant pool to include individuals already open to or inclined towards green consumption. It allowed us to investigate social influences on their attitudes towards using recycled hygiene items more effectively, as we wanted to target those more likely to consider the environmental impact of their purchases. By focusing on respondents already interested in recycling, we could better explore how perceived SN and potential stigma – stemming from the unique nature of recycled AHPs – might affect their willingness to adopt these items in their daily lives.

The survey had a competition time of 20 min, was conducted between January 2022 and April 2022 and consisted of two sections: the first investigated the socio-demographic profile of the respondents; the second explored the construct of interest for the investigation. All the research items were modelled on a seven-point Likert scale ranging from 1 (absolutely disagree) to 7 (absolutely agree). The only exception was the items referring to the attitude construct, which were modelled using a semantic differential scale (e.g. 1 = "bad", 7 = "good"). The four key constructs used in this investigation are as follows. GSI, adapted from Barbarossa and De Pelsmacker (2016) and also used by Confente *et al.* (2020), measures an individual's self-perception as an environmentally conscious consumer. The TPB-related constructs were adapted from Yadav and Pathak (2016) and measured following Ajzen's (1991) recommendations. SN evaluates the extent to which "important others" would approve or disapprove of the purchase of recycled APHs. Attitude towards recycled products (ATT) examines individuals' attitudes towards recycled AHPs, focusing on perceived benefits and ethical considerations. Lastly, intention to buy (INT) assesses individuals' likelihood of purchasing these recycled products. Such adaptations of these measures are widely applied in TPB-related research (e.g. Loera *et al.*, 2022; Yadav and Pathak, 2016).

A total of 1,315 questionnaires were collected. From the initial sample, incomplete responses and respondents who failed one or more attention checks in the survey were eliminated. Lastly, careless respondents – detected through the individual response variance method from Arthur *et al.* (2021) – were

Figure 1 The proposed theoretical model



Source(s): Authors' own work

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eliminated. The final sample consisted of 1,113 responses. The main characteristics of this sample are presented in Table 1. The large sample provides a robust foundation for exploring green consumption attitudes, though it shows a slight skew. There is a higher representation of females, younger individuals – particularly from Generation Z – and respondents who are students or have mid-level educational attainment. Most participants are unmarried, with fewer from older age groups, married demographics or more established careers. While our sample is slightly skewed towards younger demographics, the large size nonetheless enhances the reliability of our insights. All the analyses were conducted using SPSS 26 (IBM Corp, 2019) and AMOS 23 (Arbuckle, 2014).

Construct validity and reliability

Measurement reliability and validity were tested via CFA. Overall, the result of this analysis showed an acceptable level of fit for the data ($\chi 2 = 415{,}567$, df = 59, RMSEA = 0.074 [90% CI: 0.067, 0.080], CFI = 0968, TLI = 0.958, NFI = 0.963, SRMR = 0.049) (Hu and Bentler, 1999). Convergent validity was assessed by evaluating CR and AVE and standardised factor loadings, which should be greater than 0.70, 0.50 and 0.50, respectively. As shown in Table 2, all values exceeded the minimum threshold, supporting the constructs' convergent validity reliability (Hair *et al.*, 2018).

Fornell–Lacker criterion (Fornell and Larcker, 1981) and heterotrait-monotrait (HTMT) ratio of correlations (Henseler *et al.*, 2015) were used as a test to ascertain discriminant validity. All square roots of AVE estimates were greater than the corresponding inter-construct correlation. Additionally, the HTMT values did not exceed the value of 0.85. Both tests suggested no hindrances in terms of discriminant validity. More detail is displayed in Tables 2 and 3.

Table 1 Demographic profile of the respondents

Variable	Freq.	%	Cum. %
Sex			
Male	363	32.60	32.60
Female	750	67.40	100.00
Generation			
Generation Z	613	55.10	55.10
Generation Y	308	27.70	82.80
Generation X	192	17.20	100.00
Education			
Primary school diploma	5	0.40	0.40
Middle school diploma	69	6.20	6.60
Vocational school	60	5.40	12.00
High school diploma	462	41.50	53.50
Bachelor's degree	379	34.10	87.60
Master's degree	107	9.6	97.20
Other	31	2.8	100.00
Civil status			
Never married	840	75.50	75.50
Married	235	21.10	96.60
Divorced or separated	32	2.90	99.50
Widowed	6	0.50	100.00
Employment			
Student	466	41.90	41.90
Intern	32	2.90	44.80
Apprenticeship	68	6.10	50.90
Part-time worker	89	8.00	58.90
Full-time worker	322	28.90	87.80
Freelance worker	58	5.20	93.00
Entrepreneur	33	3.00	96.00
Retired	41	3.70	99.70
Unable to work	4	0.30	100.00

