



Theory of planned behavior and fast fashion purchasing: an analysis of interaction effects

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Abstract

The fast fashion industry, characterized by its reliance on rapid consumption cycles, and short-lived garment use, has raised major environmental concerns. This industry generates over 92 million tons of waste and consumes 79 trillion liters of water annually, driven by rising consumer demand for fast fashion. As such, there is a pressing need to transition from the current wasteful fast fashion purchasing behavior to more sustainable behavior. Despite extensive research on sustainable purchasing behavior, there is still a gap in our understanding of the predictors of consumers' sustainable fast fashion purchasing behavior. To address this gap, our study utilized a survey questionnaire to collect data from a convenience sample of 123 South African consumers. We expanded the theory of planned behavior (TPB) by incorporating sustainability awareness as a background factor in the hypothesized theoretical model. We also investigated the relationships among the TPB constructs (attitude, subjective norm, and perceived behavioral control), sustainability awareness, and sustainable fast fashion purchasing behavior. By employing hierarchical regression within the extended TPB framework, we found that perceived behavioral control mediated the relationship between sustainability awareness and sustainable fast fashion purchasing behavior. Further, perceived behavioral control and its interaction with attitude significantly predicted sustainable fast fashion purchasing behavior, while sustainability awareness significantly predicted perceived behavioral control. Notably, our findings reveal that lower perceived behavioral control is associated with a stronger positive relationship between attitude and sustainable fast fashion purchasing behavior. These findings have important implications for theory and practice, and provide suggestions for future research directions.

Keywords Sustainability awareness · Fast fashion · Interaction effects · Sustainable fast fashion · Sustainable purchasing behavior · Theory of planned behavior

Introduction

The rise of fast fashion brands such as Forever 21, H&M, Primark, Shein, Uniqlo, and Zara has significantly contributed to the global fashion industry's growth. Now valued at approximately US\$2.5 trillion, the industry accounts for about 2% of global GDP and supports around 300 million jobs worldwide. Notably, the global fast fashion sector continues to experience high growth, with forecasts estimating its value to grow at a compound annual growth rate of 10.7%, from \$103.2 billion in 2022 to \$291.1 billion by

2032 (Allied Market Research, 2023). Fast fashion, a business model that produces a wide array of rapidly manufactured garments that mirror current trends and are sold at low prices (Miranda & Roldán, 2024), offers consumers fashion at low prices, but incurs high social and environmental costs by creating substantial textile waste, using vast water resources, significantly contributing to CO² and microplastic pollution, and often featuring poor working conditions (Niinimäki et al., 2020).

There is a growing awareness among consumers about the unsustainable practices of the fast fashion industry (Bläse et al., 2023; Lundblad & Davies, 2016; Niinimäki et al., 2020). Despite this rising awareness, demand for fast fashion remains high (Bläse et al., 2023; Miranda & Roldán, 2024; Niinimäki et al., 2020; Rausch & Kopplin, 2021), driven by the low prices and rapidly changing fashion trends (Camargo et al., 2020). This rising demand alongside the

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increasing consumer awareness of the industry's unsustainable practices highlights a paradox: awareness does not consistently result in sustainable fast fashion purchasing behavior (Bläse et al., 2023). This disconnect underscores the need for consumers to modify their consumption patterns (Busalim et al., 2022). To facilitate this essential behavioral shift, a deeper understanding of the predictors of consumers' sustainable fast fashion purchasing behavior is imperative, with scholars (e.g., Kang et al., 2013; Lundblad & Davies, 2016; Rozenkowska, 2023) highlighting the urgent need for such research.

Scholars agree that sustainability awareness does not consistently result in sustainable fast fashion purchasing behavior (Bläse et al., 2023; Bocti et al., 2021; Miranda & Roldán, 2024; Rausch & Kopplin, 2021) and that fashion choices are an outcome of a dynamic interplay between objective factors such as cost, quality, accessibility, eco-label, perceived product features, and green brand image, and subjective factors such as beliefs, attitudes, values, social norms, motives, emotions, self-efficacy, life satisfaction, and individual aesthetic values (for comprehensive reviews, see Busalim et al., 2022 and Testa et al., 2021). Despite this consensus, little is known about consumers' sustainable fast fashion purchasing behavior (Lundblad & Davies, 2016; Rozenkowska, 2023), particularly the role of sustainable fast fashion awareness (Bocti et al., 2021; Rausch & Kopplin, 2021). To fill these important knowledge gaps, the current study aims to examine and understand the predictors of consumers' sustainable fast fashion purchasing behavior within the context of the theory of planned behavior (TPB; Ajzen, 1991).

In this study, we define sustainable fast fashion purchasing behavior (referred to hereafter for brevity as sustainable purchasing behavior) as one that considers the unsustainable practices of fast fashion (e.g., environmental harm and poor labor conditions). Drawing from Grob's (1995) and Maloney and Ward's (1973) definitions of environmental awareness, we define sustainable fast fashion awareness (referred to hereafter for brevity as sustainability awareness) as the understanding of fast fashion's social and environmental impacts. This study, therefore, addresses the research question: *Does sustainability awareness and the TPB constructs – attitude, subjective norm, and perceived behavioral control – predict sustainable purchasing behavior?*

The study aims to: (a) develop a conceptual model with consumers' attitude, subjective norm, and perceived behavioral control as predictors of sustainable purchasing behavior; and (b) empirically test the model based on a sample of consumers from a developing country, specifically South Africa, thereby addressing the call by Kumar et al. (2017) for more research in this context and heeding Busalim et al.'s (2022) and Testa et al.'s (2021) recommendations for varied consumer demographics in sustainable clothing

studies. This study aims to enhance the explanatory power of the TPB in fast fashion consumption by incorporating consumer sustainability awareness as an antecedent of the TPB constructs, given the ongoing debate regarding its relationship with sustainable purchasing behavior (for a comprehensive review, see Testa et al., 2021), and by testing interaction effects within the TPB that have rarely been examined in the literature (Hagger et al., 2022; La Barbera & Ajzen, 2020; Yzer & van den Putte, 2014) but which are crucial for defining the boundary conditions for associations between TPB variables (La Barbera and Ajzen (2020)).

In summary, our research enriches the existing body of literature on fast fashion, clothing consumption, and consumer behavior by elucidating the predictors of sustainable purchasing behavior within the fast fashion domain. The structure of this article is as follows: First, we present a brief literature review and develop hypotheses, leading to the study's conceptual model. Next, the conceptual model is empirically tested with a dataset ($n = 123$) using hierarchical linear regression. Finally, we discuss the main findings, limitations, and implications of the study and make recommendations for future research.

