WILEY

| RESEARCH ARTICLE | OPEN ACCESS |

"Like the Windmills of Your Mind": A Cross-Country Investigation of the Role of Past Behavior in Circular Consumption Behavioral Intention

Pedro Augusto Bertucci Lima[1] [ID] | David Badajoz-Dávila[2] | Octaviano Rojas Luiz[1] | Enzo Barberio Mariano[1] | Lise Magnier[3]

[1]São Paulo State University (UNESP), School of Engineering, Bauru, Brazil | [2]Department of Advertising, Public Relations and Audiovisuals, Universitat Autònoma de Barcelona (UAB), Spain | [3]Faculty of Industrial Design Engineering, Delft University of Technology, Delft, the Netherlands

Correspondence: Pedro Augusto Bertucci Lima (pedro.ab.lima@unesp.br)

ABSTRACT

Consumers are a fundamental link in closing material loops in the circular economy. However, the understanding of how past circular behaviors such as recycling and purchasing of recycled products are related to consumption intention (willingness to pay and choosing recycled products) of circular products is limited. Through a cross-section online questionnaire with Brazilian ($N = 203$) and Spanish ($N = 196$) undergraduate students, this research employed Partial Least Square Structural Equation Modelling (PLS-SEM) and multi-group analysis to test the effect of past circular behavior on behavioral intention and the moderating effect of variables from an extended norm-activation model (NAM) on this relationship. The findings indicate that past purchasing of recycled products is related to the intention of purchasing specific recycled products. However, past recycling behavior did not appear to be a good predictor of purchase intention. Despite the awareness of consequences, outcome efficacy, personal norms, social norms, and attitude present relationships with behavioral intention, the moderating effect of these variables was not consistently found. Our study contributes to existing literature by showing how variables from extended NAM models are good predictors of behavioral intention but not necessarily good moderator variables. The study innovates by showing that consumers already buying circular products tend to keep doing so, while efforts should be made to increase the spillover effect of recycling behavior into purchasing intention, as both are necessary to achieve the circular economy. Thus, policymakers, educators, and businesses should promote not only recycling but also circular purchasing through awareness, marketing, and norm-shaping strategies.

1 | Introduction

The Circular Economy (CE) is regarded as one way to achieve human and sustainable development (Lima et al. 2021; Ortiz-de-Montellano et al. 2023) as it proposes a regenerative system based on waste, emissions, and pollution minimization that can be achieved by slowing, closing, and narrowing material and energy loops (Geissdoerfer et al. 2017) through a series of CE approaches (e.g., recycle, reuse, repair, Mignacca et al. 2025). Individuals are important for achieving material and energy loops because of their consumption habits and behaviors (Gomes et al. 2023; Kirchherr et al. 2017; Stangherlin et al. 2023; Szilagyi et al. 2022). Importantly, human behavior is not only a product of the current decisions that individuals make, but

---

also a reflection of previous actions that they have internalized, which might create a behavioral cycle (Linder et al. 2022). CE has gained momentum in different environments and among different audiences, such as in the higher education context, mainly due to the importance of educating younger people to shift from linear consumption patterns to the CE and the representation that this public has as consumers (Do Paço et al. 2013; Renfors 2024). Thus, a better understanding of how young consumers, for example, undergraduate students, deal with different kinds of circular consumption behaviors can be helpful for planning strategies to increase such behavior (Bertossi and Marangon 2022; Lopes, Gomes, Suchek, and Nogueira 2024; Penz et al. 2019; Thøgersen 1999).

Circular behaviors extend beyond the acquisition phase to include actions during the consumption/use of a product and at the end of its life (Arias et al. 2022; Macklin and Kaufman 2024). Effectively closing material and energy loops within the CE requires appropriate behaviors at both the acquisition stage (e.g., purchasing and consuming) and end-of-life stage (e.g., recycling and disposal) (Stangherlin et al. 2023). Recycling-related behaviors, in particular, span both stages: they involve acquiring products made from recycled materials (Chaturvedi et al. 2020; Hein 2022), as well as managing waste in an appropriate manner (Lima et al. 2023; Onel and Mukherjee 2017). Given that recycling is among the most widely adopted "R" strategies in both developed and developing countries, (Haswell et al. 2024), this study focuses on the recycling dimension of circular behaviors.

Several studies have examined the consumption aspect of the CE (see Camacho-Otero et al. 2018; Gomes, Moreira, and Ometto 2022 for reviews). However, less attention has been given to how different circular behaviors relate to one another (Wieser and Tröger 2018) and how past behavior can be linked to behavioral intention, which is particularly important for understanding consumption patterns in the CE (Gomes et al. 2023; Stangherlin et al. 2023). Behavioral intention plays an important role in understanding consumer decisions regarding circular products and in predicting their demand (Lopes, Gomes, Suchek, and Nogueira 2024). Given their positive environmental impact, circular behaviors can be classified as pro-environmental behaviors (PEBs), as they help reduce environmental harm or contribute to environmental benefits (Steg and Vlek 2009).

Individuals who engage in one type of PEB are more prone to repeating the same behavior or adopting a new one—a phenomenon known as positive spillover (Nilsson et al. 2017; Thøgersen 1999). Spillover can occur within the same behavioral domain, such as when someone who has previously purchased one type of recycled product intends to buy another type of recycled product, or across domains, such as when past recycling behavior influences the intention to purchase recycled products. Theory in psychology suggests that individuals feel uncomfortable in a situation of cognitive dissonance and, as a result, are motivated to act consistently, making spillover more likely when behaviors are perceived as similar (Thøgersen 2004). For example, someone who recycles may be more inclined to adopt another recycling-related behavior rather than a different kind of PEB, such as avoiding car use (Truelove et al. 2014). However, negative spillover is also possible, as in cases of "moral licensing", where individuals feel justified in acting less sustainably

after performing one PEB (Thøgersen 1999). Understanding both forms of spillover is important in the context of the CE, where consumer actions, such as recycling and purchasing products made from recovered materials, are necessary to closing material and energy loops (Stangherlin et al. 2023). Considering the desirability of stimulating more PEBs, there is an increasing interest in factors that encourage positive spillover (Behn et al. 2025). While some moderators for spillover effects are well described, such as the ones highlighted by Nilsson et al. (2017) in their review—similarity, personality, self-identity, and framing—other possible moderators should be investigated (Truelove et al. 2014), such as other psychological variables commonly associated with PEBs, for example, environmental beliefs and social norms (Puntiroli et al. 2022). Moreover, the behavioral domain in which a spillover is being investigated influences the spillover effect (Behn et al. 2025), reinforcing the necessity of studies in different domains, such as in the CE context.

Among the theories used to explain PEB, those emphasizing intrinsic motivations, such as the norm activation model - NAM (Schwartz 1977), are considered particularly influential (Steg 2016). The NAM asserts that being aware of environmental problems (awareness of consequences) and the perception of the possibility to improve the environmental state (outcome efficacy) activate personal norms that will encourage PEB (Van der Werff and Steg 2015). Personal norms, thus, act as an internal compass for individuals to guide their PEB (De Groot et al. 2021). Although NAM has been widely applied in previous research (De Groot and Steg 2009; Van der Werff and Steg 2015), its explanatory power can be enhanced by integrating additional theoretical perspectives and variables beyond its original emphasis on moral considerations, especially social norms (i.e., individuals' expectations of what others believe should or should not be done) and attitudes (Han et al. 2015; Klockner 2013; Koklic et al. 2019; Pasquariello et al. 2024; Sharma et al. 2023; Zhang et al. 2024). Therefore, considering the influence of the variables from an extended NAM perspective (from now on, extended NAM considers awareness of consequences, outcome efficacy, personal norms, social norms, and attitude) on PEB, they will be incorporated into the present research as possible factors stimulating the adoption of a positive spillover effect (Behn et al. 2025).

While several studies have examined PEBs among undergraduate students (Bertossi and Marangon 2022; Carmona et al. 2023; Mehraj et al. 2023), CE behavior remains an underexplored topic in this context. In order to address the aforementioned gaps, the present research formulated the following research questions: "How does past circular behavior influence the intention to adopt a circular behavior in the same domain and across domains?" and "How do the different psychological factors of individuals interact in the relationship between past circular behavior and circular behavioral intention?". Thus, the primary objective of the research is to analyze if past recycling behaviors and past purchase of recycled products are related to the willingness to pay and the preference of choosing a recycled product over a traditional one. Both outcomes can be considered environmental behavioral intentions (Dangelico et al. 2022; Vicente et al. 2021). Moreover, this research also aims to analyze if the psychological factors of individuals influence the relationship between past circular

behavior and circular behavioral intention. To achieve these goals, data were collected from Brazilian and Spanish undergraduate students. By examining Brazil and Spain, two countries characterized by distinct cultural norms, economic structures, and policy environments, this study highlights both commonalities and context-specific behavioral patterns. These insights are particularly relevant for adapting circular economy policies and market interventions to culturally and institutionally diverse settings, thereby improving their relevance, acceptance, and impact (Nguyen et al. 2025). The present research tested structural equation models to assess the direct effect of past recycling and purchasing behavior on willingness to pay and the intention to choose recycled products. The research also assessed the direct and moderating effect of the extended NAM variables in the relationship between past behavior and behavioral intention.

This study is one of the first to analyze the relationship of past circular behavior and circular behavioral intention in the same and across domains, thereby addressing the gap of knowledge related to the interrelationships between different circular behaviors. Understanding how past recycling and purchasing behaviors influence the intention to buy recycled products can help companies build on consumer habits to tailor marketing strategies to reinforce circular consumption and support policymakers in designing targeted interventions that promote both recycling and circular purchasing as complementary behaviors. By also examining how psychological factors influence these relationships in the culturally and economically distinct contexts of Brazil and Spain, it provides new insights into circular consumption patterns in both developing and developed countries. Brazil and Spain are currently discussing national CE plans that encompass sustainable and production issues. Thus, the findings of this research can enrich this type of strategy not only for these countries but also for all countries that are implementing CE policies and strategies. Moreover, the present research answers the call to investigate what factors can stimulate positive spillover, a universally desired outcome in the sustainability context.

2 | Theoretical Background and Research Hypotheses

2.1 | Theoretical Perspective of the Spillover Effect and Norm Activation Model

This research relied on two main conceptual frameworks: environmental spillover and the norm activation model (NAM). The multiple theoretical approaches employed in the research allowed a complementary approach as support in analyzing the dependent variable of interest, that is, circular behavioral intention (Aryee 2024). The spillover effect is rooted in different psychological theories that claim that individuals aim to be consistent in their behavior (Thøgersen and Ölander 2003). Thus, spillover is a suitable theoretical perspective to analyze how one (circular) behavior influences the adoption of other (circular) behaviors (Nilsson et al. 2017; Thøgersen 1999)—required in the CE context, as consumers are expected to adopt circular behavior throughout the whole life cycle of products (Gomes, Moreira, and Ometto 2022; Koch et al. 2024). The NAM was selected

for this study due to its strong theoretical foundation and relevance in explaining PEB across diverse contexts (Schwartz 1977; Steg 2016) and, more recently, in explaining circular behavior (Sajjad et al. 2024). Unlike other behavioral theories, NAM explicitly integrates moral and normative dimensions, such as personal norms and awareness of consequences, which are important enablers of pro-environmental actions.

As the circular behaviors included in the present research, namely: recycling, willingness to pay for recycled products, and purchasing intention of recycled products, can also be considered PEB, psychological variables frequently used in the PEB literature, such as awareness of consequences, outcome efficacy, personal norms, social norms, and attitudes, may help explain these behaviors (Lima et al. 2023; Van der Werff and Steg 2015; Sharma et al. 2023). Awareness of consequences is the awareness that individuals have toward the environmental issue (Van der Werff and Steg 2015); that is, an individual should acknowledge the negative environmental impact of waste generated in their consumption habits. Outcome efficacy is the perception that individuals can help mitigate environmental issues by adopting specific behaviors (Van der Werff and Steg 2015); that is, they should feel that choosing recycled products over an equivalent traditional option decreases environmental degradation. Personal norms are the perceived moral obligation toward a behavior that influences the likelihood of performing it or not (Schwartz 1977); that is, individuals should feel that it is morally right to prefer recycled products over the traditional option. These are the three original variables that compound the NAM (Schwartz 1977). Considering that previous research has indicated that extending the NAM with other variables can increase its explanatory power (Han 2020; Han et al. 2015), we decided to include other variables recognized as influencing PEB, such as social norms and attitude (Lima et al. 2024; Steg and Vlek 2009). Social norms are the perception that individuals have about what others do and want them to do (Cialdini et al. 1990); that is, individuals should perceive that choosing recycled products is what others expect that they would do. Attitude is the positive or negative perception that individuals have toward a specific subject (Verma et al. 2019); that is, individuals should have a positive attitude toward recycled products.

2.2 | Previous Research on Circular Behavior

Circular solutions require that customers adapt their behavior (Levänen et al. 2023). Circular behaviors promote resource efficiency and the flow of circular value through consumption systems (Gomes, Moreira, and Ometto 2022). Therefore, behaviors aligned to the CE principles present similarities with concepts such as sustainable and environmental behavior (Garcia et al. 2021), mainly because they aim to mitigate the environmental impact of consumption activities. Thus, as with the PEB literature (Blankenberg and Alhusen 2019), several studies have been done to compile elements that influence circular consumption behavior. Camacho-Otero et al. (2018), for example, presented seven factors that influence the acceptance of circular products, namely: personal characteristics, product and service offering, knowledge and understanding, experience and social aspects, risks and uncertainty, benefits, and other psychological factors. This research focuses on the

psychological factors (e.g., attitudes, norms, and habits) due to their importance for several circular behaviors, including buying behavior (Gomes, Moreira, Bouman, et al. 2022) and recycling (Onel and Mukherjee 2017).