Source(s): Authors' own work

Common method bias

The so-called latent common method factor technique (Collier, 2020) was used to test for the presence of common method bias. The model with the common factor did not fit the data better than the model without the common factor. Even if the difference in the models' $\chi 2$ statistic were deemed as statistically significant, the variations of the other commonly used fit indexes were deemed as marginal (ΔCFI = |0.001|, ΔRSMEA = |0.000|, ΔSRMR = |0.001|). Thus, common method bias was not likely to affect the data (Table 4).

Invariance across age groups

A multi-group comparison was carried out as the work aims to test the differences in the moderation effect of SN across generations. The analytical strategy for testing the multi-group moderation is as follows: we first tested SN as a continuous moderator across the entire sample (i.e. *H2*). Following that, we conducted a multi-group analysis, focusing on the moderation effect and examining how this varies across different generational cohorts (i.e. *H3*). In short, we tested how the moderated relationship changes across generations, specifically aiming to explore differences in the moderation effect of SN between these cohorts.

However, before conducting this analysis, it was essential to establish measurement invariance across groups. To ensure that the underlying constructs being measured had the same theoretical structure for each group, a multi-group CFA was conducted, following the recommendations of Byrne (2004) and Hair *et al.* (2018). Once the baseline goodness-of-fit values for the configural model were established, the next step was to test invariance across groups by adding several restrictions in a stepwise approach. Specifically, we tested for configural, metric and scalar invariance (Hair *et al.*, 2018). The thresholds used to assess the different levels of invariance were based on the guidelines provided by Chen (2007).

As the first step in invariance testing, we examined configural invariance. Each group model had an identical factorial structure, ensuring configurational invariance. The goodness-of-fit statistics related to these three groups' unconstrained model (M1, in Table 5) were examined. Overall, the fit indexes for this model aligned with those suggested by the literature (Hair *et al.*, 2018; Hu and Bentler, 1999). In the second step, metric invariance was tested by imposing the equivalence of factor loadings across groups. These second models (M2, in Table 5) were compared against the M1. As reported in Table 5, the $\chi 2$ difference test was non-significant, and ΔCFI, ΔRMSEA and ΔSRMR were lower than 0.010, 0.015 and 0.030, respectively (Chen, 2007). Thus, factor loading

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Table 2 CFA with factor loadings, AVE and Cronbach's α

Construct	Measurement items		λ	AVE
Green self-identity (GSI)				*0.620*
	I think of myself as someone who is concerned about environmental issues		0.892	
	I think of myself as a "green" consumer		0.806	
	Buying these recycled products (AHPs) would make me feel like a green consumer		0.644	
Social norms (SN)				*0.804*
	Most people who are important to me would like me to buy these recycled products [AHPs]		0.930	
	Most people who are important to me think I should buy these recycled products [AHPs]		0.942	
	Most people who are important to me buy these recycled products [AHPs]		0.815	
Attitude towards recycled products (ATT)				*0.729*
	Buying these recycled products [AHPs] is			
	Wrong	Right	0.799	
	Unwise	Wise	0.893	
	Useless	Useful	0.892	
	Harmful	Beneficial	0.827	
Intention to buy recycled products (INT)				*0.756*
	When possible, I always buy these recycled products [AHPs]		0.865	
	Among two AHPs, I always look for the one that has been recycled		0.895	
	I make an effort to buy only recycled AHPs		0.848	

Note(s): λ = standardised factor loadings; AVE = average variance extracted
Source(s): Authors' own work

Table 3 Correlations among constructs and discriminant validity

	CR	Sex	Generation	Education	GSI	SN	ATT	INT
Sex	–	–	–	–	–	–	–	–
Generation	–	−0.047	–	–	–	–	–	–
Education	–	−0.078	−0.231	–	–	–	–	–
GSI	0.828	−0.178	0.059	0.006	*0.788*	*0.516*	*0.572*	*0.819*
SN	0.925	0.080	0.075	−0.071	0.462	*0.897*	*0.337*	*0.655*
ATT	0.915	−0.112	−0.018	0.055	0.587	0.317	*0.854*	*0.520*
INT	0.903	−0.074	0.075	−00.08	0.779	0.625	0.509	*0.870*