Literature review and hypothesis development

The significance of fashion

To fully understand sustainable purchasing behavior and its driving factors, we must first answer the following question: What is fashion? Fashion encompasses all items worn on the body as well as any alterations or decorations applied to the body, including all forms of dress, clothing, and adornments that interact with the body (Thompson & Haytko, 1997). Fashion has symbolic meanings and values such as identity, lifestyle, social status, beauty, and uniqueness (Niinimäki, 2010; Thompson & Haytko, 1997), and serves various roles, including acting as armor, providing a joyful creative outlet, or expressing a political statement. As such, fashion, distinct from the basic utility of clothing, goes beyond mere necessity. It is an emotionally charged choice and way to express and assert social status (Thompson & Haytko, 1997), and serves as a means for personal fulfillment, encompassing symbolic self-completion, belonging, and adaptation (Niinimäki, 2010; Thompson & Haytko, 1997). Given the central role that fashion has traditionally played in society, the emergence of fast fashion has merely amplified a social phenomenon that already existed (Miranda & Roldán, 2024).

Sustainability in the fast fashion industry

There is a growing awareness among consumers about the unsustainable practices linked to fast fashion, leading to a heightened interest in purchasing sustainable fashion items (Camargo et al., 2020; Miranda & Roldán, 2024). In response, fast fashion companies have started to implement business strategies that mitigate the negative impact of unsustainable practices such as use of sweatshops, child labor, poor working conditions, and environmental harm (Lundblad & Davies, 2016; Miranda & Roldán, 2024; Muposhi & Chuchu, 2022). Such strategies include publishing codes of conduct for supplier workers, incorporating social and environmental sections in annual reports, supporting the United Nations' Global Compact, and issuing annual CSR reports (Miranda & Roldán, 2024). In addition, fast fashion companies have been increasing the use of sustainable materials such as organic cotton and recycled fibers, reducing the use of hazardous chemicals, reducing energy consumption, lowering CO₂ emissions, using renewable energy sources, minimizing plastic use, promoting recyclable packaging and garment collection systems for reuse or recycling into new textiles, and collaborating with unions, governments, and international bodies to enhance worker and supplier conditions (Miranda & Roldán, 2024). Moreover, fast fashion companies have ventured into ethical brand extensions, exemplified by initiatives such as H&M Conscious, ASOS Green Room, and Zara Join Life, and have engaged in pro-social activities, including in-store recycling, take-back schemes, and garment repair services such as H&M Take Care (Miranda & Roldán, 2024).

Sustainable fast fashion purchasing behavior

Fast fashion, a consumer-driven process characterized by the industry's capacity to rapidly produce garments aligned with the latest fashion trends at affordable prices, has intensified the intrinsic connection between fashion and societal behaviors (Miranda & Roldán, 2024). These affordable prices, which are essential requisites for the mass consumption of fast fashion, have led to an increase in the quantity of items purchased per person and the frequency of purchases, resulting in individuals owning a larger number of clothing items and a decreased useful life for garments. These items are now often viewed as perishable goods and are frequently discarded after minimal use (Camargo et al., 2020; Miranda & Roldán, 2024). Given that the fast fashion industry's sustainability initiatives are often overshadowed by consumer overconsumption (Camargo et al., 2020; Miranda & Roldán, 2024), this study emphasizes the need to identify the predictors of sustainable purchasing behavior.

This matters because the existing broader sustainable clothing purchasing literature predominantly frames it as the antithesis of fast fashion. Rather than exploring sustainable clothing purchasing in this context, we examine fast fashion purchasing behavior that considers the unsustainable practices of fast fashion, such as environmental harm and poor labor conditions. On the surface, fast fashion and sustainability appear to be at odds; fast fashion is characterized by rapid product turnover, while sustainability is rooted in ethical practices, product durability, and reuse (Niinimäki, 2010). However, various scholars (e.g., Lundblad & Davies, 2016; Miranda & Roldán, 2024; Muposhi & Chuchu, 2022; Testa et al., 2021) suggest that these two seemingly disparate concepts are converging. Further, with the growing interest in sustainability among fast fashion consumers, we caution against assuming that fast fashion and sustainability are mutually exclusive concepts.

Given the complex meanings and significant role of fashion in individual lives (Niinimäki, 2010; Thompson & Haytko, 1997), scholars have employed various theoretical frameworks to elucidate fashion purchasing behaviors, including the theory of reasoned action, the value orientation model, the norm activation theory, and the cognition–affect–behavior model (Testa et al., 2021; Busalim et al., 2022). However, the TPB is distinguished for its considerable explanatory power and widespread adoption among researchers, making it a particularly prominent model (Rozenkowska, 2023).

The theory of planned behavior

The theoretical lens for this study is the TPB, a theory currently referenced in more than 5,000 papers in the Web of Science database. The TPB has been widely utilized to explain sustainable consumer behaviors, including a diverse range of behaviors such as retirement saving, recycling, organic food consumption, green packaging use, and energy-saving behaviors (Kang et al., 2013; Magwegwe & Lim, 2020; Rausch & Kopplin, 2021). The TPB has also demonstrated its robustness in predicting sustainable purchase intentions and actual behaviors (for review, see Rozenkowska, 2023). The TPB suggests that an individual's behavior is predicted by their attitude toward the behavior, which represents their overall evaluation of the behavior; subjective norm, which involves perceived societal pressures to perform the behavior; and perceived behavioral control which reflects their perceptions of control over executing the behavior (Ajzen, 1991). These factors collectively shape an individual's intention to perform a behavior, which is the key predictor of actual behavioral execution (Ajzen, 1991). Given the TPB's effectiveness in predicting sustainable purchasing

intentions and actual behaviors (Rozenkowska, 2023), and considering that the study's respondents reported buying at least one fast fashion item within the 12 months prior to data collection, this research is specifically designed to predict sustainable purchasing behavior rather than intention.

Finally, in the TPB, variables such as personality traits, intelligence, demographic characteristics, and life values are categorized as background factors that indirectly predict intention and behavior by shaping behavioral beliefs, which shape attitude toward the behavior; normative beliefs, which predict subjective norm; and control beliefs, which predict perceived behavioral control (Ajzen, 1991). However, several criticisms have been leveled against the TPB, including its classification of variables such as personality traits and demographic characteristics as merely background factors; its exclusion of other important predictors of behavior like emotions, habits, past behavior, anticipated regret, or moral norms; and its underlying assumption that decision-making is predominantly deliberative and rational (Armitage & Conner, 2001). Although it faces these criticisms, the TPB remains a parimonius model with robust predictive power across a wide range of behaviors (Armitage & Conner, 2001). Given that this study aims to develop a conceptual model using attitude, subjective norm and perceived behavioral control as predictors of sustainable purchasing behavior, the limitations of the TPB do not substantially impact our research focus.