Recycling is one of the most common R strategies implemented in both developed and developing countries (Haswell et al. 2024). This makes it a suitable approach to be considered in a spillover analysis, where there is a greater chance that individuals would report past behaviors related to recycling (Koch et al. 2024). Researchers have not only analyzed factors that influence recycling behavior (see Phulwani et al. 2020 for a review), but also the intention of purchasing different types of recycled products (see Polyportis et al. 2022 for a review). Some studies analyzed specific types of recycled products rather than general preferences; Dobbelstein and Lochner (2023), for example, analyzed buying behavior related to recycled t-shirts, mobile phones, and toilet paper, Testa et al. (2022) focused on recycled backpacks, while Magnier et al. (2019) analyzed consumption intentions related to different recycled products, explicitly mentioning that they were made of recycled ocean plastic. In general, these studies indicate that recycled products are well accepted by a significant portion of consumers and that they can compete in the market with equivalent traditional products. However, the relationships between recycling behavior and the purchase of recycled products are still underdeveloped in the literature. An exception is the research conducted by Stangherlin et al. (2023), who found that recycling behavior is related to buying circular products (recycled clothes, electronics and household items), while the opposite was only weakly found. Considering this, more studies are needed to increase knowledge on the subject.

2.3 | Development and Formulation of Hypotheses

Habits and past behavior have been regarded as strong predictors of behavioral intention (Ouellette and Wood 1998) and called to be more included in PEB models (Phipps et al. 2013). Shishan et al. (2021) found a positive relationship between dining in green restaurants and further intention to dine in green restaurants. Puntiroli et al. (2022) found positive relationships related to past and future energy conservation behavior. Koklic et al. (2019) found a positive relationship between past organic food purchases and the intention to buy organic food. Therefore, considering that the adoption of one type of PEB is an indication of a predisposition to perform the same PEB in the future, which might be regarded as temporal (or same domain) spillover (Nilsson et al. 2017), we can expect that past circular behavior will influence future circular behavior. In the present research, we examine the willingness to pay for a recycled product as well as the intention to choose a recycled product over a traditional one, both being considered PEB (Dangelico et al. 2022; Vicente et al. 2021). This approach addresses the growing demand for a deeper understanding of consumer willingness to pay for circular products (Gomes et al. 2023). Therefore, H1, as well as further hypotheses, are formulated as:

H1. *Past purchasing behavior influences behavioral intention toward recycled products. Specifically.*

H1a. *Past purchasing behavior is positively related to willingness to pay for a recycled product.*

H1b. *Past purchasing behavior is positively related to choosing a recycled product over an equivalent traditional one.*

H2. *Past recycling behavior influences behavioral intention toward recycled products.*

H2a. *Past recycling behavior is positively related to willingness to pay for a recycled product.*

H2b. *Past recycling behavior is positively related to choosing a recycled option over an equivalent traditional one.*

Penz et al. (2019) found that PEB related to mitigating CO_2 emissions was positively associated with adopting other PEB also focusing on reducing CO_2 emissions. Lauren et al. (2016) found that engaging in easy PEB related to saving water was positively related to engaging in more difficult water-saving behavior. Vicente et al. (2021) found that environmental activism behavior was related to willingness to pay for better environmental quality (e.g., pay higher taxes and prices so that better environmental practices are made by public services and companies). However, the relationship between recycling and purchasing behavior in the CE context is still unclear (Phipps et al. 2013). One exception is Stangherlin et al. (2023), who found that individuals engaged in recycling tend to present a higher willingness to buy recycled products, and individuals who buy recycled products have a tendency, to a lower extent, to increase their recycling level. Thus, considering that a past PEB might be related to the adoption of new types of PEB, a cross-domain spillover (Nilsson et al. 2017), the second research hypothesis is formulated as:

Greater levels of consumer environmental awareness might be related to more engagement in circular consumption systems (Gomes, Moreira, and Ometto 2022), in such a way that studies have indicated positive relationships between awareness of consequence and behavioral intention, such as Godinho Filho et al. (2024) who found that CE awareness is positively related to circular behavior. The meta-analysis conducted by Gu et al. (2024) indicated that outcome efficacy, personal and social norms, and attitude are related to reuse behavior. Hein (2022) found that personal norms were positively associated with the purchase intention of recycled products. Onel and Mukherjee (2017) found that personal norms, social norms, and attitudes were positively related to recycling behavior. Therefore, all five variables considered in the extended NAM have been positively related to a diverse set of circular behaviors.

Although the NAM variables tend to present stronger predictions in the traditional sequential relationship, ordering the variables differently is also possible (De Groot and Steg 2009). For example, Van der Werff and Steg (2016) presented the direct effect of awareness of consequences and outcome efficacy on behavioral intention. Besides, Godinho Filho et al. (2024) found a direct relationship between CE awareness and circular behavior. Therefore, considering that psychological variables that affect PEB can be arranged in different manners (Riepe et al. 2021) and inspired by Klockner et al. (2013), who, through 10 different
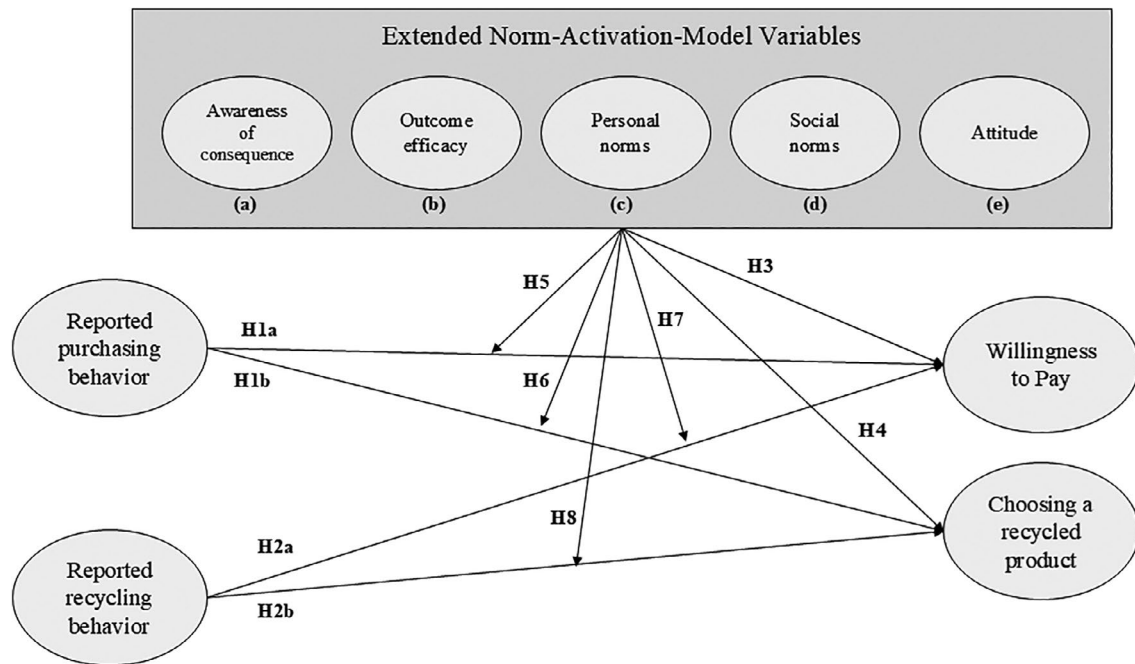
FIGURE 1 | Research model.

models, analyzed the relationship of 10 different psychological variables (e.g., awareness of consequences, ascription of responsibility, personal norms, social norms, and attitude) in the spillover effect of transportation behavior, the following hypothesis was developed:

H3. *Variables from the extended norm activation model*: (*a*) *awareness of consequences*, (*b*) *outcome efficacy*, (*c*) *personal norms*, (*d*) *social norms, and* (*e*) *attitudes are positively related to willingness to pay for a recycled product.*

H4. *Variables from the extended norm activation model*: (*a*) *awareness of consequences*, (*b*) *outcome efficacy*, (*c*) *personal norms*, (*d*) *social norms, and* (*e*) *attitudes are positively related to choosing a recycled product over an equivalent conventional one.*

In addition to their direct effects, psychological variables from the extended NAM have also been linked to interaction effects in the PEB literature (e.g., De Groot et al. 2021; De Groot and Steg 2009). Notably, these variables have been shown to moderate spillover effects. For example, awareness about CO_2 emissions has been associated with positive same and across domain spillover effects (Penz et al. 2019), and social norms related to recycling have been positively associated with recycling behavior and can also trigger support for the implementation of other waste management practices (Ling et al. 2023). Moreover, Arias and Trujillo (2020) found that the perception of effectiveness in behavior is related to across domain spillover. However, the moderating role of these variables in relation to past circular behaviors remains underexplored. Accordingly, this study investigates whether these psychological variables moderate the spillover effect between past circular behaviors and behavioral intention toward recycled products:

H5. *Variables from the extended norm activation model*: (*a*) *awareness of consequences*, (*b*) *outcome efficacy*, (*c*) *personal*

norms, (*d*) *social norms, and* (*e*) *attitudes moderate the relationship between past purchasing behavior of recycled products and willingness to pay for a recycled product.*

H6. *Variables from the extended norm activation model*: (*a*) *awareness of consequences*, (*b*) *outcome efficacy*, (*c*) *personal norms*, (*d*) *social norms, and* (*e*) *attitudes moderate the relationship between past purchasing behavior of recycled products and choosing a recycled product over an equivalent traditional one.*

H7. *Variables from the extended norm activation model*: (*a*) *awareness of consequences*, (*b*) *outcome efficacy*, (*c*) *personal norms*, (*d*) *social norms, and* (*e*) *attitudes moderate the relationship between past recycling behavior and willingness to pay for a recycled product.*

H8. *Variables from the extended norm activation model*: (*a*) *awareness of consequences*, (*b*) *outcome efficacy*, (*c*) *personal norms*, (*d*) *social norms, and* (*e*) *attitudes moderate the relationship between past recycling behavior and choosing a recycled product over an equivalent traditional one.*

The conceptual framework and research hypotheses are represented in Figure 1.

3 | Methods

3.1 | Sample

The research relied on a convenience sample of undergraduate students. Convenience sample strategy is usually employed in the literature especially when the main objectives of the research are related to analyzing relationships between internal variables, not seeking to generalize the findings (De Groot et al. 2021; Lima et al. 2023). Thus, the first and third authors of the research

distributed the questionnaire to undergraduate students in a Brazilian university, while the second authors distributed it to undergraduate students in a Spanish university. Previous studies have used students as samples not only for convenience but also because of their role in sustainability, especially as consumers (Bertossi and Marangon 2022; Cruz et al. 2025; Mehraj et al. 2023; Do Paço and Reis 2012). Young adults are considered the "consumers of the future", being in the phase of developing their identity and systems of beliefs and values (Vermeir and Verbeke 2008), which makes it particularly relevant for environmental products (Gomes et al. 2023).

Brazil is a developing country with a Human Development Index (HDI) of 0.786 (87th position), while Spain is a developed country with an HDI of 0.918 (28th position) (UNDP 2025). Brazil presents fewer individualism cultural values than Spain (although considering other European countries, Spain is rather Collectivist), and Spain is not an indulgent society (the extent to which people try to control their desires and impulses) while Brazil can be considered a largely indulgent society (Hofstede Insights 2023). The final observation about both countries is their level of CE maturity (Haswell et al. 2024). CE is still in its infancy in Brazil (Delgado and Lima 2022; Sehnem et al. 2019), while developed European countries present a more mature stage (Hughes 2017; Vanhamäki et al. 2021). This factor influences the degree of products and services related to CE available in the market (Ezeudu and Kennedy 2024). These contextual differences between Brazil and Spain might influence the circular mindset of consumers (Gomes, Moreira, Bouman, et al. 2022), making an analysis of consumers from both countries more relevant.

A total of 206 undergraduate students answered the questionnaire in Brazil between October and November of 2023. After removing answers that failed to meet the attention check question ($n = 3$), the final sample comprised 203 valid answers. From the valid answers, 100 (49.26%) were female, 94 (46.31%) were male, 7 (3.45%) did not identify as female or male, and 2 (0.99%) preferred not to answer. Participants' age ranged from 18 to 50 ($M = 22.039$, SD $= 3.757$), with 67 (33%) living with their parents and 136 (67%) not.

A total of 205 undergraduate students answered the questionnaire in Spain between May and June of 2023, and between September 2023 and February 2024. The second collection was carried out to match the Brazilian sample size. Considering the longer time-frame of the data collection in Spain, we performed Mann–Whitney U tests to compare the means of the first 50% of respondents with the last 50%. This procedure was done to verify possible differences between the beginning and the end of the data collection. No differences were found between early and late respondents in the Spanish sample. After removing the incorrect answers from the attention check questions ($n = 11$), the final sample comprised 196 valid answers. From the valid answers, 154 (78.57%) were female, 37 (18.88%) were male, 2 (1.02%) did not identify as female or male, and 3 (1.53%) preferred not to answer. Participants' age ranged from 18 to 54 ($M = 19.770$, SD $= 3.695$), with 153 (78.06%) living with their parents while 43 (21.94%) did not.