Note(s): CR = composite reliability; For the constructs, use the square root of AVE on the diagonal in bold and the inter-construct correlation under the diagonal; use HTMT correlations above the diagonal and in italics; Sex was coded as follows: 0 for females. 1 for males. Generation and education were coded ascendingly
Source(s): Authors' own work

Table 4 Common method bias test using the common latent factor technique

	χ^2 (df)	RSMEA	CFI	SRMR
Model with common latent factor included	408.562 (59)	0.074	0.969	0.050
Model without common latent factor	415.567 (59)	0.074	0.968	0.049
$\|\Delta\|$	7.005 (1); $p < 0.01$	0.000	0.001	0.001

Source(s): Authors' own work

invariance was ensured, and full metric invariance was confirmed. In the third step, a stricter invariance test was carried out by imposing a constraint on the equality of both factor loadings and intercepts between the groups. This model (M3, in Table 5) was compared against M2. Even if the $\chi 2$ difference test between M2 and M3 was significant at a $p < 0.01$, the CFI, RMSEA and SRMR variations were lower than 0.010, 0.015 and 0.010, respectively. Thus, this hinted at the presence of scalar invariance across groups. Overall, the invariance testing results were deemed sufficient to carry out a meaningful comparison across the three generational cohorts (Hair *et al.*, 2018).

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Table 5 Invariance tests among the two groups

Model	Compared against	Level	χ^2(df)	Fit indexes CFI	|ΔCFI|	SRMR	|ΔSRMR|	RSMEA	|ΔRSMEA|
M1	–	Configural	563.117 (177)	0.965	–	0.053	–	0.044	–
M2	M1	Metric	583.795 (195)	0.965	0.000	0.051	0.002	0.042	0.002
M3	M2	Scalar	676.293 (221)	0.959	0.006	0.051	0.000	0.043	0.001

Source(s): Authors' own work

Table 6 Structural model

Path	Estimate	SE	*p*	ULCI	LLCI
GSI → ATT	0.554	0.030	< 0.001	0.492	0.614
ATT → INT	0.543	0.029	< 0.001	0.448	0.604
Moderation effect					
GSI x SN → INT	−0.102	0.040	< 0.01	−0.177	−0.018
Covariates					
SEX → INT	−0.014	0.027	0.616	−0.068	0.042
GEN → INT	0.075	0.026	< 0.001	0.021	0.112
EDU → INT	−0.019	0.027	0.503	−0.068	0.038
Moderation effect (GSI x SN → INT) in the three groups					
Generation Y	−0.274	0.069	< 0.01	−0.392	−0.121
Generation Z	−0.019	0.056	0.633	−0.128	0.089
Generation X	−0.099	0.108	0.403	−0.264	0.149

Note(s): ULCI = upper-level confidence interval; LLCI = lower-level confidence interval; Sex was coded as follows: 0 for females. 1 for males. Generation and education were coded ascendingly
Source(s): Authors' own work

Results

Path modelling results and multi-group comparison

We tested the main hypotheses via bootstrap (5,000 samples, 90% bias-corrected confidence intervals), which was used to compute confidence intervals for the estimates and compare the moderation effect across groups.

A first structural model on the whole sample was run. The path analysis showed positive and significant effects of GSI on ATT (Est. = 0.554; 95% CI: 0.492, 0.614), thus confirming *H1*. Additionally, the same path was significantly moderated by SN, which had a negative influence (Est. = −0.102; 95% CI: −0.177, −0.018). Hence, *H2* was accepted. Lastly, ATT had a positive and significant effect on INT (Est. = 0.543; 95% CI: 0.448, 0.604). This led to the acceptance of *H4*. Regarding the covariates, statistically significant effects were identified between generational cohorts (i.e. GEN in Table 5) and INT (Est = 0.075; 95% CI: 0.021, 0.112). SEX and EDU showed no significant effect. Lastly, concerning the INT, the percentage of variability explained was about 30% ($R^2 = 0.306$, Adjusted-$R^2 = 0.297$).