Prior studies (Kang et al., 2013; Kumar et al., 2017, 2021; Paul et al., 2016; Rausch & Kopplin, 2021) have found that attitude, subjective norm, and perceived behavioral control are robust predictors of intentions regarding sustainable clothing purchases. While this prior research has focused on predicting behavioral intention, the TPB asserts that behavioral intention is the key predictor of actual behavior. Moreover, according to Rozenkowska (2023), the TPB is effective in predicting both sustainable purchasing intentions and actual behaviors. Based on the TPB and the findings from prior research outlined above, we contend that attitude, subjective norm, and perceived behavioral control are significant predictors of sustainable purchasing behavior. Therefore, we propose the following hypotheses:

H1: (a) attitude, (b) subjective norm, and (c) perceived behavioral control are positively associated with sustainable purchasing behavior.

TPB constructs as mediators between awareness and purchasing behavior

In recent qualitative studies, focus group participants have bemoaned the lack of sustainability awareness as a major

impediment to sustainable purchasing behavior. One participant noted, "This is of course very very important to know how it was produced and if the brand informs or advertises how things are done and how sustainable they are, would definitely be a thing where I would prefer to buy from them" (Bocti et al., 2021, p. 30). Another participant highlighted the information gap: "I would say that there exists an enormous lack of information. Time after time, I hear about the big companies, such as H&M or Primark, that they produce under terrible conditions in Bangladesh or elsewhere. However, there is little information on the backgrounds and even less what is done against it" (Wiederhold & Martinez, 2018, p. 425). These insights suggest that sustainability awareness could be pivotal in driving sustainable purchasing behavior. However, the empirical support for the association between knowledge and awareness and behavior is contradictory (Testa et al., 2021). While some studies (e.g., Rausch & Kopplin, 2021) have shown a positive association, others (e.g., Khare & Sadachar, 2017) have reported no significant association.

Sustainability awareness, defined earlier as understanding the social and environmental impacts of fast fashion, comprises general sustainability attitudes that do not directly predict specific behaviors but have an indirect association (Grob, 1995; Maloney & Ward, 1973). Instead, an individual's attitudes, subjective norm, and perceived behavioral control are shaped by their general attitudes via situation-specific behavioral, normative, and control beliefs. Taken together, and in alignment with the TPB, we argue that sustainability awareness directly predicts attitude, subjective norm, and perceived behavioral control, while attitude, subjective norm, and perceived behavioral control function as mediators in the relationship between sustainability awareness and sustainable purchasing behavior.

There is evidence for this in literature based on the related construct of environmental concern, defined by Dunlap and Jones (2002) as the level of awareness and concern about human-caused environmental problems and the inclination to contribute to their solutions. Bamberg (2003) found a positive relationship between environmental concern and both subjective norm and perceived behavioral control. This finding is echoed in the work of Chen and Tung (2014) and Paul et al. (2016), who reported a positive relationship between environmental concern and attitude, subjective norm and perceived behavioral control, indicating a consistent pattern of environmental concern influencing the TPB constructs. In contrast, when examining environmental knowledge, Kang et al. (2013) discovered a more nuanced set of associations: a negative relationship with subjective norm, a positive relationship with perceived behavioral control, and no significant association with attitude. Therefore, we propose the following hypotheses:

H2: Sustainability awareness is positively associated with (a) attitude, (b) subjective norm, and (c) perceived behavioral control.

Bamberg (2003) demonstrated that subjective norm and perceived behavioral control mediated the relationship between environmental concern and the intention to request a brochure about green electricity products. Similarly, Chen and Tung (2014) observed that attitude, subjective norm, and perceived behavioral control acted as mediators between environmental concern and the intention to visit green hotels. Paul et al. (2016) further corroborated these findings, showing that attitude, subjective norm, and perceived behavioral control mediated the relationship between environmental concern and the intention to purchase green products. Extending beyond environmental concern, Kang et al. (2013) found that attitude, subjective norm, and perceived behavioral control mediated the relationship between environmental knowledge and the intention to buy environmentally sustainable textiles and apparel. Consistent with the TPB's theorizing and findings from prior research discussed above, we developed the following hypotheses.

H3: attitude, subjective norm, and perceived behavioral control mediate the association between sustainability awareness and sustainable purchasing behavior.

The moderating role of perceived behavioral control

Although research utilizing the TPB commonly treats attitude, subjective norm, and perceived behavioral control as independent predictors of intention (La Barbera & Ajzen, 2020), the TPB theorizes an interactive approach in which perceived behavioral control interacts with attitude and with subjective norm in predicting intention and with intention in predicting actual behavior. This interaction hypothesis, which posits that favorable attitudes and subjective norm lead to the formation of a favorable intention only when combined with high perceived behavioral control, has not been extensively examined in TPB studies (Yzer & van den Putte, 2014). However, there is an increasing scholarly focus on the moderating role of perceived behavioral control (La Barbera & Ajzen, 2020). Despite this growing interest, empirical investigations on this topic remain limited, with most research concentrating on the moderation of the intention–behavior relationship by perceived behavioral control. Comparatively, few studies have investigated how perceived behavioral control moderates the relationship between attitude and intention and between subjective norm and intention (La Barbera & Ajzen, 2020).

Building on the preceding discussion about the moderating role of perceived behavioral control within the TPB, there is emerging empirical evidence for significant Attitude \times Perceived Behavioral Control interactions in predicting intentions from various scholars (e.g., Earle et al., 2020; La Barbera & Ajzen, 2020; Yzer & van den Putte, 2014), yet findings concerning Subjective Norm \times Perceived Behavioral Control interactions have been mixed. While some studies (i.e., Earle et al., 2020; Kothe & Mullan, 2015) observed no significant Subjective Norm \times Perceived Behavioral Control interactions, others (i.e., Yzer & van den Putte, 2014; La Barbera & Ajzen, 2020) identified significant interactions. Consistent with the TPB's interaction hypothesis and findings from prior research discussed above, we developed the following hypotheses.

H4: perceived behavioral control moderates the association between attitude and sustainable purchasing behavior such that when perceived behavioral control is high, the relationship between attitude and sustainable purchasing behavior is stronger.

H5: perceived behavioral control moderates the association between subjective norm and sustainable purchasing behavior such that when perceived behavioral control is high, the relationship between subjective norm and sustainable purchasing behavior is stronger.

Figure 1 presents all the hypotheses in the conceptual model developed for the study.