An a priori sample size calculation in G*Power (Faul et al. 2009) indicated that, for an effect size of $f^2 = 0.10$ (De Groot et al. 2021),

with a minimal statistical power of 0.80, probability level of 0.05, and five predictors (i.e., past purchasing behavior, past recycling behavior, "extended NAM variable", past purchasing behavior × "extended NAM variable", and past recycling behavior × "extended NAM variable"), the research would need at least 134 individuals per country. We highlight that each model relied on one extended NAM variable at a time. The study adopted the small effect size threshold established by Cohen (1988), which inherently requires a larger sample to ensure adequate power. Therefore, the sample for both countries was deemed sufficient for this study.

3.2 | Questionnaire

An online questionnaire was developed using the "Free Questionnaire" for the Brazilian sample and "Google Forms" for the Spanish sample. The original questions in English were translated into Portuguese by the Brazilian authors and Catalan by the Spanish author. First, the questionnaire presented the research aims and ethical statements. Individuals could consent to participate if they agreed with the ethical statement and were 18 or older. Collecting reported data using online questionnaires has been gaining relevance over the years, mainly due to the possibility of facilitating the collecting process both for the researchers and for the respondents (Wright 2005), this being a common approach in the literature (e.g., Gomes et al. 2023; Lange and Dewitte 2019; Lima et al. 2023). The Ethics Committee of the Faculty of Sciences, São Paulo State University, Brazil, approved the research with the Brazilian sample (referee number "73010223.9.0000.5398"), while the Ethics Committee of the Universitat Autònoma de Barcelona, Spain, approved the research with the Spanish sample (referee number "6466").

Participants answered questions about awareness of consequences (e.g., "The amount of waste humans are generating causes acute problems for society"), outcome efficacy (e.g., "I think I can contribute to reducing environmental problems by buying products made of recycled materials"), personal (e.g., "I feel morally obliged to buy products made of recycled materials, regardless of what other people do") and social norms (e.g., "People who are important to me support that I buy products made of recycled materials"), attitude toward buying recycled products (e.g., "For me, buying products made of recycled materials is Bad (1) vs Good (7)"), and past recycling (e.g., "In general, how often do you separate something that you are not going to use anymore to recycle instead of discarding it in another way?") and purchasing behavior (e.g., "I try to buy products made of recycled materials as much as I can"). These questions were based on the literature and ranged on a scale from 1 to 7 (Bamberg et al. 2007; Gomes, Moreira, Bouman, et al. 2022; Han 2014; Hein 2022; Huffman et al. 2014; Lima et al. 2023; Van der Werff and Steg 2015). Next, participants answered questions about their willingness to pay for a recycled product, and intention to choose a recycled product rather than a traditional one (as detailed in Section 3.3). Finally, the participants were asked to answer socio-demographic questions including age, gender and housing situation. The questionnaire is available in the Supporting Information (Table S1). The questionnaire also contained questions that were used for other research purposes, which are not presented in this paper.

3.3 | Behavioral Intentions Toward Recycled Products

To measure behavioral intention, respondents were presented with three distinct situations. The first involved a question assessing their willingness to pay for a recycled product, while the second and third involved questions about choosing a recycled product over a traditional alternative. Previous research has shown that a recycled version of a product can compete with equivalent traditional alternatives (Testa et al. 2022).

The first situation involved a product commonly purchased by undergraduate students: a university sweatshirt. Participants were presented with the following prompt: "Consider that your undergraduate program is going to sell a sweatshirt with the name and logo of your program. Consider that you could choose two options that have no visual difference, a regular cotton sweatshirt costing R\$120,00 (22.50 €) and a sweatshirt made of recycled materials recovered from the ocean. Imagine that you are considering buying the sweatshirt, how much would you be willing to pay in order to choose the recycled option?" They were then asked to indicate the maximum they would pay for the recycled option (Pretner et al. 2021). The reference price of R\$120,00 (22.50 €) was determined based on a market analysis of branded sweatshirts sold by major retailers in both Brazil and Spain. The ordinal scale ranged from $1 = $ I would not buy for any price, to $13 = $ no more than R\$240,00 (45.00 €); each higher point in the scale presented an increase of R\$20,00 (approximately, 4.00 €) in the maximum value (Brazil: $M = 7.034$, $SD = 2.142$; Spain: $M = 6.474$, $SD = 2.243$).

The second situation involved a lower-cost, frequently purchased product: household detergent. Participants were presented with the following scenario: "Consider that you are going to buy a detergent to use in your house. You found a traditional option for R\$2,00 (0.50 €) and an optional with a bottle made of recycled plastic recovered from the ocean for R\$3,00 (0.75 €) (both options are from the same brand). What is the probability that you would buy the recycled option?". The scale ranged from $1 = $ Totally unlikely, to $7 = $ Totally Likely. The recycled option was priced 50% higher than the traditional one, a price difference selected based on Galati et al. (2022), who identified a 60% willingness-to-pay threshold for recycled water bottles (Brazil: $M = 4.232$, $SD = 1.960$; Spain: $M = 5.112$, $SD = 1.604$).

The third and final decision-making context involved selecting notepads for an academic event, where choosing the recycled option implied a budget trade-off. Participants were presented with the following scenario: "Consider that you are helping organize an academic event on the campus (e.g., a conference). The organizational committee received some budget from your department for the event. Considering that all enrolled individuals will receive a notepad. You can buy a cheaper notepad, made of regular paper, or a recycled notepad (i.e., recycled paper and recycled wire). Both notepads are from the same brand and have the same size. The recycled option is more expensive, thus, by choosing it, the organization committee will have less budget for the rest of the event (i.e., the coffee break will receive 10% to 20% less money and should be adapted to this new budget). What is the probability that you would choose the recycled notepad?" The scale ranged from $1 = $ Totally unlikely, to $7 = $ Totally Likely. The 20% cost difference between the recycled and traditional notepads was based on a market analysis of office and school supplies from one of Brazil's largest retailers, which confirmed that recycled products were typically priced about 20% higher than traditional counterparts. (Brazil: $M = 3.882$, $SD = 1.705$; Spain: $M = 4.495$, $SD = 1.409$).

The selection of products such as those involved in the scenarios used to evaluate participants' behavioral intention toward circular products was guided by the extended NAM framework, which emphasizes the key psychological antecedents of PEB: awareness of consequences, outcome efficacy, personal norms, social norms, and attitudes in shaping pro-environmental choices. This approach activates both the moral and normative elements central to the NAM framework but also enables the exploration of potential spillover effects, where past engagement in one circular behavior (e.g., recycling, purchase of recycled products) may positively influence intention toward others (e.g., purchasing or willingness to pay for recycled products). The chosen scenarios, featuring familiar products such as detergent, a sweatshirt, and notepads, reflect real-life trade-offs relevant to undergraduate students, who often face budget constraints and must navigate practical and ethical considerations in their consumption choices. Following previous research about intention to buy recycled products (e.g., Dobbelstein and Lochner 2023; Magnier et al. 2019; Stangherlin et al. 2023), these categories were deliberately chosen to represent a range of product types that vary in terms of product function, involvement, and material types, thereby increasing the generalizability of the results and reducing the risk of product-specific bias. The university sweatshirt is a garment made of cotton or other kinds of fabric with an average involvement in the purchase process and a higher price than the other products included in the research. The detergent and the notepad present low involvement, as both are cheap products routinely bought; while the detergent is a cleaning product used for daily domestic tasks that usually comes in a plastic bottle, the notepad is mainly made of paper with possible metal (e.g., wire) and plastic (e.g., cover) parts.

3.4 | Common Method Bias

Considering that the data collected in the study are from the same source (respondents) and the same instrument (online questionnaire), the research is subject to common method bias (CMB), and therefore its assessment is necessary to increase the suitability of the analysis. CMB should be controlled with both procedural and statistical approaches (Kock et al. 2021). The procedural step, also known as ex ante analysis, includes approaches employed to improve the research instrument and, therefore, is done before collecting the data. A robust procedural step can also reduce the chance of other biases, such as acquiescence, leniency, and non-response biases. The statistical step, also named as ex post analysis, is done after the data is collected and indicates the quality and reliability of the data (Kock et al. 2021).

In the present research, the following procedural techniques were employed: (1) relying on questionnaires already validated

and well used in the literature, including attention questions (e.g., "Please, select number 5"), and piloting the instrument to verify possible difficulties in answering the questionnaire (Lima et al. 2023). For the statistical step, the present research relied on Harman's single factor test, to assess whether a single factor accounts for the majority of the variance among the variables (Craighead et al. 2011), being commonly used in the literature (Aryee et al. 2024; Fuller et al. 2016). This analysis was conducted using the psych package in R (Revelle 2025) to perform an Exploratory Factor Analysis with a single factor, without rotation, and estimated using the maximum likelihood method. The proportion of variance explained by a single factor was 28% for the Brazilian data and 26% for the Spanish data. Values below 50% suggest the absence of substantial common method bias.

3.5 | Statistical Analysis

This research relied on several models for each country to assess the direct effect of past behavior on purchasing intention (H1 and H2), the direct effect of the extended NAM variables on purchasing intention (H3 and H4), and the moderating effect of the extended NAM variables in the relationship between past behavior and behavioral intention (H5–H8). To carry out these tests, one model was developed for each extended NAM variable and each country, resulting in a total of 15 models (5 variables from extended NAM and 3 different dependent variables) for each country (total of 30 models). These models were then tested with the Structural Equation Modeling (SEM) technique. Given the sample size, more parsimonious models were developed to avoid potential multicollinearity that could arise from the inclusion of multiple simultaneous explanatory variables. This approach ensures more reliable and interpretable results. It also aligns with the exploratory strategy of the article, which aims to analyze different variables related to past behavior and behavioral intention.

SEM encompasses statistical techniques for analyzing relationships among multiple variables, integrating aspects of factor analysis and regression analysis (Hair et al. 2022). This research relied on the PLS-SEM as it is a non-parametric technique and, therefore, does not require statistical assumptions regarding data distribution (Sarstedt et al. 2014). Using the Shapiro–Wilk test, it was found that all study variables, for the samples from both countries, did not follow a normal distribution. Therefore, the PLS-SEM algorithm was chosen over CB-SEM, as the latter requires the assumption of normality, whereas PLS-SEM is more appropriate when this assumption is violated (Hair et al. 2021). Moreover, PLS-SEM is a suitable approach for testing moderating effects between variables. This is the case of the present research: the moderating effect of the extended NAM on the relationship between past behavior and behavioral intention. All these features make PLS-SEM a standard tool in studies analyzing the relationship between individuals' aspects and their consumption behavior (e.g., Gomes et al. 2023; Han et al. 2015; Li et al. 2019; Lima et al. 2023; Palacios-González and Chamorro-Mera 2022).

The analysis was conducted using SmartPLS 4 (Ringle et al. 2024) with the following configuration settings. The "Path" weighting scheme was selected, as it is appropriate for estimating relationships between latent constructs within the PLS-SEM framework. The results were generated in their "Standardized" form to allow for meaningful comparison of path coefficients across constructs. Furthermore, the "Default" option was used for the initial weight setting, following the standard procedure recommended by the software.

After completing all the tests to ensure the reliability and validity of the models, a complete bootstrapping with 10,000 subsamples was employed to check the significance of the path coefficients in the structural models. The goodness-of-fit of the structural models was assessed. These included the (adjusted) R-squared, which measures the proportion of variance explained by the model; the Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), and Bayesian Information Criterion (BIC) were used to evaluate and compare the fit of different models. Two-tailed hypothesis tests were performed to establish the statistical significance of the coefficients, which need to be considered when interpreting the presented p values. Finally, a multigroup analysis was performed to compare the models from Brazil and Spain.

4 | Results

4.1 | Validity and Reliability of the Extended NAM Variables, Reported Behavior, and Behavioral Intention

The descriptive statistics of the sample and variables used in the research are presented in Table 1.

To evaluate the measurement models, the reflective constructs (awareness of consequences, outcome efficacy, personal norms, social norms, attitudes, past recycling behavior, past purchasing behavior, and behavioral intention) were evaluated considering their internal consistency and convergent and discriminant validity. The outer loading was not presented here due to space constraints, but data will be made available upon request. The Cronbach's alphas were above 0.700, the Average Variance Extracted (AVE) were above 0.500, and the Composite Reliability was above 0.700 in the majority of the cases (Table S2); in those cases in which data presented lower values, the variable was removed, and the model was checked again. Except for one case, in all other cases the measurement model improved after the removal. In these cases, the same variable was removed from the same model for the other country so that models would be equal for both countries (Hair et al. 2021). The discriminant validity was checked using the heterotrait monotrait ratio of correlations (HTMT); all values were below 0.850 (Henseler et al. 2015). The variance inflation factors (VIFs) were below 3.300, indicating that the models are free of multicollinearity problems (Kock 2015). These data are also not presented here due to space constraints, but will be made available upon request.

4.2 | Relationships Between Past Behavior and Behavioral Intention

To test the hypotheses presented in this research, 30 PLS-SEM models were adopted in the study, 15 for each country. Almost

TABLE 1 | Descriptive statistics.