After that, a second (multi-group) structural model was estimated to assess the differences in the moderated structural path across generations. The findings indicated that only Generation Y demonstrated a negative and statistically significant moderating effect of SN on the path from green self-identity to attitudes towards recycled products (Est. = −0.274, 95% CI: −0.392, −0.121). By contrast, the effect was not significant in the other groups. More details are available in Table 6 and Figure 2.

Supplementary qualitative investigation

To further examine the significant moderating effect of SN observed for Generation Y, we conducted a small supplementary qualitative study. The investigation involved a series of face-to-face interviews using a structured open-ended interview approach (Monroe, 2002), a method already used to study sustainability practices and recycling (e.g. Boskova *et al.*, 2024; Gandolfo and Lupi, 2021; Jayarathna *et al.*, 2023). The interview guide focused on three primary areas: factors influencing AHP choices, awareness of and concerns regarding recycled AHPs and the role of SN in shaping attitudes towards recycled AHPs. A purposive sampling approach was used (Suri, 2011), and an initial screening question ensured that only individuals who regularly purchased recycled products for personal or household use were included. Participants, all belonging to Generation Y, were recruited through word-of-mouth and informed at the beginning of each interview that the discussion would centre on AHPs and their recycled alternatives.

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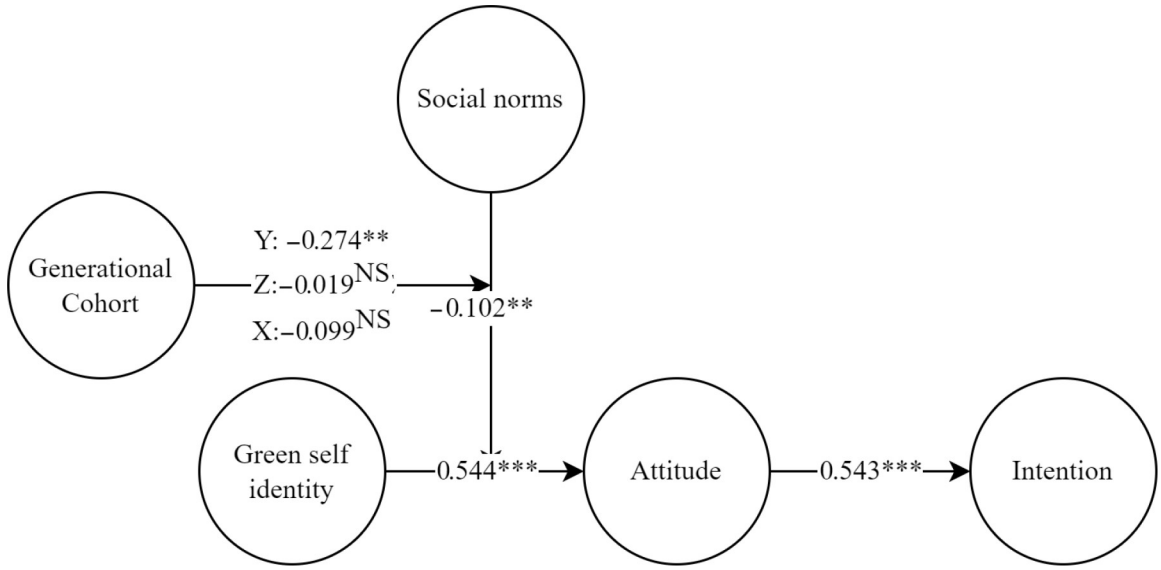
Figure 2 The estimated model



Note(s): 1. Level of significance: $^{*}p < 0.05$; $^{**}p < 0.01$; and $^{***}p < 0.001$
Source(s): Authors' own work

Seven interviews were conducted with millennial participants, all active AHP shoppers residing in a region in northeastern Italy (see Table 7). One of the authors conducted these interviews, which lasted between 16 and 27 min and were recorded. The transcriptions of the recordings were then analysed thematically to derive the qualitative findings presented below.

Qualitative results

Regarding the factors influencing AHP choices, the interviews revealed a division between price-oriented and brand-oriented consumers. Some participants primarily focused on selecting the most affordable AHP available on the shelves, actively seeking discounts and switching products based on ongoing promotions. By contrast, other participants consistently chose the same brand, placing their trust in established names, particularly when it came to products like sanitary pads, where a trusted brand alleviated many concerns. One participant explained,

> For sanitary pads, I always go for [name of the brand]. I know that their products have what I look for. [name of the brand] unites in one product all that I need from a sanitary pad (P5).