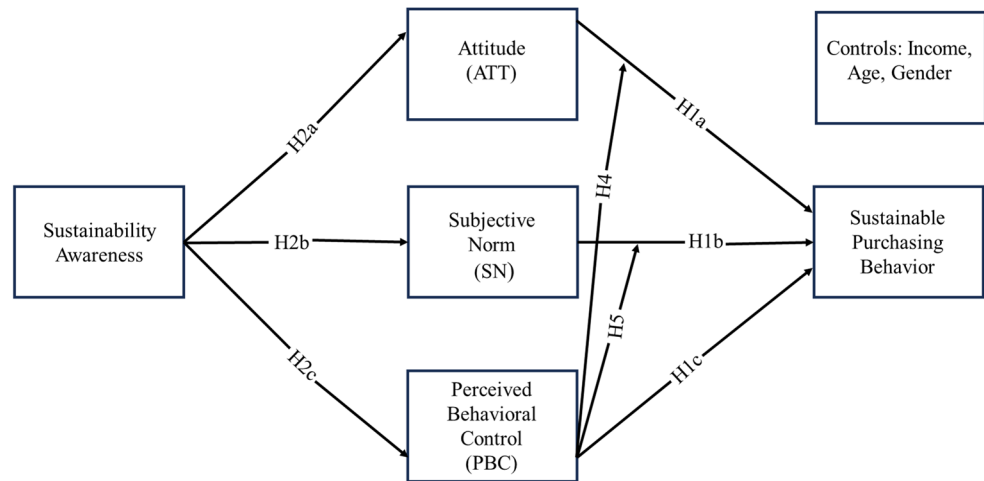
Methods

Participants and procedures

Out of 125 returned questionnaires, 123 participants were included in this study after meeting the inclusion criteria of being 18 years or older and having purchased at least one fast fashion item in the 12 months prior to completing the questionnaire. Besides these inclusion criteria, no specific exclusion criteria were set for participation. The completion of all questions was mandatory, resulting in no missing data.

The study utilized convenience sampling, where accessible and willing individuals were recruited through personal networks and social media platforms (WhatsApp, Facebook, and LinkedIn) from November 3, 2022, to December 3, 2022. Respondents were encouraged to forward the survey to their networks, enhancing the reach and diversity of the participant pool. Fast fashion was described as low-priced clothing produced rapidly by retailers in response to

Fig. 1 Conceptual model and hypotheses. Note: H3 tests the mediating roles of attitude, subjective norm, and perceived behavioral control



the latest trends, while sustainable fast fashion was characterized as being socially responsible and environmentally friendly.

The sample size required for this study was computed based on Tabachnick and Fidell's (2007, p. 123) recommendation of a desired minimum level of $N > 50 + 8m$ (where m = number of independent variables), resulting in an ideal sample size of 133 respondents. Although we achieved 123 respondents, slightly below the target, we believe this minor shortfall does not significantly impact the validity of our study's findings.

Ethical adherence was a priority; the corresponding author's university ethics committee granted approval for this research, ensuring all participants gave informed consent and voluntarily participated in this cross-sectional study among South African consumers. The survey, which took approximately 15–20 min to complete, included an introduction, a screening query about fast fashion purchases, a request for demographic information, and inquiries regarding actual fast fashion purchasing behaviors, awareness of unsustainable fast fashion practices, and questions assessing attitude, subjective norm, and perceived behavioral control.

Common method bias

Our study's use of self-administered surveys, where participants answered questions in one sitting, raised the potential for common method bias. To mitigate this risk, we incorporated several strategies during the survey design phase, as recommended by Podsakoff et al. (2003). These included providing clear instructions, guaranteeing response anonymity, using straightforward and unambiguous questions verified through pilot testing, and keeping the survey concise to reduce respondent fatigue.

Our study employed Harman's single factor test to assess the presence of common method bias, following the guidance of Podsakoff et al. (2003). The test results were very

encouraging: a single factor accounted for only 15.08% of the total variance, which is considerably below the often-cited threshold of 50%. This finding suggested that common method bias was unlikely to be a major issue in our research.

Measures

This study's scales and questions were developed based on previous literature (Rausch & Kopplin, 2021; Zhang et al., 2021). We employed 5-point Likert-type scales for all the focal variables, where respondents rated their level of agreement from 1 (strongly disagree) to 5 (strongly agree).

Sustainable purchasing behavior. Participants rated these attributes as follows: (1) country of manufacture, (2) durability, (3) environmental impact, and (4) human dignity during manufacture in response to the statement "I consider the following garment attributes when purchasing fast fashion products." Responses were averaged across items to produce a single composite score, with higher values indicating a stronger sustainable purchasing behavior (Cronbach's $\alpha = 0.83$).

Attitude.¹ We used this single item: I feel disgusted when I learn how much the fast fashion industry generates waste and pollution.

Subjective norm. We assessed subjective norm with the following items: (1) My family and/or friends affect my purchase of fashion products with sustainability features, and (2) social media influencers affect my purchase of fashion products with sustainability features. The responses were aggregated into a single average score (Cronbach's $\alpha = 0.70$). Higher values indicate

¹ We initially had two items. The second item was "I feel angry when I learn about labor slavery and child labor in the fast fashion supply chain." We removed this item because it had extreme responses ($M = 4.60$, $Mdn = 5.00$, $SD = 0.57$).

subjective norm supportive of sustainable purchasing behavior.

Perceived behavioral control. We used a single item: I am knowledgeable about apparel brands that sell eco-friendly products. Higher values indicate greater perceived behavioral control.

Sustainability awareness. We used the following items: (1) I am aware of social issues in the fast fashion industry, (2) I am aware of child labor and sweatshop issues in the global supply chain of the fast fashion industry, and (3) I am informed of environmental issues in the fast fashion industry, such as waste and pollution caused by the excessive production of garments. The responses were aggregated into a single average score (Cronbach's $\alpha = 0.83$). Higher values indicate greater awareness.

Participants also described other garment attributes (i.e., fashionability, price, fit, and quality) they consider when purchasing fast fashion products and their monthly budget for fast fashion, with options ranging from less than R1,000 to more than R5,000. They defined sustainable fashion with attributes such as good quality, longevity, costliness, fair labor practices, and the use of organic fabrics. Additionally, they disclosed the proportion of their clothing purchases that are sustainable and their willingness to pay extra for sustainable fast fashion clothing, with both aspects measured in percentage ranges. Demographic information was collected, including gender, age (in decade brackets from 18 to over 60), and net monthly household income (categorized from below R10,000 to more than R60,000). We included age, gender, and income as control variables. Controlling for these demographic factors, as highlighted by Testa et al. (2021), is common in studies of sustainable purchasing behavior to enhance the robustness of findings.

Analytical strategy

For our descriptive and inferential analyses, we utilized SAS 9.4 statistical software and confirmed that there were no missing data across all variables. The aim of this research was to explore the relationships among sustainability awareness, attitude, subjective norm, and perceived behavioral control, along with the interaction effects between perceived behavioral control and both attitude and subjective norm, on sustainable purchasing behavior. First, descriptive analyses examined the participants' sociodemographic characteristics, followed by tests of normality and multicollinearity. All variance inflation factors were below 2.50, indicating no multicollinearity issues within our model. Second, we conducted bivariate correlational analyses to examine the associations between the study's variables. Finally, guided by the TPB and given that the skewness (-0.38) and kurtosis

(0.65) of the study's dependent variable, sustainable fast fashion purchase behavior, indicated an approximate normal distribution, we employed a three-step hierarchical linear regression to test the study's hypotheses.