Variable	Brazil	Spain
Number of individuals	203	196
Gender		
Women	100 (49.26%)	154 (78.57%)
Men	94 (46.31%)	37 (18.88%)
Not identified as women or men	7 (3.45%)	2 (1.02%)
Preferred not to answer	2 (0.99%)	3 (1.53%)
Age		
Mean (Standard deviation)	22.039 (3.757)	19.770 (3.695)
Range	18–50	18–54
Housing situation		
Living with parents	67 (33%)	153 (78.06%)
Not living with parents	136 (67%)	43 (21.94%)
Awareness of consequence		
Mean (Standard deviation)	6.373 (1.007)	5.449 (1.265)
Outcome efficacy		
Mean (Standard deviation)	5.243 (1.515)	5.449 (1.265)
Personal norms		
Mean (Standard deviation)	3.558 (1.840)	3.643 (1.746)
Social norms		
Mean (Standard deviation)	3.235 (1.759)	3.476 (1.776)
Attitude		
Mean (Standard deviation)	5.905 (1.352)	5.663 (1.367)
Past recycling		
Mean (Standard deviation)	4.899 (1.924)	5.370 (1.760)
Past purchasing		
Mean (Standard deviation)	3.681 (1.778)	3.845 (1.656)

all models evaluated showed a good fit according to the SRMR criterion. Only the models with moderation of awareness of consequences, using data from Brazil, presented SRMR values greater than or equal to 0.08. However, the Normed Fit Index (NFI) values were lower than the recommended threshold,

which might be attributed to the sample size. For both countries, only the sweatshirt-related models had R^2 values below the 10% threshold (with the exception of Brazil's awareness of consequences moderation model). This reinforces the overall quality of adjustments indicated by the SRMR. Especially for the Spanish data, negative adjusted R^2 values were found for three models explaining willingness to pay for the sweatshirt. These models were disregarded in the analysis. Due to space constraints, the summary of some metrics (i.e., SRMR, NFI, R^2, Adjusted R^2, BIC) of model quality and fit for the estimated models are presented in the Supporting Information (Table S3).

Comparing the BIC values, it is clear that the framed behaviors are more likely to be better explained when moderated by awareness of consequences than by other extended NAM variables. One exception is the explanatory model of the intention to purchase the notepad for Brazil, whose model with the best prediction quality was moderated by personal norms (BIC = 1.822). Even for this model, awareness of consequences moderation performed similarly to the best model (BIC = 1.989). The most contrasting model was the predictor of detergent purchase intention using data from Spain. The model with moderation of awareness of consequences was considered the worst for this product. Those moderated by outcome efficacy stand out among the models with lower predictive capacity. Across all six combinations of countries and products, models containing this variable ranked among the two worst predictive models.

Due to space constraints, only the significant relationships are presented in this article. The rest of the data can be made available upon request. Considering the exploratory nature of the research, we considered a less stringent threshold for significant ρ values ($\rho < 0.100$) (Dahiru 2008; Lima et al. 2023). The Brazilian models presented 23 direct and four moderating relationships (Table 2), while the Spanish models presented 17 direct and one moderating relationship (Table 3). In Brazil, the models related to detergent purchasing behavior presented higher values for explaining the variance, that is, R^2 (15.4% to 24%), followed by the notepad models (10.5% to 13.3%) and the sweatshirt (7% to 10.2%). In Spain, the notepad models presented higher R^2 (16.5% to 18.6%), followed by the detergent models (13.2% to 16.3%) and sweatshirt (2.1% to 6%). The standardized root mean square residuals (SRMR) of the models were below the accepted value of 0.100 for the models (Hu and Bentler 1998).

Past purchasing behavior was positively related to willingness to pay for the sweatshirt in four models, all in the Brazilian scenario. Therefore, considering that six models did not present significant relationships, H1a was only partially supported. Considering the intention to choose the recycled option instead of the equivalent traditional one, 15 models presented significant relationships: six in Brazil (four in the detergent model and two in the notepad model) and nine in Spain (five in the detergent model and four in the notepad model). Therefore, considering that the majority of models presented significant relationships in both countries, H1b was partially supported. Past recycling was not related to any willingness to pay and was only significantly related to behavioral

TABLE 2 | Significant relationships in Brazil.

Hypothesis	Product	Moderator in the model	β	M	SE	t	p	f²
H1a: PP → BI	Sweatshirt	AC	0.174	0.183	0.075	2.338	0.019	0.028
H1a: PP → BI	Sweatshirt	OE	0.191	0.194	0.084	2.270	0.023	0.029
H1a: PP → BI	Sweatshirt	PN	0.150	0.150	0.085	1.761	0.078	0.016
H1a: PP → BI	Sweatshirt	SN	0.165	0.164	0.092	1.797	0.072	0.020
H1b: PP → BI	Detergent	AC	0.231	0.228	0.072	3.215	0.001	0.049
H1b: PP → BI	Detergent	OE	0.257	0.251	0.080	3.215	0.001	0.057
H1b: PP → BI	Detergent	SN	0.216	0.212	0.084	2.566	0.010	0.036
H1b: PP → BI	Detergent	AT	0.209	0.202	0.086	2.435	0.015	0.023
H1b: PP → BI	Notepad	AC	0.164	0.164	0.077	2.111	0.035	0.023
H1b: PP → BI	Notepad	OE	0.177	0.175	0.084	2.102	0.036	0.026
H2b: PR → BI	Notepad	SN	0.132	0.153	0.069	1.916	0.055	0.016
H3a: AC → BI	Sweatshirt	AC	0.209	0.196	0.093	2.240	0.025	0.044
H3c: PN → BI	Sweatshirt	PN	0.147	0.161	0.086	1.723	0.085	0.017
H3e: AT → BI	Sweatshirt	AT	0.165	0.167	0.096	1.708	0.087	0.019
H4a: AC → BI	Detergent	AC	0.330	0.336	0.062	5.307	0.000	0.138
H4a: AC → BI	Notepad	AC	0.235	0.239	0.064	3.689	0.000	0.053
H4b: OE → BI	Detergent	OE	0.203	0.203	0.075	2.712	0.007	0.041
H4c: PN → BI	Detergent	PN	0.354	0.359	0.080	4.402	0.000	0.114
H4c: PN → BI	Notepad	PN	0.216	0.221	0.086	2.512	0.012	0.039
H4d: SN → BI	Detergent	SN	0.191	0.200	0.074	2.575	0.010	0.032
H4d: SN → BI	Notepad	SN	0.212	0.220	0.075	2.842	0.004	0.038
H4e: AT → BI	Detergent	AT	0.218	0.223	0.076	2.844	0.004	0.036
H4e: AT → BI	Notepad	AT	0.217	0.227	0.077	2.806	0.005	0.034
H6b: PP * OE → BI	Notepad	OE	0.161	0.150	0.096	1.675	0.094	0.021
H6c: PP * PN → BI	Notepad	PN	0.121	0.115	0.072	1.683	0.092	0.016
H6e: PP * AT → BI	Notepad	AT	0.147	0.135	0.085	1.741	0.082	0.018
H8a: PR * AC → BI	Detergent	AC	0.147	0.149	0.075	1.962	0.050	0.025

Abbreviations: AC = awareness of consequences, AT = attitude, BI = behavioral intention, OE = outcome efficacy, PN = personal norms, PP = past purchasing, PR = past recycling, SN = social norms, β = path coefficient (standardized beta), M = mean, SE = standard error, t = t-statistic, p = p-value, f_2 = effect size (f-squared).

intention in one model. Therefore, both H2a and H2b were not supported.

Awareness of consequence was related to willingness to pay only in Brazil, offering partial support to H3a. Outcome efficacy was not related to willingness to pay, not supporting H3b. Personal norms only were related to willingness to pay in Brazil, offering partial support to H4c. Social norms were not related to willingness to pay, not supporting H3d. Attitude was positively related to willingness in both countries, supporting H3e. Awareness of consequence, outcome efficacy, personal norms, and social norms were related to intention to choose the recycled option instead of the equivalent traditional one in three of the four models, while attitude was positively related in the four

models. Thus, H4a–H4d were partially supported while H4e was supported.

None of the extended NAM variables moderated the relationships between past purchasing and willingness to pay for a recycled product on the one hand and past recycling behavior and willingness to pay for a recycled product on the other hand. Thus, all H5 and H7 were not supported. Outcome efficacy, personal norms, and attitude positively moderated the relationship between past purchasing and intention to choose the recycled option instead of the equivalent traditional in one model each. Thus, H6b, H6c, and H6e were only partially supported, while H6a and H6d were not supported due to the lack of moderating effect of awareness of consequence and social norms.

TABLE 3 | Significant relationships in Spain.

Hypothesis	Product	Moderator in the model	β	M	SE	t	p	f^2
H1b: PP → BI	Detergent	AC	0.282	0.276	0.070	4.053	0.000	0.076
H1b: PP → BI	Detergent	OE	0.247	0.244	0.073	3.394	0.001	0.053
H1b: PP → BI	Detergent	PN	0.220	0.215	0.077	2.845	0.004	0.032
H1b: PP → BI	Detergent	SN	0.190	0.192	0.073	2.617	0.009	0.009
H1b: PP → BI	Detergent	AT	0.228	0.216	0.079	2.880	0.004	0.042
H1b: PP → BI	Notepad	AC	0.354	0.349	0.062	5.733	0.000	0.128
H1b: PP → BI	Notepad	PN	0.267	0.262	0.086	3.110	0.002	0.050
H1b: PP → BI	Notepad	SN	0.345	0.340	0.074	4.684	0.000	0.097
H1b: PP → BI	Notepad	AT	0.305	0.297	0.075	4.093	0.000	0.080
H3e: AT → BI	Sweatshirt	AT	0.177	0.188	0.097	1.820	0.069	0.022
H4a: AC → BI	Notepad	AC	0.195	0.197	0.068	2.888	0.004	0.040
H4b: OE → BI	Detergent	OE	0.130	0.134	0.075	1.731	0.083	0.015
H4b: OE → BI	Notepad	OE	0.346	0.341	0.068	5.106	0.000	0.107
H4c: PN → BI	Notepad	PN	0.200	0.203	0.091	2.189	0.029	0.031
H4d: SN → BI	Detergent	SN	0.213	0.216	0.074	2.877	0.004	0.041
H4e: AT → BI	Detergent	AT	0.171	0.185	0.080	2.129	0.033	0.023
H4e: AT → BI	Notepad	AT	0.170	0.176	0.080	2.121	0.034	0.024
H8c: PR * PN → BI	Detergent	PN	0.160	0.147	0.093	1.728	0.084	0.022

Abbreviations: AC = awareness of consequences, AT = attitude, BI = behavioral intention, OE = outcome efficacy, PN = personal norms, PP = past purchasing, PR = past recycling, SN = social norms, β = path coefficient (standardized beta), M = mean, SE = standard error, t = t-statistic, p = p-value, f_2 = effect size (f-squared).

Awareness of consequence and personal norms positively moderated the relationship between past recycling and intention to choose the recycled option instead of the equivalent traditional in one model each. Thus, H8a and H8c were partially supported only, while H8b, H8d, and H8e were not supported due to the lack of moderating effect of outcome efficacy, social norms and attitude. Interaction plots were constructed with SmartPLS 4 for the statistically significant moderation hypotheses (Figures S1–S5). Analysis of these plots shows that at low levels of the NAM model variables, the relationship between reported behavior and intention was either nonexistent (H6b) or negative. In contrast, at high levels of these variables, all significant relationships were positive. Overall, mean values of the moderating variables were associated with positive relationships, although the slopes were weaker or nearly flat (H8a).

4.3 | Differences in Behavioral Intention Between Brazil and Spain

In order to check if the behavioral intentions were different between countries, we first tested for the normality of the data using the Shapiro–Wilk test. After confirming that the three behavioral intentions (willingness to pay for the sweatshirt, purchase intention of the recycled detergent and notepad) followed a non-normal distribution, we performed three distinct Mann–Whitney tests. The Brazilian and Spanish samples did not present statistical differences in willingness to pay for the recycled

sweatshirt (W = 19,806, p = 0.939). The previous analysis indicated that the Brazilian sample presented more significant relationships between the tested variables and willingness to pay than the Spanish. This discrepancy suggests that, while the average willingness to pay is similar across both countries, the factors influencing this willingness differ. Considering the Brazilian and Spanish samples, respectively, only 2.45% and 1.02% of respondents would not choose the recycled sweatshirt. In comparison, 23.65% and 30.10% would pay less than the traditional option, 34.98% and 28.06% would pay the same price as the traditional option, and 38.92% and 40.82% would pay more than for the traditional option. An increase of 50% in the price of the sweatshirt presented less willingness than an increase of 16% and 33% (Figure 2). Considering the recycled detergent (W = 14,887, p = 0.000) and notepad (W = 15,687, p = 0.000), Spanish respondents were more likely than the Brazilian respondents to choose the recycled option.