Interestingly, only a participant from the price-sensitive group declared that sustainability is one of the criteria driving her choices:

> I rarely choose based on the brand. For AHPs, I look at price and packaging. At the same price levels, I would go for products with sustainable packaging or those that had sustainability claims on them (P3).

In general, it emerged that price and brand are the dominant factors influencing AHP purchases, while sustainability was mentioned spontaneously only once.

Participants were generally aware of recycled AHPs available in supermarkets, identifying products such as nose tissues, wet wipes and toilet paper. However, their awareness did not extend to the recyclability of items like sanitary pads and diapers. To address this gap, the interviewer explained the recycling process – mirroring the introduction provided in the quantitative survey – to illustrate how recycled materials could be transformed into new products, including new AHPs. When asked about their concerns regarding recycled AHPs, participants were once again divided into two groups. Some expressed scepticism about recycled AHPs due to hygiene concerns, with one participant remarking:

> I see recycled sanitary pads as worse than period underwear. In my opinion, all sanitary absorbent products, whether pads or simple tissues, should be discarded forever. Recycling them is unsafe for hygiene (P4).

Another participant stated:

> I would never choose a recycled AHP. I know there is a cleaning process, but in my perception, that doesn't ensure they are completely hygienic. Whether it's a nose tissue or a diaper, I would never choose them (P5).

By contrast, the non-sceptical participants argued that if some firms aim to make this product available on the market (e.g. Puntillo *et al.*, 2021; Routray, 2022), then they must comply with strict regulations and standards to ensure safety and hygiene. As one participant stated:

> I have no worries regarding these products, whether it's a napkin, toilet paper, or a wet wipe. If it gets commercialised, I assume that it is safe. I imagine there are and would be regulations in place to ensure their safety (P1).

Interestingly, some of the sceptical participants suggested that strong brand endorsement might help overcome their concerns about hygiene.

Lastly, the discussion of SN revealed that recycled AHPs are subject to negative social stigma. Although most participants claimed they would not personally judge others for using recycled AHPs, they acknowledged that these products might attract negative perceptions in broader society. One interviewee labelled the users of recycled AHPs as "brave" (P7), implying that choosing such products requires overcoming significant

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Table 7 Interviewees and interview protocol

Participants			Interview protocol	
ID	Sex	Year	Questions	
1	M	1993	Do you regularly purchase recycled products for yourself or your household?	Screener
2	M	1991	What factors influence your choice of absorbent hygiene products in general? (e.g. brand, price, product features, quality) Among these factors, which do you prioritise the most?	Consumption habits
3	F	1996	Before today, were you aware that AHP can be recycled? Have you ever seen recycled AHP in supermarkets?	Product awareness
4	F	1994	What concerns or potential issues do you associate with recycled absorbent hygiene products? Would any of these concerns prevent you from purchasing such products?	Product issues
5	F	1996	How do you see someone who chooses to use recycled hygiene products?	Social norms
6	F	1994	Do you think people are judged based on their use of such products? If so, in what way? Would you	Social norms
7	F	1992	personally feel judged if you were to use them?	

Source(s): Authors' own work

concerns and social disapproval. Another participant recalled an instance on social media:

> I am sure that others judge, and people are afraid of being judged. I remember once seeing an ad on Instagram about period panties, and the comments were all like "Omg, this is disgusting" (P6).

Another noted:

> I think the issue is still something people are unfamiliar with, and it remains somewhat of a taboo. Many are sceptical about these products—some may judge, and others may avoid purchasing AHPs because they fear what others might think (P5).

While almost all the participants recognised this negative SN, one, antithetically to the majority, suggested that purchasing recycled AHPs could enhance one's self-image as an environmentally conscious consumer. This view was partially echoed by another, who explained that while negative SN is prevalent—especially among older generations—younger consumers might see these products and their users in a more positive light.