In the first step, we entered sustainability awareness into the model. Subsequently, in the second step, we entered attitude, subjective norm, and perceived behavioral control into the model. The final step involved introducing interaction terms to test the hypothesized interactions with the interaction terms created by multiplying perceived behavioral control with attitude and subjective norm, respectively. We centered all continuous independent variables before the analysis and utilized unstandardized coefficients to determine the significance of each variable (Aiken & West, 1991), using a p value less than 0.05 to determine statistical significance.

Results

Explanatory factor analysis and descriptive statistics

For the current study, we performed an exploratory factor analysis to ascertain the dimensionality of the newly developed indices. We set the threshold for factor loadings at 0.60, with no cross loadings, and applied both Kaiser's eigenvalue criterion (≥ 1) and the scree plot test to determine factor retention. Consistent with our expectations, all the indices revealed a single factor structure. The internal consistency reliability and convergent validity of the study's focal constructs were confirmed with an acceptable Cronbach's alpha, composite reliability, and average variance extracted metrics. The factor analysis outcomes for the included items are detailed in Table 1.

Table 2 illustrates the profiles of the participants, including their age, gender, monthly net household income, and budget allocation for fast fashion purchases. The sample comprised slightly more females (54.47%), with the largest age group being 40 to 49 years (36.59%). Most participants (78.05%) allocated under R1 000 monthly for fast fashion, while the majority reported a monthly income between R20 000 and R40 000 (27.64%). Regarding sustainable fashion perceptions, participants equally valued long-lasting quality and organic fabrics (both at 34.15%), followed by fair labor practices (10.57%). For sustainable fashion purchases, the largest segments were those who bought less than 10% sustainable fashion (26.83%) or more than 70% sustainable fashion (18.71%). In terms of paying a premium for sustainable fashion, most were willing to pay 1 to 5% more (28.46%), while a notable proportion (22.76%) were willing to pay over 20% more.

Table 1 Explanatory factor analysis

Variables and Items	Factor Loadings	CR	AVE	Cronbach's Alpha
Sustainable purchasing behavior		0.89	0.66	0.83
Country of manufacture	0.88			
Durability	0.65			
Environmental impact	0.92			
Human dignity during manufacture	0.78			
Subjective norm		0.86	0.76	0.70
Family/friends affect my fast fashion purchasing	0.84			
Social media affect my fast fashion purchasing	0.90			
Sustainability awareness		0.90	0.74	0.83
Aware of social issues	0.85			
Aware of child labor and sweat-shop issue	0.91			
Aware of waste and pollution issues	0.82			

CR composite reliability, AVE average variance extracted

In terms of TPB constructs, attitudes toward sustainable purchasing behavior were generally favorable, with a high mean score of 4.06 (SD=0.91), indicating that, on average, the respondents agreed or strongly agreed with the statements that measured attitude. Subjective norm showed moderate agreement, with a mean of 2.89 (SD=1.02). Perceived behavioral control was moderately high, with a mean of 3.28 (SD=1.13). Sustainability awareness had an average score of 3.45 (SD=0.97), reflecting a moderate to high level of awareness among participants.

Figure 2 illustrates the divergent priorities of fast fashion purchasing decisions. Traditional factors such as 'fit,' 'quality,' and 'price' markedly outweigh sustainability concerns, with 'country of manufacture,' 'environmental impact,' and 'human dignity during manufacture' scoring lower. This highlights the gap between the high value placed on conventional attributes and the lower emphasis on sustainability, despite a generally favorable attitude toward sustainable fast fashion (mean=4.23, SD=0.65).

Figure 3 presents the dichotomized categories of sustainable purchasing behavior and attitude, segmented by median splits. This indicates that most (55%) of the participants had high attitude and, correspondingly, high sustainable purchasing behavior. Notably, 10% of participants reported having high sustainable purchasing behavior and low attitude. Approximately one-quarter (24%) of the respondents had high attitude but reported low sustainable purchasing behavior. These patterns imply that while a positive attitude toward sustainable fast fashion is a good predictor of sustainable purchasing behavior, additional factors, alongside or interacting with attitude, may predict sustainable

purchasing behavior, underscoring the multifaceted nature of this consumer behavior.

Table 3 shows that sustainable purchasing behavior was most significantly associated with perceived behavioral control ($r=0.508$, $p<0.001$) and sustainability awareness ($r=0.368$, $p<0.001$). Attitude exhibited a moderate positive relationship with sustainable purchasing behavior ($r=0.175$, $p=0.05$), however subjective norm was weakly and non-significantly correlated with the sustainable purchasing behavior ($r=0.105$). A notably strong relationship existed between perceived behavioral control and sustainable purchasing behavior ($r=0.539$, $p<0.001$), suggesting a strong association between consumers' perceived control and sustainability awareness.

Hypotheses testing

Initially, we employed structural equation modeling (SEM) to evaluate the hypothesized model depicted in Fig. 1. However, the structural model exhibited poor fit, which might be attributed to the small sample size and the use of single-item measures. Specifically, the comparative fit index was 0.871, falling short of the preferred threshold of 0.95 or higher. Similarly, the Tucker–Lewis index stood at 0.728, below the 0.95 benchmark, and the root mean square error of approximation was 0.102, exceeding the maximum acceptable value of 0.06. Due to these limitations, we opted to proceed with linear regression to test our hypotheses. However, despite the poor fit of the SEM, the results from both regression models were substantially the same, underscoring the robustness of our results.

Hierarchical linear regression analysis was conducted to examine the relationships between the TPB predictors, sustainability awareness, and sustainable purchasing behavior, as well as the interaction effects. The detailed results are presented in Table 4. In Model 0, the baseline model features only control variables (gender, age, income), none of which significantly predicted sustainable purchasing behavior. Model 1 demonstrates that sustainability awareness significantly predicted sustainable purchasing behavior, ($B=0.331$, $SE=0.070$, $p<0.001$), contributing 15.41% of additional explained variance ($F_{1,113}=20.82$, $p<0.001$). Model 2, which added the TPB predictors to Model 1, explained 32.47% of the variance in sustainable purchasing behavior with a significant R^2 change of 0.1609 ($F_{3,110}=8.74$, $p<0.001$). Attitude ($B=0.145$, $SE=0.07$, $p<0.05$) and perceived behavioral control ($B=0.303$, $SE=0.063$, $p<0.001$) were significant predictors in Model 2, whereas subjective norm ($B=0.07$, $SE=0.059$, $p=0.224$) was not. Model 3, incorporating interaction terms, accounted for 38.89% of the variance in sustainable purchasing behavior, a further R^2 increase of 0.0642 ($F_{2,108}=5.67$, $p<0.01$).