The multigroup analysis identified seven significant differences between the Brazilian and Spanish contexts (Table 4), five differences related to direct effect, and two to moderating effect. Most of the differences pointed to more substantial effects in the Brazilian context, especially considering the direct effect of the extended NAM variables, which is aligned with previous analyses indicating a more significant relationship between the independent and dependent variables in Brazil. These results reinforce the view that different variables affect consumers from these countries differently.
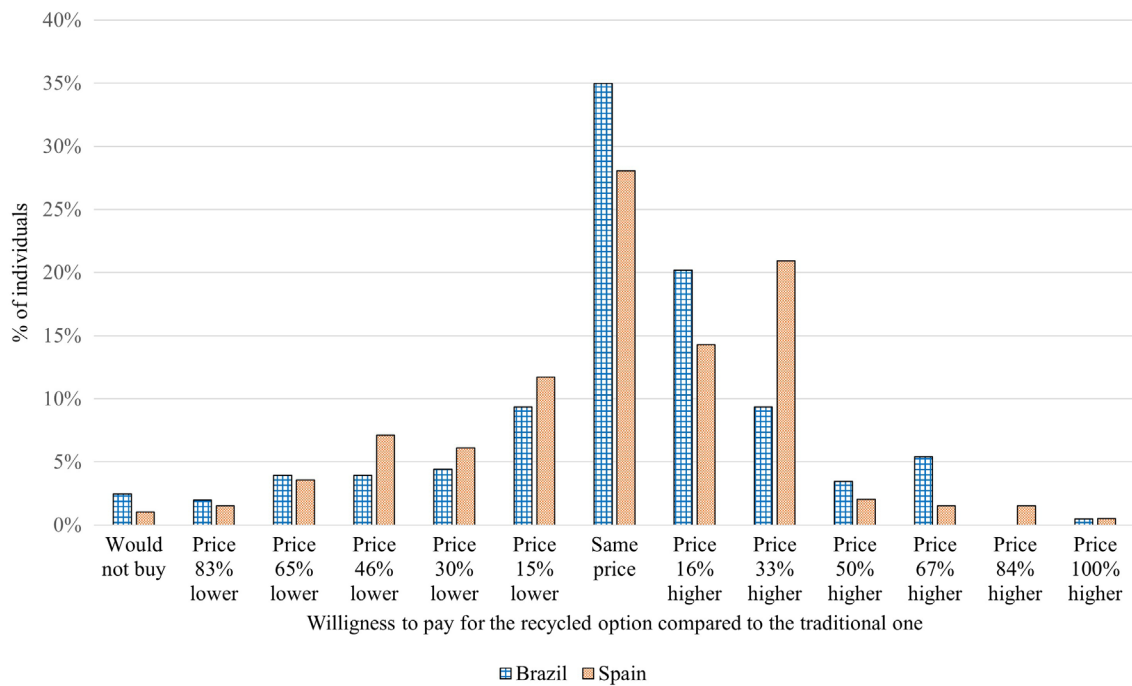
FIGURE 2 | Willingness to pay for the recycled option compared to the traditional one, for Brazilian and Spanish respondents.

TABLE 4 | Differences between the Brazil and Spain.

Model	Relationship	Δ	p
ΔBrazil—Spain: AC_Detergent	AC → BI_Detergent	0.234	0.013
ΔBrazil—Spain: AC_Notepad	PP → BI_Notepad	−0.195	0.046
ΔBrazil—Spain: PN_Detergent	PN → BI_Detergent	0.267	0.020
ΔBrazil—Spain: SN_Detergent	PR * SN → BI_Detergent	0.181	0.066
ΔBrazil—Spain: SN_Notepad	PP → BI_Notepad	−0.245	0.033
ΔBrazil—Spain: AT_Notepad	PP → BI_Notepad	0.047	0.660
	PP * AT → BI_Notepad	0.220	0.049

Abbreviations: AC = awareness of consequences, AT = attitude, BI = behavioral intention, OE = outcome efficacy, PN = personal norms, PP = past purchasing, PR = past recycling, SN = social norms, Δ = difference between group path coefficients, p = two-tailed p-value.

5 | Discussion

5.1 | Discussion of Results

The present research analyzed the relationship between past recycling and purchasing behavior with purchase intention in a CE context. Thus, besides increasing the understanding of consumer behavior in relation to the CE, this research also answers the call to consider behavior as an independent variable rather than solely as a dependent variable (Phipps et al. 2013). Almost 30 years ago, Thøgersen (1999) had already highlighted

that, due to routinization, individuals are likely to perform repeated behaviors in other categories over time. He also exemplified how individuals engaged in recycling behavior might expand this behavior to other categories of behaviors aligned to the same environmental principal (i.e., reducing waste disposed of in the natural environment). The principle would be to develop a virtuous cycle of PEBs enabled by psychological associations of these behaviors made by individuals (e.g., behaviors favoring CE) (Thøgersen and Ölander 2003). Thus, an intention to behave in a circular fashion would be impacted by previous experiences of individuals in the same or other domains (Linder et al. 2022), like "windmills in their mind." This cyclical approach of circular behavior is aligned with the main principle of CE: consider waste as input to keep materials and energy within a cyclical "never ending or beginning" loop (Geissdoerfer et al. 2017; Keijer et al. 2019). Therefore, investigating the relationship between past behavior and intention to behave in the same domain and across domains can support the understanding of the spillover effect in the CE context. To contribute to this perspective, the present research relied on 30 models with Brazilian and Spanish data, including variables from an extended NAM framework (Han 2014; Van der Werff and Steg 2015). In this research, the model with awareness of consequences presented a better adjustment fit, while outcome efficacy presented the worst. The literature has indicated the importance of awareness for the adoption of PEB in general (Godinho Filho et al. 2024), while for outcome efficacy, individuals might perceive that their efforts would not be enough to improve environmental conditions, leading to the "drop in the ocean" perception (Vezich et al. 2017).

The Brazilian case indicates that past purchase behavior is positively related to willingness to pay for a recycled sweatshirt, while the results from Spain do not support this relationship. Considering that there were no differences in the willingness to pay for the sweatshirt between both countries, other variables

such as positive feelings, self-expression, and perceived quality (Polyportis et al. 2022) might have been influencing Spanish consumers rather than past buying behavior. Moreover, the results indicate that some individuals in both countries are willing to pay the same or even more for the recycled product, which was not found by previous research that indicates a limited willingness to pay for recycled hoodies (Pretner et al. 2021). On the other hand, the intention to choose a recycled product over an equivalent traditional one was found in both countries for both the detergent and notepad. These results suggest that for a product such as cleaning and office supplies, with lower involvement and price, past purchase behavior presents more influence than in the sweatshirt. Therefore, spillover in the same domain is more common in a CE context. Previous research has found that consumers perceive value on non-garment recycled products, which increases the purchasing intention when compared to the equivalent traditional option (Testa et al. 2022). Recycled garments can be perceived as inferior quality and with contamination issues by consumers, reducing purchasing intention (Magnier et al. 2019).

Results for both countries converge in the sense that past recycling behavior is not related to willingness to pay nor intention to choose a recycled product of an equivalent traditional one. Several psychological and contextual factors may help explain this outcome. First, from a psychological perspective, the observed lack of relationship may reflect limited spillover across behavioral domains. While recycling and purchasing recycled products are behaviors aligned with the CE, they involve different types of decisions. Recycling is typically a habitual, low-cost behavior often shaped by infrastructure and routine, whereas purchasing recycled products requires active choice and, in this case, financial trade-offs. Moreover, aspects of recycled products, such as perceived inferior quality or revulsion (Polyportis et al. 2022), might be why some individuals are engaged in recycling but not in acquiring recycled products. Prior research suggests that spillover is more likely when behaviors are perceived as similar or fall within the same domain (Penz et al. 2019; Thøgersen 2004). Therefore, individuals who recycle might not automatically extend this behavior to their purchasing decisions. Second, moral licensing could be at play. Individuals who engage in recycling may feel they have "done their part", reducing their perceived need to make further pro-environmental choices, such as buying recycled products (Truelove et al. 2014). Vicente et al. (2021), for example, did not find direct relationships between reported behaviors—such as separating waste and recycling, saving water and energy, and buying green products—with the willingness to pay for improving environmental quality. Therefore, these findings offer new evidence that even individuals who support closing the material and energy loops by properly disposing of their waste are not necessarily willing to close the loop by acquiring recycled materials. This disconnection between waste management and sustainable acquisition could be a barrier to fully achieving circularity.

Awareness of consequence and personal norms were only positively related to willingness to pay for a recycled sweatshirt in Brazil. Attitudes were positively related to willingness to pay in both Brazil and Spain. Outcome efficacy and social norms, however, were not related to willingness to pay in both countries. These findings indicate that attitude might be a stronger predictor of willingness to pay than the other variables and be less context dependent than awareness of consequence and personal norms, which were only related to willingness to pay in Brazil. The stronger effect of attitude was corroborated by the intention of choosing the recycled option of the detergent and the notepad in both countries. Awareness of consequence, outcome efficacy, personal norms, and social norms presented three positive relationships each. Products with lower levels of involvement, such as the detergent and the notepad, seem to present more relationships with extended NAM variables and be less dependent on specific features of the product, while the sweatshirt might be more prone to aspects such as quality and appeal. Dobbelstein and Lochner (2023) also found that a more expensive and less frequently bought product is less likely to be purchased in a recycled version than a more daily bought product, which might be associated with a reduced intention to try something different when purchasing more expensive products.

The findings suggest that attitude, personal norms, and awareness of consequence were more consistently related to circular behavioral intention than outcome efficacy and social norms. Personal norms are indeed the strongest predictor according to the NAM (Schwartz 1977), while the literature has increasingly presented the importance of awareness to foster circular behavior (Godinho Filho et al. 2024) and intention (Elgaaied 2012), and willingness to pay for environmental products (Gomes et al. 2023). Moreover, the literature has already shown awareness of consequences as presenting a stronger relationship with behavioral intention than outcome efficacy (Van der Werff and Steg 2016). The strong influence of attitudes reinforces the call to combine moral models (i.e., NAM) with other variables, as it can increase the predictive power of the model (Han 2020; Han et al. 2015). On the other hand, the weaker effect of outcome efficacy might be related to the individual perception that action in the cases analyzed would not lead to a significant positive effect on the environment (Vezich et al. 2017). Furthermore, a lack of visual differences in recycled products might reduce the effect of social norms, as others would not recognize that a given individual exercised a preference for a recycled product.

Only a few positive moderating relationships were found. However, it is interesting to note that the three significant moderating effects of the extended NAM variables in the relationship between past behavior and behavioral intention were related to past purchase and the notepad as the dependent variable, while the two positive relationships in the past recycling context were with the detergent as a dependent variable. These findings suggest that different variables can work as moderators to stimulate spillover, depending on the type of product considered. The lack of a moderating effect for some of the variables tested in the present research has also been identified in the CE literature (Godinho Filho et al. 2024). De Groot and Steg (2009) and Han et al. (2015) did not find strong moderating effects of awareness of consequences and ascribed responsibility. However, they tested their moderating effect on the relationship between personal norms and behavioral intention and not on the relationship between past behavior and behavioral intention.

The significant differences in relationships between countries reinforce that individual nationality is one of the aspects that influences the adoption of circular behavior (Gomes, Moreira, and

Ometto 2022). The findings contradict previous research that has not highlighted significant differences between sustainable habits of Brazilian and Spanish undergraduate students. This difference might be related to the behaviors analyzed, as they relied on an aggregated index of 25 behaviors (Chuvieco et al. 2018), which can disperse differences in specific behaviors. Moreover, contrary to Dobbelstein and Lochner (2023), who found higher behavioral intention within a developing country (e.g., South Africa) than in a developed country (e.g., Germany), the present research found higher behavioral intention within the developed country studied. However, when considering willingness to pay, there were no significant differences in the degree of behavioral intention, only in the factors affecting this behavioral intention. These differences might be related to the higher level of CE implementation in developed countries (e.g., Spain), but an increase in CE implementation in developing countries (e.g., Brazil) might be reducing the distance between countries.

5.2 | Theoretical Implications

From the aforementioned discussion, four main theoretical contributions can be highlighted that the present research offers for the spillover effect and NAM frameworks. First, the results indicate that same domain spillover is expected under the CE perspective; that is, individuals who already buy recycled products tend to do so for a diverse range of products. Second, cross domain spillover does not indicate an intrinsic relationship, in such a way that individuals who help close material loops by properly discarding end of life products (i.e., recycling) do not necessarily choose to buy recycled products. Third, the present research is one of the first to integrate the NAM in a CE context, increasing knowledge in this emerging literature. Fourth, although the variables from the extended NAM seem to be significantly related to behavioral intention to opt for recycled products, they are not adequate factors to stimulate the spillover effect.

5.3 | Practical Implications

A better understanding of factors that affect the purchase intention of recycled products among undergraduate students is important to develop strategies to increase this behavior (Bertossi and Marangon 2022; Dobbelstein and Lochner 2023). Considering that the results suggest that recycling is not associated with choosing recycled products, universities should better emphasize the relevance of circular products through social marketing initiatives and educational approaches, especially considering that recycling is already a relatively common behavior (Koch et al. 2024). These initiatives could also be adopted to stimulate individuals who recycle to opt for recycled products when shopping, necessary behavior if material cycles are to be closed completely. Additionally, since purchase intention varies depending on the product, simply labeling something as "recycled" may not be sufficient to drive consumer choice. Campaigns should, therefore, tailor their strategies to highlight the specific benefits and appeal of different recycled products to influence consumer preferences better.