Discussion and conclusion

Developing markets for recycled products plays a crucial role in advancing a circular economy globally. Prior research suggests that consumers' concerns about resource waste can be offset by the positive emotions associated with recycling, enhancing consumer acceptance across various product categories (Sun and Trudel, 2017). However, this acceptance does not extend equally to all recycled products; some items, like AHPs, may face consumer hesitancy due to perceived hygiene concerns and potential social stigma (Laborda *et al.*, 2023; Roxburgh *et al.*, 2020). This study adapted the TPB to address these complexities and to investigate consumer intentions toward purchasing recycled products, especially in the context of green self-identity, SN and generational differences.

The findings show a significant positive relationship between green self-identity, consumer attitudes and purchase intentions for recycled products. This relationship aligns with prior research: Confente *et al.* (2020) found that environmentally conscious consumers value eco-friendly products, strengthening their intention to purchase them. Similarly, Abrar *et al.* (2021) confirmed that green self-identity influences purchase intentions for recycled goods, with attitude as a crucial mediating factor. This positive link between self-identity and purchase intention underscores the role of environmental identity in shaping consumer attitudes, a pattern confirmed in several other studies (Barbarossa *et al.*, 2017; Barbarossa and De Pelsmacker, 2016; Johe and Bhullar, 2016).

A key finding of this study is the moderating role of SN, which negatively impacts the relationship between green self-identity and consumer attitudes towards recycled products. Prior research indicates that consumers often hesitate to adopt certain recycled items, such as r-PET bottles or recycled clothing, due to hygiene concerns and social perceptions (De Marchi *et al.*, 2020; Dissanayake, 2022). Our results align with these insights, suggesting that SN can shape attitude formation by diminishing consumers' evaluations of recycled products, especially those associated with specific social stigmas. In product categories where hygiene or social perceptions are significant concerns, consumers appear more likely to form attitudes based on others' opinions, heightening their susceptibility to social influence. This susceptibility can, in turn, inhibit the development of positive attitudes towards purchasing recycled products, even when consumers possess a strong environmentally conscious self-identity.

Lastly, our study also reveals that the moderating effect of SN varies across generational cohorts, with Generation Y (Millennials) showing a unique, significant pattern. For Millennials, SN exerts a notably more substantial negative moderating effect on the relationship between green self-identity and purchase intention for recycled products than Generation X and Generation Z. In other words, Millennials appear more sensitive to social pressures that conflict with their pro-environmental values when deciding on certain recycled products. Furthermore, the qualitative study made to confirm this insight provided further evidence. Participants highlighted that recycled AHP carry indeed a negative social stigma. Many interviewees verbalised that the fear of being judged may significantly influence one's purchasing decisions. Needless to say, the stigma and the consequent negative social norm derived from the hygiene concerns surrounding recycled AHP, with some products (diapers and sanitary pads) being more critical than others.

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Theoretical implications

Several studies have suggested that self-identity serves as a foundation for attitude formation, particularly in shaping pro-environmental behaviours (Abrar *et al.*, 2021; Kumar *et al.*, 2023). The findings of this research align with this perspective, confirming that green self-identity influences consumer attitudes toward recycled products, which in turn affect their purchasing intentions.

Regarding SN, this study found that green self-identity and SN interact to shape consumer attitudes. Specifically, while a solid green self-identity fosters positive attitudes towards recycling, SN, particularly those around products that may carry negative associations, may weaken these attitudes. This suggests that while consumers may identify as environmentally conscious, social pressures – such as being seen by others as consumers of AHPs, which are recycled products that may carry some hygiene concerns – can inhibit the development of favourable attitudes towards these products. This finding adds to the literature by showing that SN may also negatively shape consumer attitudes towards recycling in some cases (Corsini *et al.*, 2024; Culiberg and Elgaaied-Gambier, 2016; De Marchi *et al.*, 2020; Nguyen-Van *et al.*, 2021).

Regarding the role of generational differences, some studies suggest that younger generations are more likely to exhibit pro-sustainable attitudes and purchase green products (Ewe and Tjiptono, 2023; Yamane and Kaneko, 2021), and others argue that they are less inclined to do so compared to older generations (Casalegno *et al.*, 2022). This study adds a new dimension to this conversation by exploring how generational cohorts influence the impact of SN on the relationship between green self-identity and consumer attitudes. While previous research has shown that Generation Y is more likely to engage in pro-environmental behaviours, such as recycling (Kim *et al.*, 2016; Mason *et al.*, 2022), our findings reveal an interesting twist: Generation Y shows heightened susceptibility to SN that weakens the connection between green self-identity and positive attitudes towards recycled products. By contrast, other generational cohorts appear less influenced by the negative social perceptions associated with recycling, suggesting that Generation Y is uniquely affected by social pressures in this context.