Table 2 Summary of descriptive statistics ($n = 123$)

	Mean (SD)/%	Skewness (SE)	Kurtosis (SE)	Min	Max
Focal variables					
Sustainable purchasing behavior	3.63 (0.78)	-0.38 (0.22)	0.65 (0.44)	1	5
Attitude	4.06 (0.91)	-1.05 (0.22)	1.19 (0.44)	1	5
Subjective norm	2.89 (1.02)	-0.08 (0.22)	-0.30 (0.44)	1	5
Perceived behavioral control	3.28 (1.13)	-0.41 (0.22)	-0.45 (0.44)	1	5
Sustainability awareness	3.45 (0.97)	-0.35 (0.22)	-0.49 (0.44)	1	5
Other variables					
Garment attributes					
Fashionability	3.98 (0.91)	-0.75 (0.22)	0.83 (0.44)	1	5
Quality	4.54 (0.73)	-2.01 (0.22)	5.34 (0.44)	1	5
Fit	4.72 (0.53)	-2.14 (0.22)	5.55 (0.44)	1	5
Price	4.46 (0.75)	-1.12 (0.22)	0.14 (0.44)	1	5
What does sustainable fashion mean to you?					
Good quality	19.51	-	-	-	-
Long-lasting	34.15	-	-	-	-
Expensive	1.63	-	-	-	-
Fair labor practice	10.57	-	-	-	-
Organic fabrics	34.15	-	-	-	-
What % of purchases is sustainable fashion?					
Under 10%	26.83	-	-	-	-
10 to 30%	21.13	-	-	-	-
31–50%	13.82	-	-	-	-
51–70%	19.51	-	-	-	-
Above 70%	18.71	-	-	-	-
% more able to pay for sustainable fashion?					
Under 1%	19.51	-	-	-	-
1 to 5% more	28.46	-	-	-	-
6 to 10% more	17.07	-	-	-	-
11 to 20% more	12.20	-	-	-	-
More than 20%	22.76	-	-	-	-
My monthly budget for fast fashion is:					
Under R1 000	78.05	-	-	-	-
R1 001 to R2 000	14.63	-	-	-	-
R2 001 to R3 000	4.88	-	-	-	-
R3 001 to R5 000	1.63	-	-	-	-
More than R5 000	0.81	-	-	-	-
Age: 18 to 29	19.51	-	-	-	-
Age: 30 to 39	21.14	-	-	-	-
Age: 40 to 49	36.59	-	-	-	-
Age: 50 to 59	17.07	-	-	-	-
Age: 60 and older	5.69	-	-	-	-
Male	45.53	-	-	-	-
Female	54.47	-	-	-	-
Income: Under R10 000	22.76	-	-	-	-
Income: R10 00 to R19 999	19.51	-	-	-	-
Income: R20 000 to R39 999	27.64	-	-	-	-
Income: R40 000 to R59 999	10.57	-	-	-	-
Income: More than R60 000	19.51	-	-	-	-

Fig. 2 Mean scores of fast fashion product attributes

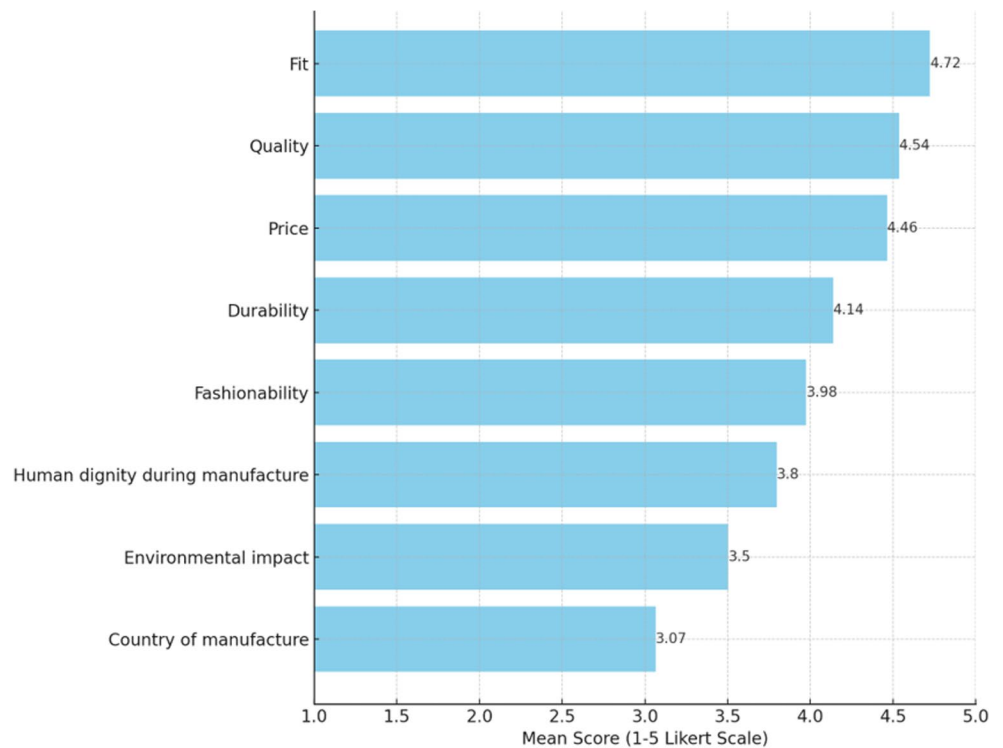
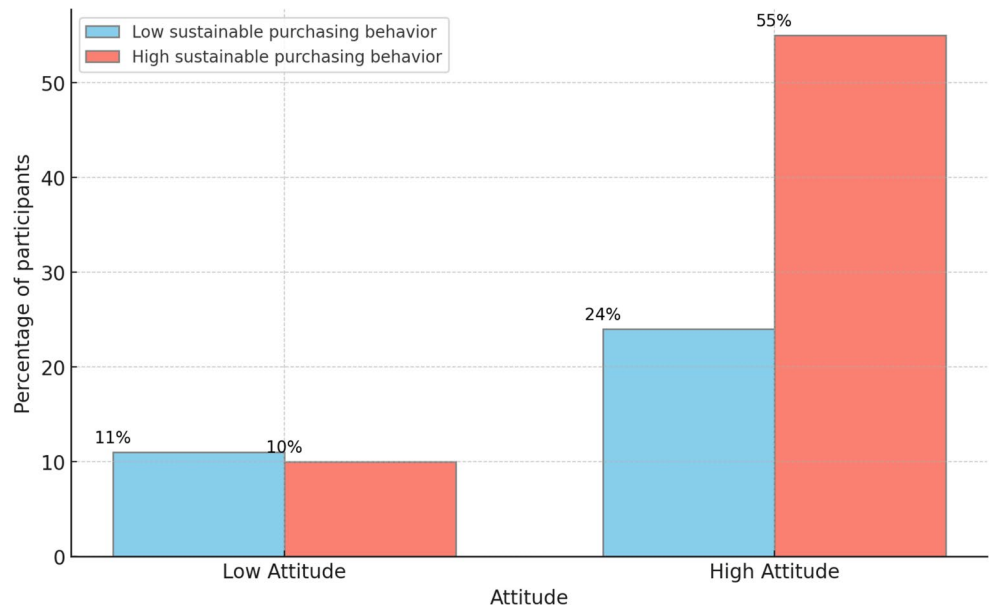


Fig. 3 Median split analyses of the association between attitude and the sustainable purchasing behavior



This modest yet significant increase supports the relevance of interaction effects, which are often modest in magnitude (Aiken & West, 1991). Perceived behavioral control ($B=0.299, SE=0.060, p<0.001$) and Attitude \times Perceived Behavioral Control ($B = - 0.172, SE=0.047, p<0.001$) significantly predicted sustainable purchasing behavior. In Model 3, after the interaction terms were added, attitude was no longer significant ($p=0.569$). The findings thus supported only Hypotheses 1c and 4, with Hypotheses 1a, 1b, and 5 not being supported.