Communication strategies could also rely on the variables from the NAM to stimulate the adoption of PEB, such as raising awareness of the issues, revealing how individual behavior can mitigate environmental problems, and provoking moral commitment. However, in order to trigger across-domain spillover, other approaches would need to be implemented as well, such as increasing the appeal of such products by highlighting product-related attributes, such as perceived quality and value. Marketers should also note that although consumers might be willing to pay a premium price for some recycled products, this value should not excessively surpass the price of an equivalent product made using raw materials (Dobbelstein and Lochner 2023).

The differences observed between countries suggest that government policies and marketing campaigns designed to promote circular consumption behavior should take account of cultural differences and local specificities. Furthermore, results that were consistent across countries may suggest more universal guidelines. For example, past purchasing behavior was positively associated with a preference for recycled products over traditional options, a trend that may apply across different cultures. These findings are important in the development of national plans to stimulate the CE. Besides European initiatives, Spain has already approved a national plan toward CE (Fernández et al. 2025), while in Brazil, political and legal procedures are being discussed as a means of stimulating CE practices in the country (Guarnieri 2024). The Brazilian approach includes strategies to stimulate individual engagement in the CE in such a way that the lack of cross-domain spillover (i.e., recycling to buying recycled products) poses a challenge to the national plan that should be addressed by the country. Our results demonstrate that this lack of cross-domain spillover is not exclusive to developing countries but can also affect the transition in developing and more mature countries in the CE context, such as Spain. Therefore, it is equally important that cross-domain spillover be addressed by European countries that are struggling to implement cohesive CE plans (Losa 2025).

5.4 | Limitations and Avenues for Future Research

The present research has limitations. First, it is mainly focused on consumer psychological characteristics and the recycling features of products. Considering that other product attributes affect consumer decision-making (Camacho-Otero et al. 2018) and that internal consumer aspects might interact with these product attributes, thereby affecting consumption decisions (Schuitema and De Groot 2015), future studies should consider a broad scope of variables. Special attention could be given to attributes recognized in green consumption literature for their relevance, such as price sensitivity, product durability, product quality, and uniqueness (Bhardwaj et al. 2023; Jacobs et al. 2018; Lopes, Gomes, and Trancoso 2024), as well as other sustainable related attributes such as using natural and organic materials (Jacobs et al. 2018). Another factor might be the lack of a control question regarding whether the individuals studied already had sufficient winter clothes, which would be a particularly important factor for willingness to pay behavioral intention, especially considering Brazil's tropical climate.

A second limitation is that the search only relied on self-reported data, which may have been affected by social desirability and recall biases. Participants might overstate

environmentally friendly behavior, such as recycling or willingness to buy recycled products, due to social approval or may not recall accurately their past behavior. These biases could lead to overestimations of pro-environmental intention and behavior, potentially impacting the results. Future studies should consider objective measures or methods to reduce these biases, such as observational recycling data (Rioux 2011), apps to register behavior periodically (Novoradovskaya et al. 2021), and recording the actual amount of money spent (Balderjahn et al. 2018). Despite this limitation, self-reporting remains a practical tool for capturing behavior across diverse contexts (Lange and Dewitte 2019).

A third limitation concerns the sample of the study, which is restricted to undergraduate students in Brazil and Spain, and may limit the generalizability of the findings to the broader consumer population, as students may differ in terms of purchasing power, environmental attitudes, and consumption patterns. Although the approach of relying on a convenience sample is generally acceptable in the literature, specifically when the main goals are not to provide generalization of the findings, but rather to analyze the internal relationship between the variables of interest (De Groot et al. 2021; Lima et al. 2023), future research should replicate this study with more diverse demographic groups to assess the robustness and applicability of the findings across different consumer segments.

A fourth limitation is the lack of control variables in the PLS-SEM analysis made due to the "no possible solution" issue occurring when an attempt was made to employ models with socio-demographic variables (i.e., age, gender, housing situation) as control variables. The "no possible solution" issue is described in the SmartPLS[1] when the bootstrapping routine and at least one of the bootstrapping samples result in an invalid solution. One of the suggestions given in the software is to increase the sample, which was not possible in the present research due to constraints in data collection. However, we reinforce the fact that the sample size was deemed adequate with an a priori test made on G*Power (as presented in the method section). The other suggestion indicated was to remove the control variables from the model, which was the solution adopted. It is recognized that this is a limitation of the research. However, given the homogeneity of the sample (all undergraduate students) and the study focus on spillover effects and psychological antecedents of circular consumption, which are reported to present higher relationships with circular behavior than demographic factors (Gu et al. 2024), it is believed that this would not significantly impact the objectives of the study. However, it would indeed be interesting if future research examined potential sociodemographic (e.g., gender, age, and income) effects in more heterogeneous populations.

6 | Conclusions

The importance of CE has been highlighted by different developed and emerging economies, due to its capability of mitigating environmental issues while promoting economic outcomes. Consumers are regarded as key agents in this transition by closing material loops through properly disposing of end-of-life products and purchasing circular products. However, how past circular behavior influences intentions to adopt circular behaviors in the same domain and across domains, and how individuals' psychological factors influence these relationships, are still little explored in the literature. Therefore, the present research analyzed the relationship between past recycling and purchasing behavior of recycled products with consumption intention of different recycled products and the direct and moderating effect of an extended NAM model on the behavioral relationship.

The findings indicated that past purchasing behavior has a strong relationship to the intention to purchase recycled products, although recycling behavior did not seem to be a good predictor of purchase intention. Moreover, all variables from the extended NAM presented direct relationships with behavioral intention, especially personal norms and attitudes, which support the claim that including more variables in moral frameworks might increase the model's predictive power. However, the extended NAM variables only presented a few moderating effects between past behavior and behavioral intention, indicating the necessity to test the moderating power of other variables to support increasing circular behavior.

The results of the research highlight challenges in closing material and energy loops in a CE economy context, as individuals are expected to properly dispose of their waste (e.g., recycle) and acquire products aligned with CE principles, such as using recycled materials. The results point to the closer relationship between circular behavior in the same domain than between behavior across domains. Finally, this study also highlights the importance of the type of recycled product and the country context as influencing factors for consumer behavior.

Author Contributions

Pedro Augusto Bertucci Lima: conceptualization, methodology, software, formal analysis, writing – original draft, writing – review and editing. **David Badajoz-Dávila:** conceptualization, methodology, formal analysis, writing – original draft, writing – review and editing. **Octaviano Rojas Luiz:** conceptualization, methodology, software, formal analysis, writing – original draft, writing – review and editing. **Enzo Barberio Mariano:** supervision, writing – original draft, writing – review and editing. **Lise Magnier:** methodology, supervision, writing – original draft, writing – review and editing.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Endnotes

[1] https://www.smartpls.com/faq/documentation/consistent-pls-problems/.

References

Arias, C., J. M. Quiroga Beltrán, J. M. Martínez Ariza, J. B. Cadena Lozano, and M. A. Bello Bernal. 2022. "Pro-Circular Consumer Profile: An Approach to Their Identification and Characterization Based on the Components of the Value-Belief-Norm Theory." *Sustainability* 14, no. 13: 7883. https://doi.org/10.3390/su14137883.

Arias, C., and C. A. Trujillo. 2020. "Perceived Consumer Effectiveness as a Trigger of Behavioral Spillover Effects: A Path Towards Recycling." *Sustainability* 12, no. 11: 4348. https://doi.org/10.3390/su12114348.

Aryee, R. 2024. "Theoretical Perspectives in Reverse Logistics Research." *International Journal of Logistics Management* 35, no. 6: 1897–1920. https://doi.org/10.1108/IJLM-08-2023-0349.

Aryee, R., A. A. Alfa, H. Acquah, G. B. Addey, and E. J. K. Akoto. 2024. "Circular Economy, Customer Citizenship Behaviour and Firm Performance: Some Empirical Evidence." *Business Strategy & Development* 7, no. 2: e377. https://doi.org/10.1002/bsd2.377.

Balderjahn, I., M. Peyer, B. Seegebarth, K. P. Wiedmann, and A. Weber. 2018. "The Many Faces of Sustainability-Conscious Consumers: A Category-Independent Typology." *Journal of Business Research* 91: 83–93. https://doi.org/10.1016/j.jbusres.2018.05.022.

Bamberg, S., M. Hunecke, and A. Blöbaum. 2007. "Social Context, Personal Norms and the Use of Public Transportation: Two Field Studies." *Journal of Environmental Psychology* 27, no. 3: 190–203. https://doi.org/10.1016/j.jenvp.2007.04.001.

Behn, O., J. Wichmann, M. Leyer, and A. Schilling. 2025. "Spillover Effects in Environmental Behaviors: A Scoping Review About Its Antecedents, Behaviors, and Consequences." *Current Psychology* 44, no. 5: 1–3689. https://doi.org/10.1007/s12144-025-07431-9.

Bertossi, A., and F. Marangon. 2022. "A Literature Review on the Strategies Implemented by Higher Education Institutions From 2010 to 2020 to Foster Pro-Environmental Behavior of Students." *International Journal of Sustainability in Higher Education* 23, no. 3: 522–547. https://doi.org/10.1108/IJSHE-11-2020-0459.

Bhardwaj, S., N. Sreen, M. Das, A. Chitnis, and S. Kumar. 2023. "Product Specific Values and Personal Values Together Better Explains Green Purchase." *Journal of Retailing and Consumer Services* 74: 103434. https://doi.org/10.1016/j.jretconser.2023.103434.

Camacho-Otero, J., C. Boks, and I. N. Pettersen. 2018. "Consumption in the Circular Economy: A Literature Review." *Sustainability* 10, no. 8: 2758. https://doi.org/10.3390/su10082758.

Carmona, L. J. M., A. G. P. Barretto, and E. Bacinello. 2023. "Does Intention Translate Into Actual Purchase? Analysis of Inducers of Sustainable Consumption in Higher Education Students." *Young Consumers* 25, no. 1: 45–64. https://doi.org/10.1108/YC-03-2023-1710.

Chaturvedi, P., K. Kulshreshtha, and V. Tripathi. 2020. "Investigating the Determinants of Behavioral Intentions of Generation Z for Recycled Clothing: An Evidence From a Developing Economy." *Young Consumers* 21, no. 4: 403–417. https://doi.org/10.1108/YC-03-2020-1110.

Chuvieco, E., M. Burgui-Burgui, E. V. Da Silva, K. Hussein, and K. Alkaabi. 2018. "Factors Affecting Environmental Sustainability Habits of University Students: Intercomparison Analysis in Three Countries (Spain, Brazil and UAE)." *Journal of Cleaner Production* 198: 1372–1380. https://doi.org/10.1016/j.jclepro.2018.07.121.

Cialdini, R. B., R. R. Reno, and C. A. Kallgren. 1990. "A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places." *Journal of Personality and Social Psychology* 58, no. 6: 1015. https://doi.org/10.1037/0022-3514.58.6.1015.

Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Routledge. https://doi.org/10.4324/9780203771587.

Craighead, C. W., D. J. Ketchen, K. S. Dunn, and G. T. M. Hult. 2011. "Addressing Common Method Variance: Guidelines for Survey Research on Information Technology, Operations, and Supply Chain Management." *IEEE Transactions on Engineering Management* 58, no. 3: 578–588. https://doi.org/10.1109/TEM.2011.2136437.

Cruz, C. M. L., I. G. Bosa, C. Kolling, J. F. de Medeiros, and J. L. D. Ribeiro. 2025. "Perceptions of Different Communication Strategies on Proenvironmental Waste Disposal Behavior: A Case Study With University Students in Brazil." *International Journal of Sustainability in Higher Education* 26, no. 3: 485–504. https://doi.org/10.1108/IJSHE-11-2023-0517.

Dahiru, T. 2008. "P-Value, a True Test of Statistical Significance? A Cautionary Note." *Annals of Ibadan Postgraduate Medicine* 6, no. 1: 21–26. https://doi.org/10.4314/aipm.v6i1.64038.

Dangelico, R. M., L. Alvino, and L. Fraccascia. 2022. "Investigating the Antecedents of Consumer Behavioral Intention for Sustainable Fashion Products: Evidence From a Large Survey of Italian Consumers." *Technological Forecasting and Social Change* 185: 122010. https://doi.org/10.1016/j.techfore.2022.122010.

De Groot, J. I., K. Bondy, and G. Schuitema. 2021. "Listen to Others or Yourself? The Role of Personal Norms on the Effectiveness of Social Norm Interventions to Change Pro-Environmental Behavior." *Journal of Environmental Psychology* 78: 101688. https://doi.org/10.1016/j.jenvp.2021.101688.

De Groot, J. I., and L. Steg. 2009. "Morality and Prosocial Behavior: The Role of Awareness, Responsibility, and Norms in the Norm Activation Model." *Journal of Social Psychology* 149, no. 4: 425–449. https://doi.org/10.3200/SOCP.149.4.425-449.

Delgado, F. C. M., and P. A. B. Lima. 2022. "Legislação, Políticas Públicas e Impactos Sociais e Humanos da Economia Circular." In *Economia Circular: Uma rota para a sustentabilidade*, edited by D. Jugend, B. S. Bezerra, and R. G. Souza. Minotauro.

Do Paço, A., H. Alves, C. Shiel, and W. L. Filho. 2013. "Development of a Green Consumer Behaviour Model." *International Journal of Consumer Studies* 37, no. 4: 414–421. https://doi.org/10.1111/ijcs.12009.