A possible rationale for this is Millennials' strong alignment with environmental ideals, coupled with their heightened sensitivity to social acceptance and perception. This generation places a high value on personal ideals while being attuned to social visibility. This can create tension when evaluating products with a potential social stigma, such as recycled items perceived as lower quality or associated with hygiene concerns. Thus, while Millennials may prioritise green self-identity, their purchasing decisions are still influenced by how well these products align with socially accepted norms.

Regarding the other cohorts, Generation X's weaker green identities may explain why SN has less influence on their purchasing attitudes. For Generation Z, however, the contrast with Millennials is more intriguing. A tentative explanation is that the youngest cohort in our sample is more inclined to disregard social pressure, showing less concern for conformity in their behaviours. This independence may suggest that Gen Z is more likely to act on personal values without being swayed by social perceptions, even when it comes to potentially stigmatised products.

Practical implications

This study offers compelling implications for marketers. Consumer self-identity is a crucial driver of attitudes, especially among those who prioritise sustainability. Consumers with a strong green self-identity are more inclined to purchase recycled products, providing brands with an opportunity to connect with this segment through eco-conscious messaging. By aligning branding and product offerings with sustainability ideals – through product certifications, partnerships with environmental influencers and loyalty programmes – businesses can strengthen the link between self-identity and recycled product purchases, driving deeper engagement and sales.

Moreover, our findings underscore the need to address SN that shapes consumer attitudes towards recycled products. Marketers should actively challenge prejudices linked to recycled goods, particularly perceptions of lower quality or hygiene concerns. Campaigns that promote positive SN and highlight trusted, well-known brands within the recycled AHP category can help dispel negative stereotypes. By showcasing community sustainability initiatives and collaborating with eco-conscious influencers, businesses can reshape public perceptions and encourage more widespread eco-friendly purchasing behaviours.

In sum, managers can leverage the growing influence of eco-conscious influencers and trusted branding to enhance the personal and social appeal of recycled products. This approach not only drives consumer engagement but also helps challenge societal stigmas, particularly among Generation Y, paving the way for broader acceptance of eco-friendly products.

Limitations and future research

The present study has several limitations that should be considered. Firstly, this research used a cross-sectional survey within a specific geographical area – Italy. Future studies could benefit from a longitudinal design and cross-country samples to enhance the generalisability of the results. Additionally, the snowball sampling technique used in this study was non-probabilistic, meaning participants were not randomly selected. This may have led to a less diverse sample, potentially affecting the representativeness and limiting the ability to generalise the findings to the broader population. Moreover, as the data were self-reported, response biases such as social desirability may have influenced the accuracy of participants' answers.

Furthermore, Baby Boomers were not included in our sample. While some survey data suggest that Baby Boomers are generally less interested in environmental issues than younger generations (Gelfand, 2022), this exclusion represents a limitation. Including this generation could have provided additional insights into generational differences in green consumption behaviours and SN influence, contributing to a more comprehensive understanding of the topic.

Moreover, our study measured purchase intention rather than actual behaviour. While it is argued that behaviour is often a direct function of an individual's intention, investigations relying on intention as a proxy for actual behaviour should be

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interpreted cautiously. Therefore, future research could explore actual purchasing behaviour to provide a more accurate understanding of consumer actions towards recycled products.

Further studies could also examine potential relationships or disparities among demographic factors. For example, how might income level moderate consumer buying behaviour towards recycled products? Additionally, other theories explaining the attitude–behaviour relationship could be explored to deepen our understanding of consumer behaviour in the context of recycled products.

Regarding the qualitative study, one limitation is the limited sample size and the focus on Generation Y, which restricts the generalizability of the findings. Even though we purposefully selected participants who were purchasers of recycled products and belonged to the millennial generation, the reliance on word-of-mouth recruitment may have also introduced some bias.

Lastly, future research should investigate how strong SN and a solid green self-identity create a reinforcing cycle that enhances engagement with recycled products. It would also be valuable to assess whether marketing strategies targeting SN and green self-identity have a more significant impact on purchasing behaviour than those focusing on just one of these factors.

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Supplementary material

The supplementary material for this article can be found online.

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