To test Hypotheses 2a, 2b, and 2c, regression analyses predicting attitude, subjective norm, and perceived behavioral control were conducted with sustainability awareness as the focal predictor. Sustainability awareness significantly predicted perceived behavioral control ($B=0.669, SE=0.093, p<0.001$) but neither attitude ($p=0.620$) nor subjective norm ($p=0.466$). Thus, these findings only supported Hypothesis 2c with Hypotheses 2a and 2b not being supported. The detailed results are presented in Table 4.

Table 3 Zero-order correlations among focal variables

Variable	1	2	3	4	5
1. Sustainable purchasing behavior	–				
2. Attitude	0.175	–			
3. Subjective norm	0.105	–0.055	–		
4. Perceived behavioral control	0.508***	0.016	0.100	–	
5. Sustainability awareness	0.368***	0.100	0.028	0.539***	–

$N=123$

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The inclusion of TPB predictors reduced the relationship between sustainability awareness and sustainable purchasing behavior to non-significance ($p = 0.216$), aligning with Hypothesis 3, which postulated partial mediation by TPB predictors. We proceeded to perform a formal mediation analysis following the procedures recommended by Baron and Kenny (1986).² Regression analysis indicated a significant positive association between sustainability awareness and sustainable purchasing behavior ($B = 0.295$, $SE = 0.068$, $p < 0.001$), satisfying the first criterion for establishing mediation. Subsequent regression analyses were also conducted to assess the relationships between sustainability awareness and potential mediators – attitude, subjective norm, and perceived behavioral control. Sustainability awareness did not significantly predict either attitude ($B = 0.094$, $SE = 0.084$, $p = 0.269$) or subjective norm ($B = 0.029$, $SE = 0.096$, $p = 0.7604$), but did significantly predict perceived behavioral control ($B = 0.623$, $SE = 0.089$, $p < 0.001$), meeting the second condition for mediation. Finally, when attitude, subjective norm, and perceived behavioral control were included in the regression model with sustainability awareness predicting sustainable purchasing behavior, the relationship between sustainability awareness and sustainable purchasing behavior became nonsignificant ($B = 0.092$, $SE = 0.074$, $p = 0.216$), while attitude and perceived behavioral control significantly predicted sustainable purchasing behavior. This change suggests full mediation. Further, Sobel's z-test revealed a significant indirect effect of sustainability awareness on sustainable purchasing behavior through perceived behavioral control ($z = 3.92$, $p < 0.001$), which was further substantiated by a 95% bootstrap confidence interval for the indirect effect that did not encompass zero (95% CI [0.094, 0.283]). In contrast, the indirect effects through attitude and subjective norm were not significant, indicating that perceived behavioral control is the primary mediator in this relationship. Therefore, Hypothesis 3 was supported. The detailed results are presented in Table 4.

² These regression analyses did not include control variables.

Simple slope analysis (Aiken & West, 1991) was also conducted to probe the nature of the significant Attitude \times Perceived Behavioral Control interaction. At one standard deviation below the mean of perceived behavioral control, the relationship between attitude and sustainable purchasing behavior was positive and statistically significant ($B = 0.2602$, $SE = 0.0749$, $t(116) = 3.4724$, $p < 0.001$), indicating that lower perceived control was associated with a stronger positive relationship between attitude and sustainable purchasing behavior. Conversely, at one standard deviation above the mean of perceived behavioral control, the slope was negative but not statistically significant ($B = -0.0622$, $SE = 0.0947$, $t(116) = -0.6565$, $p = 0.513$), suggesting that higher perceived control did not significantly alter the association between attitude and sustainable purchasing behavior. At the mean level of perceived behavioral control, the relationship between attitude and sustainable purchasing behavior was not significant ($B = 0.099$, $SE = 0.067$, $t(116) = 1.4776$, $p = 0.142$), indicating that when individuals perceive an average level of behavioral control, attitude does not significantly predict sustainable purchasing behavior. Figure 4 illustrates the slopes. These findings underscore the conditional role of perceived behavioral control in the relationship between attitude and sustainable purchasing behavior. Specifically, the association between attitude and sustainable purchasing behavior is strongest under conditions of low perceived behavioral control.

Although not initially hypothesized, examining the relationships between TPB background factors – age, gender, and income – and sustainable purchasing behavior alongside the model's core components is important. In our findings, the age group 50 and above demonstrated a significant positive association with sustainable purchasing behavior, while higher household income brackets (R20K – R40K and above R40K) were negatively associated with sustainable purchasing behavior. Gender did not significantly predict sustainable purchasing behavior. According to the TPB, the relationships between age and income and purchasing behaviors should be mediated by attitude, subjective norm, and perceived behavioral control. Although full mediation was not observed, these factors contributed only an additional 0.97% to the variance in sustainable purchasing behavior.

Discussion

At the outset of this study, we set out to explore the predictors of sustainable purchasing behavior within the framework of the TPB. Our research aimed to enrich the understanding of sustainable purchasing behavior, particularly in the context of developing countries such as South Africa, where

Table 4 Multivariate linear regression results (*n* = 123)