Do Paço, A. M. F., and R. Reis. 2012. "Factors Affecting Skepticism Toward Green Advertising." *Journal of Advertising* 41, no. 4: 147–155. https://doi.org/10.1080/00913367.2012.10672463.

Dobbelstein, T., and C. Lochner. 2023. "Factors Influencing Purchase Intention for Recycled Products: A Comparative Analysis of Germany and South Africa." *Sustainable Development* 31, no. 4: 2256–2277. https://doi.org/10.1002/sd.2504.

Elgaaied, L. 2012. "Exploring the Role of Anticipated Guilt on Pro-Environmental Behavior–a Suggested Typology of Residents in France Based on Their Recycling Patterns." *Journal of Consumer Marketing* 29, no. 5: 369–377. https://doi.org/10.1108/07363761211247488.

Ezeudu, O., and C. Kennedy. 2024. "Insights and Dynamics of Circular Business Model in Developing Countries' Context: The Empirical Analysis of the Returnable Glass Bottles Process." *Business Strategy & Development* 7, no. 1: e349. https://doi.org/10.1002/bsd2.349.

Fernández, M. D. V., J. M. Robles, M. Tolentino, and S. M. Andrade. 2025. "Analysis of the Degree of Implementation of the Circular Economy in Europe and Spain." *Cogent Business & Management* 12, no. 1: 2499668. https://doi.org/10.1080/23311975.2025.2499668.

Fuller, C. M., M. J. Simmering, G. Atinc, Y. Atinc, and B. J. Babin. 2016. "Common Methods Variance Detection in Business Research." *Journal of Business Research* 69, no. 8: 3192–3198. https://doi.org/10.1016/j.jbusres.2015.12.008.

Galati, A., L. S. Alaimo, T. Ciaccio, D. Vrontis, and M. Fiore. 2022. "Plastic or Not Plastic? That's the Problem: Analysing the Italian Students Purchasing Behavior of Mineral Water Bottles Made With Eco-Friendly Packaging." *Resources, Conservation and Recycling* 179: 106060. https://doi.org/10.1016/j.resconrec.2021.106060.

Garcia, D. G., E. Kipnis, E. Vasileiou, and A. Solomon. 2021. "Consumption in the Circular Economy: Learning From Our Mistakes." *Sustainability* 13, no. 2: 601. https://doi.org/10.3390/su13020601.

Geissdoerfer, M., P. Savaget, N. M. Bocken, and E. J. Hultink. 2017. "The Circular Economy–A New Sustainability Paradigm?" *Journal of Cleaner Production* 143: 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048.

Godinho Filho, M., J. D. S. L. Gonella, H. Latan, and G. M. D. Ganga. 2024. "Awareness as a Catalyst for Sustainable Behaviors: A Theoretical Exploration of Planned Behavior and Value-Belief-Norms in the Circular Economy." *Journal of Environmental Management* 368: 122181. https://doi.org/10.1016/j.jenvman.2024.122181.

Gomes, S., J. M. Lopes, and S. Nogueira. 2023. "Willingness to Pay More for Green Products: A Critical Challenge for Gen Z." *Journal of Cleaner Production* 390: 136092. https://doi.org/10.1016/j.jclepro.2023.136092.

Gomes, G. M., N. Moreira, T. Bouman, A. R. Ometto, and E. Van der Werff. 2022. "Towards Circular Economy for More Sustainable Apparel Consumption: Testing the Value-Belief-Norm Theory in Brazil and in The Netherlands." *Sustainability* 14, no. 2: 618. https://doi.org/10.3390/su14020618.

Gomes, G. M., N. Moreira, and A. R. Ometto. 2022. "Role of Consumer Mindsets, Behaviour, and Influencing Factors in Circular Consumption Systems: A Systematic Review." *Sustainable Production and Consumption* 32: 1–14. https://doi.org/10.1016/j.spc.2022.04.005.

Gu, Y., Z. Xia, X. Tian, J. Xie, and Y. Liu. 2024. "Factors Determining Reuse Behavior: A Meta-Analysis." *Cleaner and Responsible Consumption* 14: 100213. https://doi.org/10.1016/j.clrc.2024.100213.

Guarnieri, P. 2024. "Alinhamento da política ou estratégia nacional de economia circular com estratégias e diretrizes internacionais." In *Proceeding of the XLVIII Encontro da ANPAD – EnANPAD*. ANPAD - Associação Nacional de Pós-Graduação e Pesquisa em Administração.

Hair, J. F., G. T. M. Hult, C. M. Ringle, and M. Sarstedt. 2022. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. 3rd ed. Sage.

Hair, J. F., G. T. M. Hult, C. M. Ringle, M. Sarstedt, N. P. Danks, and S. Ray. 2021. "Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R." In *Handbook of Market Research*, 1st ed. Springer International Publishing. https://doi.org/10.1007/978-3-030-80519-7.

Han, H. 2014. "The Norm Activation Model and Theory-Broadening: Individuals' Decision-Making on Environmentally-Responsible Convention Attendance." *Journal of Environmental Psychology* 40: 462–471. https://doi.org/10.1016/j.jenvp.2014.10.006.

Han, H. 2020. "Theory of Green Purchase Behavior (TGPB): A New Theory for Sustainable Consumption of Green Hotel and Green Restaurant Products." *Business Strategy and the Environment* 29, no. 6: 2815–2828. https://doi.org/10.1002/bse.2545.

Han, H., J. Hwang, J. Kim, and H. Jung. 2015. "Guests' Pro-Environmental Decision-Making Process: Broadening the Norm Activation Framework in a Lodging Context." *International Journal of Hospitality Management* 47: 96–107. https://doi.org/10.1016/j.ijhm.2015.03.013.

Haswell, F., O. Y. Edelenbosch, L. Piscicelli, and D. P. van Vuuren. 2024. "The Geography of Circularity Missions: A Cross-Country Comparison of Circular Economy Policy Approaches in the Global North and Global South." *Environmental Innovation and Societal Transitions* 52: 100883. https://doi.org/10.1016/j.eist.2024.100883.

Hein, N. 2022. "Factors Influencing the Purchase Intention for Recycled Products: Integrating Perceived Risk Into Value-Belief-Norm Theory." *Sustainability* 14, no. 7: 3877. https://doi.org/10.3390/su14073877.

Henseler, J., C. M. Ringle, and M. Sarstedt. 2015. "A New Criterion for Assessing Discriminant Validity in Variance-Based Structural Equation Modeling." *Journal of the Academy of Marketing Science* 43, no. 1: 115–135. https://doi.org/10.1007/s11747-014-0403-8.

Hofstede Insights. 2023. "Country Comparison." https://www.hofstede-insights.com/country-comparison/brazil,spain/.

Hu, L. T., and P. M. Bentler. 1998. "Fit Indices in Covariance Structure Modeling: Sensitivity to Underparameterized Model Misspecification." *Psychological Methods* 3, no. 4: 424–453. https://doi.org/10.1037/1082-989X.3.4.424.

Huffman, A. H., B. R. Van Der Werff, J. B. Henning, and K. Watrous-Rodriguez. 2014. "When Do Recycling Attitudes Predict Recycling? An Investigation of Self-Reported Versus Observed Behavior." *Journal of Environmental Psychology* 38: 262–270. https://doi.org/10.1016/j.jenvp.2014.03.006.

Hughes, R. 2017. "The EU Circular Economy Package–Life Cycle Thinking to Life Cycle Law?" *Procedia CIRP* 61: 10–16. https://doi.org/10.1016/j.procir.2016.12.006.

Jacobs, K., L. Petersen, J. Hörisch, and D. Battenfeld. 2018. "Green Thinking But Thoughtless Buying? An Empirical Extension of the Value-Attitude-Behaviour Hierarchy in Sustainable Clothing." *Journal of Cleaner Production* 203: 1155–1169. https://doi.org/10.1016/j.jclepro.2018.07.320.

Keijer, T., V. Bakker, and J. C. Slootweg. 2019. "Circular Chemistry to Enable a Circular Economy." *Nature Chemistry* 11, no. 3: 190–195. https://doi.org/10.1038/s41557-019-0226-9.

Kirchherr, J., D. Reike, and M. Hekkert. 2017. "Conceptualizing the Circular Economy: An Analysis of 114 Definitions." *Resources, Conservation and Recycling* 127: 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005.

Koch, J., K. Vringer, E. van der Werff, H. Wilting, and L. Steg. 2024. "Circular Consumption to Reduce Environmental Pressure: Potential of Behavioural Change in The Netherlands." *Sustainable Production and Consumption* 44: 101–113. https://doi.org/10.1016/j.spc.2023.12.009.

Kock, N. 2015. "Common Method Bias in PLS-SEM: A Full Collinearity Assessment Approach." *International Journal of E-Collaboration* 11, no. 4: 1–10. https://doi.org/10.4018/ijec.2015100101.

Kock, F., A. Berbekova, and A. G. Assaf. 2021. "Understanding and Managing the Threat of Common Method Bias: Detection, Prevention and Control." *Tourism Management* 86: 104330. https://doi.org/10.1016/j.tourman.2021.104330.

Koklic, M. K., U. Golob, K. Podnar, and V. Zabkar. 2019. "The Interplay of Past Consumption, Attitudes and Personal Norms in Organic Food Buying." *Appetite* 137: 27–34. https://doi.org/10.1016/j.appet.2019.02.010.

Lange, F., and S. Dewitte. 2019. "Measuring Pro-Environmental Behavior: Review and Recommendations." *Journal of Environmental Psychology* 63: 92–100. https://doi.org/10.1016/j.jenvp.2019.04.009.

Lauren, N., K. S. Fielding, L. Smith, and W. R. Louis. 2016. "You Did, so You Can and You Will: Self-Efficacy as a Mediator of Spillover From Easy to More Difficult Pro-Environmental Behaviour." *Journal of Environmental Psychology* 48: 191–199. https://doi.org/10.1016/j.jenvp.2016.10.004.

Levänen, J., S. Park, and E. Rosca. 2023. "Circular Solutions in Developing Countries: Coping With Sustainability Tensions by Means of Technical Functionality and Business Model Relevance." *Business Strategy & Development* 6, no. 1: 75–94. https://doi.org/10.1002/bsd2.224.

Li, D., L. Zhao, S. Ma, S. Shao, and L. Zhang. 2019. "What Influences an Individual's Pro-Environmental Behavior? A Literature Review." *Resources, Conservation and Recycling* 146: 28–34. https://doi.org/10.1016/j.resconrec.2019.03.024.

Lima, P. A. B., F. P. S. Falguera, H. M. R. D. Silva, S. Maciel, E. B. Mariano, and L. Elgaaied-Gambier. 2024. "From Green Advertising to Sustainable Behavior: A Systematic Literature Review Through the Lens of Value-Belief-Norm Framework." *International Journal of Advertising* 43, no. 1: 53–96. https://doi.org/10.1080/02650487.2023.2199668.

Lima, P. A. B., G. M. K. Jesus, C. R. Ortiz, F. C. O. Frascareli, F. B. Souza, and E. B. Mariano. 2021. "Sustainable Development as Freedom: Trends and Opportunities for the Circular Economy in the Human Development Literature." *Sustainability* 13, no. 23: 13407. https://doi.org/10.3390/su132313407.

Lima, P. A. B., O. R. Luiz, F. P. S. Falguera, M. Furlan, E. B. Mariano, and J. I. M. de Groot. 2023. "More Than Moral Motivations: The Moderating Role of Human Capabilities on the Relationship Between Personal Norms and Pro-Environmental Behavior." *Journal of Cleaner Production* 425: 139034. https://doi.org/10.1016/j.jclepro.2023.139034.

Linder, N., M. Giusti, K. Samuelsson, and S. Barthel. 2022. "Pro-Environmental Habits: An Underexplored Research Agenda in Sustainability Science." *Ambio* 51: 546–556. https://doi.org/10.1007/s13280-021-01619-6.

Ling, M., L. Xu, and H. Yang. 2023. "Direct and Spillover Effects of Social Norm Nudges for Household Recycling: A Longitudinal Field Experiment." *Sustainable Production and Consumption* 42: 423–433. https://doi.org/10.1016/j.spc.2023.06.001.

Lopes, J. M., S. Gomes, N. Suchek, and S. Nogueira. 2024. "The Hidden Reasons Behind Generation Z's Green Choices." *Discover Sustainability* 5, no. 1: 1–17. https://doi.org/10.1007/s43621-024-00764-8.

Lopes, J. M., S. Gomes, and T. Trancoso. 2024. "Navigating the Green Maze: Insights for Businesses on Consumer Decision-Making and the Mediating Role of Their Environmental Concerns." *Sustainability Accounting, Management and Policy Journal* 15, no. 4: 861–883. https://doi.org/10.1108/SAMPJ-07-2023-0492.

Losa, R. 2025. "Public Policies on Circular Economy: A Systematic Review." *Ecological Economics* 228: 108452. https://doi.org/10.1016/j.ecolecon.2024.108452.

Macklin, J., and S. Kaufman. 2024. "How Do we Change What we Cannot Describe? A Comprehensive Framework of User Behaviours in a Materials' Circular Economy." *Circular Economy and Sustainability* 4, no. 1: 387–412. https://doi.org/10.1007/s43615-023-00289-8.

Magnier, L., R. Mugge, and J. Schoormans. 2019. "Turning Ocean Garbage Into Products–Consumers' Evaluations of Products Made of Recycled Ocean Plastic." *Journal of Cleaner Production* 215: 84–98. https://doi.org/10.1016/j.jclepro.2018.12.246.

Mehraj, D., I. H. Qureshi, G. Singh, N. A. Nazir, S. Basheer, and V. U. Nissa. 2023. "Green Marketing Practices and Green Consumer Behavior: Demographic Differences Among Young Consumers." *Business Strategy & Development* 6, no. 4: 571–585. https://doi.org/10.1002/bsd2.263.

Mignacca, B., S. Filippelli, S. Strazzullo, L. Tiburzi, A. Urbinati, and J. Kirchherr. 2025. "Building Circular Economy Theories: A Practical-Oriented Perspective and a Way Forward." *Journal of Industrial Ecology* 29: 418–428. https://doi.org/10.1111/jiec.13622.

Nguyen, K. M., N. T. Nguyen, T. L. Ngo, and T. T. Le. 2025. "How Climate Change Anxiety Enhances Sustainable Trust and Consumption Behavior: Evidence From Vietnam and Italy." *Business Strategy & Development* 8, no. 1: e70063. https://doi.org/10.1002/bsd2.70063.

Nilsson, A., M. Bergquist, and W. P. Schultz. 2017. "Spillover Effects in Environmental Behaviors, Across Time and Context: A Review and Research Agenda." *Environmental Education Research* 23, no. 4: 573–589. https://doi.org/10.1080/13504622.2016.1250148.

Novoradovskaya, E., B. Mullan, P. Hasking, and H. V. Uren. 2021. "My Cup of Tea: Behaviour Change Intervention to Promote Use of Reusable Hot Drink Cups." *Journal of Cleaner Production* 284: 124675. https://doi.org/10.1016/j.jclepro.2020.124675.

Onel, N., and A. Mukherjee. 2017. "Why Do Consumers Recycle? A Holistic Perspective Encompassing Moral Considerations, Affective Responses, and Self-Interest Motives." *Psychology & Marketing* 34, no. 10: 956–971. https://doi.org/10.1002/mar.21035.

Ortiz-de- Montellano, C. G. S., P. Samani, and Y. van der Meer. 2023. "How Can the Circular Economy Support the Advancement of the Sustainable Development Goals (SDGs)? A Comprehensive Analysis." *Sustainable Production and Consumption* 40: 352–362. https://doi.org/10.1016/j.spc.2023.07.003.

Ouellette, J. A., and W. Wood. 1998. "Habit and Intention in Everyday Life: The Multiple Processes by Which Past Behavior Predicts Future Behavior." *Psychological Bulletin* 124, no. 1: 54–74.

Palacios-González, M. M., and A. Chamorro-Mera. 2022. "Analysis of the Predictive Variables of Socially Responsible Consumption." *Business Strategy & Development* 5, no. 3: 187–196. https://doi.org/10.1002/bsd2.189.

Pasquariello, R., M. Bianchi, F. Mari, and D. Caso. 2024. "Fostering Local Seasonality: An Extended Value-Belief-Norm Model to Understand Sustainable Food Choices." *Food Quality and Preference* 120: 105248. https://doi.org/10.1016/j.foodqual.2024.105248.

Penz, E., B. Hartl, and E. Hofmann. 2019. "Explaining Consumer Choice of Low Carbon Footprint Goods Using the Behavioral Spillover Effect in German-Speaking Countries." *Journal of Cleaner Production* 214: 429–439. https://doi.org/10.1016/j.jclepro.2018.12.270.

Phipps, M., L. K. Ozanne, M. G. Luchs, et al. 2013. "Understanding the Inherent Complexity of Sustainable Consumption: A Social Cognitive Framework." *Journal of Business Research* 66, no. 8: 1227–1234. https://doi.org/10.1016/j.jbusres.2012.08.016.

Phulwani, P. R., D. Kumar, and P. Goyal. 2020. "A Systematic Literature Review and Bibliometric Analysis of Recycling Behavior." *Journal of Global Marketing* 33, no. 5: 354–376. https://doi.org/10.1080/08911762.2020.1765444.

Polyportis, A., R. Mugge, and L. Magnier. 2022. "Consumer Acceptance of Products Made From Recycled Materials: A Scoping Review." *Resources, Conservation and Recycling* 186: 106533.

Pretner, G., N. Darnall, F. Testa, and F. Iraldo. 2021. "Are Consumers Willing to Pay for Circular Products? The Role of Recycled and Second-Hand Attributes, Messaging, and Third-Party Certification." *Resources, Conservation and Recycling* 175: 105888. https://doi.org/10.1016/j.resconrec.2021.105888.

Puntiroli, M., L. S. Moussaoui, and V. Bezençon. 2022. "Are Consumers Consistent in Their Sustainable Behaviours? A Longitudinal Study on Consistency and Spillover." *Journal of Business Research* 144: 322–335. https://doi.org/10.1016/j.resconrec.2022.106533.

Renfors, S. M. 2024. "Education for the Circular Economy in Higher Education: An Overview of the Current State." *International Journal of Sustainability in Higher Education* 25, no. 9: 111–127. https://doi.org/10.1108/IJSHE-07-2023-0270.

Revelle, W. 2025. "Psych: Procedures for Psychological, Psychometric, and Personality Research (Version 2.5.3) [R Package]." Northwestern University. https://CRAN.R-project.org/package=psych.

Riepe, C., U. Liebe, M. Fujitani, S. Kochalski, Ø. Aas, and R. Arlinghaus. 2021. "Values, Beliefs, Norms, and Conservation-Oriented Behaviors Toward Native Fish Biodiversity in Rivers: Evidence From Four European Countries." *Society & Natural Resources* 34, no. 6: 703–724. https://doi.org/10.1080/08941920.2021.1890865.

Ringle, C. M., S. Wende, and J.-M. Becker. 2024. *SmartPLS 4*. SmartPLS. https://www.smartpls.com.

Rioux, L. 2011. "Promoting Pro-Environmental Behaviour: Collection of Used Batteries by Secondary School Pupils." *Environmental Education Research* 17, no. 3: 353–373. https://doi.org/10.1080/13504622.2010.543949.

Sajjad, A., Q. Zhang, F. Asmi, M. A. Anwar, and M. Bhatia. 2024. "Identifying the Motivating Factors to Promote Socially Responsible Consumption Under Circular Economy: A Perspective From Norm

Activation Theory." *Journal of Retailing and Consumer Services* 76: 103544. https://doi.org/10.1016/j.jretconser.2023.103544.

Sarstedt, M., C. M. Ringle, and J. F. Hair. 2014. "PLS-SEM: Looking Back and Moving Forward." *Long Range Planning* 47, no. 3: 132–137. https://doi.org/10.1016/j.lrp.2014.02.008.

Schuitema, G., and J. I. De Groot. 2015. "Green Consumerism: The Influence of Product Attributes and Values on Purchasing Intentions." *Journal of Consumer Behaviour* 14, no. 1: 57–69. https://doi.org/10.1002/cb.1501.

Schwartz, S. H. 1977. "Normative Influences on Altruism." In *Advances in Experimental Social Psychology*, vol. 10, 221–279. Academic Press.

Sehnem, S., L. M. Campos, D. J. Julkovski, and C. F. Cazella. 2019. "Circular Business Models: Level of Maturity." *Management Decision* 57, no. 4: 1043–1066. https://doi.org/10.1108/MD-07-2018-0844.

Sharma, K., C. Aswal, and J. Paul. 2023. "Factors Affecting Green Purchase Behavior: A Systematic Literature Review." *Business Strategy and the Environment* 32, no. 4: 2078–2092. https://doi.org/10.1002/bse.3237.

Shishan, F., R. Mahshi, B. Al Kurdi, F. J. Alotoum, and M. T. Alshurideh. 2021. "Does the Past Affect the Future? An Analysis of Consumers' Dining Intentions Towards Green Restaurants in the UK." *Sustainability* 14, no. 1: 276. https://doi.org/10.3390/su14010276.

Stangherlin, I. C., J. Thøgersen, and M. D. de Barcellos. 2023. "Behavioral Spillover in the Circular Economy: The Importance of Consumer Goals." *Journal of Environmental Psychology* 91: 102123. https://doi.org/10.1016/j.jenvp.2023.102123.

Steg, L. 2016. "Values, Norms, and Intrinsic Motivation to Act Proenvironmentally." *Annual Review of Environment and Resources* 41: 277–292. https://doi.org/10.1146/annurev-environ-110615-085947.

Steg, L., and C. Vlek. 2009. "Encouraging Pro-Environmental Behaviour: An Integrative Review and Research Agenda." *Journal of Environmental Psychology* 29, no. 3: 309–317. https://doi.org/10.1016/j.jenvp.2008.10.004.

Szilagyi, A., L. I. Cioca, L. Bacali, E. S. Lakatos, and A. L. Birgovan. 2022. "Consumers in the Circular Economy: A Path Analysis of the Underlying Factors of Purchasing Behaviour." *International Journal of Environmental Research and Public Health* 19, no. 18: 11333. https://doi.org/10.3390/ijerph191811333.

Testa, F., N. Gusmerotti, F. Corsini, and E. Bartoletti. 2022. "The Role of Consumer Trade-Offs in Limiting the Transition Towards Circular Economy: The Case of Brand and Plastic Concern." *Resources, Conservation and Recycling* 181: 106262. https://doi.org/10.1016/j.resconrec.2022.106262.

Thøgersen, J. 1999. "Spillover Processes in the Development of a Sustainable Consumption Pattern." *Journal of Economic Psychology* 20, no. 1: 53–81. https://doi.org/10.1016/S0167-4870(98)00043-9.

Thøgersen, J. 2004. "A Cognitive Dissonance Interpretation of Consistencies and Inconsistencies in Environmentally Responsible Behavior." *Journal of Environmental Psychology* 24, no. 1: 93–103. https://doi.org/10.1016/S0272-4944(03)00039-2.

Thøgersen, J., and F. Ölander. 2003. "Spillover of Environment-Friendly Consumer Behaviour." *Journal of Environmental Psychology* 23, no. 3: 225–236. https://doi.org/10.1016/S0272-4944(03)00018-5.

Truelove, H. B., A. R. Carrico, E. U. Weber, K. T. Raimi, and M. P. Vandenbergh. 2014. "Positive and Negative Spillover of Pro-Environmental Behavior: An Integrative Review and Theoretical Framework." *Global Environmental Change* 29: 127–138. https://doi.org/10.1016/j.gloenvcha.2014.09.004.

UNDP. 2025. *Human Development Report 2025: Breaking Barriers for Human Freedoms*. United Nations Development Programme. https://hdr.undp.org.

Van der Werff, E., and L. Steg. 2015. "One Model to Predict Them All: Predicting Energy Behaviours With the Norm Activation Model." *Energy Research & Social Science* 6: 8–14. https://doi.org/10.1016/j.erss.2014.11.002.

Van der Werff, E., and L. Steg. 2016. "The Psychology of Participation and Interest in Smart Energy Systems: Comparing the Value-Belief-Norm Theory and the Value-Identity-Personal Norm Model." *Energy Research & Social Science* 22: 107–114. https://doi.org/10.1016/j.erss.2016.08.022.

Vanhamäki, S., S. Rinkinen, and K. Manskinen. 2021. "Adapting a Circular Economy in Regional Strategies of the European Union." *Sustainability* 13, no. 3: 1518. https://doi.org/10.3390/su13031518.

Verma, V. K., B. Chandra, and S. Kumar. 2019. "Values and Ascribed Responsibility to Predict Consumers' Attitude and Concern Towards Green Hotel Visit Intention." *Journal of Business Research* 96: 206–216. https://doi.org/10.1016/j.jbusres.2018.11.021.

Vermeir, I., and W. Verbeke. 2008. "Sustainable Food Consumption Among Young Adults in Belgium: Theory of Planned Behaviour and the Role of Confidence and Values." *Ecological Economics* 64, no. 3: 542–553. https://doi.org/10.1016/j.ecolecon.2007.03.007.

Vezich, I. S., B. C. Gunter, and M. D. Lieberman. 2017. "The Mere Green Effect: An fMRI Study of Pro-Environmental Advertisements." *Social Neuroscience* 12, no. 4: 400–408. https://doi.org/10.1080/17470919.2016.1182587.

Vicente, P., C. Marques, and E. Reis. 2021. "Willingness to Pay for Environmental Quality: The Effects of Pro-Environmental Behavior, Perceived Behavior Control, Environmental Activism, and Educational Level." *SAGE Open* 11, no. 4: 21582440211025256. https://doi.org/10.1177/21582440211025256.

Wieser, H., and N. Tröger. 2018. "Exploring the Inner Loops of the Circular Economy: Replacement, Repair, and Reuse of Mobile Phones in Austria." *Journal of Cleaner Production* 172: 3042–3055.

Wright, K. B. 2005. "Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services." *Journal of Computer-Mediated Communication* 10, no. 3: JCMC1034. https://doi.org/10.1111/j.1083-6101.2005.tb00259.x.

Zhang, Y., Q. Du, Y. Huang, Y. Mao, and L. Jiao. 2024. "Decoding Determinants of Pro-Environmental Behaviors of Higher Education Students: Insights for Sustainable Future." *International Journal of Sustainability in Higher Education*. https://doi.org/10.1108/IJSHE-03-2024-0166.

Supporting Information

Additional supporting information can be found online in the Supporting Information section.