	Attitude	Subjective Norm	Perceived Behavioral Control	Sustainable Purchasing Behavior: Model 0	Sustainable Purchasing Behavior: Model 1	Sustainable Purchasing Behavior: Model 2	Sustainable Purchasing Behavior: Model 3
Hypothesized predictors:							
Attitudes	–	–	–	–	–	0.15 (0.07)*	0.08 (0.07)
Subjective norm	–	–	–	–	–	0.07 (0.06)	0.03 (0.06)
Perceived behavioral control	–	–	–	–	–	0.30 (0.06)***	0.30 (0.06)***
Sustainability awareness	0.04 (0.08)	0.07 (0.10)	0.67 (0.09)***	–	0.33 (0.07)***	0.12 (0.08)	0.15 (0.07)
Attitude × Perceived Behavioral Control	–	–	–	–	–	–	–0.17 (0.05)***
Subjective Norm × Perceived Behavioral Control	–	–	–	–	–	–	–0.04 (0.04)
Control Variables:							
Gender (male = 1)	–0.40 (0.17)*	0.29 (0.20)	0.07 (0.19)	–0.06 (0.15)	–0.01 (0.14)	0.00 (0.13)	–0.04 (0.13)
Age: 30–39	0.46 (0.25)	–0.19 (0.29)	–0.27 (0.27)	0.23 (0.22)	0.20 (0.20)	0.23 (0.19)	0.31 (0.18)
Age: 40–49	0.63 (0.23)**	–0.47 (0.27)	–0.46 (0.26)	0.06 (0.21)	0.10 (0.19)	0.18 (0.18)	0.34 (0.18)
Age: 50 and above	0.63 (0.26)*	–0.64 (0.31)*	–0.52 (0.29)	0.45 (0.23)	0.41 (0.21)	0.52 (0.20)*	0.70 (0.20)**
Income: R10K–R20K	0.49 (0.24)*	0.27 (0.29)	–0.05 (0.27)	–0.08 (0.22)	–0.15 (0.20)	–0.22 (0.18)	–0.21 (0.18)
Income: R20K–R40K	0.33 (0.25)	–0.09 (0.30)	–0.16 (0.28)	–0.10 (0.22)	–0.36 (0.21)	–0.36 (0.19)	–0.40 (0.18)**
Income: More than R40K	0.47 (0.24)	0.04 (0.29)	–0.21 (0.27)	–0.30 (0.21)	–0.52 (0.20)*	–0.53 (0.18)**	–0.50 (0.18)**
Intercept	3.44 (0.21)***	3.08 (0.25)***	3.71 (0.24)***	3.61 (0.19)***	3.75 (0.18)***	3.75 (0.18)***	3.60 (0.16)***
F-statistic	2.83**	1.20	7.01***	1.17	3.99**	6.33***	6.97***
R ²	0.1071	0.0130	0.2827	0.0097	0.1638	0.3247	0.3889
ΔR ²				–	0.1541***	0.1609***	0.0642**

Unstandardized regression coefficients are reported with standard errors in parentheses; “income < R10K” was used as the reference category for income; “age 18–29” was used as the reference category for age

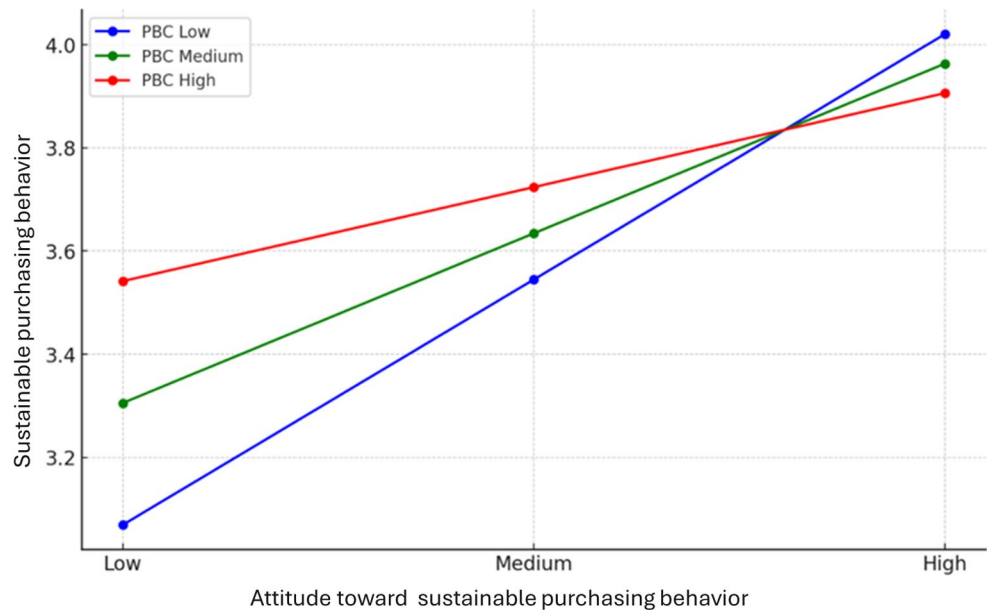
p* < 0.05; *p* < 0.01; ****p* < 0.001

the influx of fast fashion retailers has transformed consumer purchasing behavior (Muposhi & Chuchu). We focused on sustainable purchasing behavior, a concept that combines the rapid consumerism of fast fashion with sustainability concerns. This study not only responds to calls (e.g., Rausch & Kopplin, 2021; Rozenkowska, 2023) for more diverse consumer samples in sustainable clothing purchase behavior studies, but also examines the relatively unexplored interaction hypothesis within the TPB framework (e.g., La Barbera & Ajzen, 2020).

Aligned with our research objectives, our study utilized the TPB framework to address four critical questions: (1) What are the factors associated with sustainable purchasing behavior (H1)? (2) Does sustainability awareness relate to the TPB constructs – attitude, subjective norm, and perceived behavioral control (H2)? (3) Do TPB constructs mediate the relationship between sustainability

awareness and sustainable purchasing behavior (H3)? (4) Does perceived behavioral control moderate the relationships between attitude and sustainable purchasing behavior (H4) and between subjective norm and sustainable purchasing behavior (H5)? Our findings aligned with some of our hypotheses; attitude only indirectly predicts sustainable purchasing behavior through its significant interaction with perceived behavioral control. Surprisingly, subjective norm, and the interaction between subjective norm and perceived behavioral control, did not show a significant relationship with sustainable purchasing behavior. In contrast, perceived behavioral control demonstrated a significant association. Sustainability awareness was significantly associated only with perceived behavioral control, and not with attitude or subjective norm. Notably, among the TPB predictors – attitude, subjective norm, and perceived behavioral control – only perceived behavioral control significantly mediated

Fig. 4 Simple slopes of Attitude \times Perceived Behavioral Control interaction on sustainable purchasing behavior



the relationship between sustainability awareness and sustainable purchasing behavior. These findings are explored further below.

The regression analysis revealed a notable shift when the interaction terms (Attitude \times Perceived Behavioral Control and Subjective Norm \times Perceived Behavioral Control) were incorporated into Model 3; specifically, the previously significant relationship between attitude and sustainable purchasing behavior became non-significant, suggesting that the relationship between attitude and sustainable purchasing behavior is contingent upon levels of perceived behavioral control, as indicated by the significant interaction between perceived behavioral control and attitude. The interaction between perceived behavioral control and subjective norm, however, was not significant, indicating that perceived behavioral control did not modify the relationship between subjective norm and sustainable purchasing behavior in the same way. Our findings on the TPB interaction hypothesis corroborate the mixed results seen in the literature. Consistent with studies such as those by Earle et al. (2020), La Barbera and Ajzen (2020), and Yzer and van den Putte (2014), we observed a significant interaction between attitude and perceived behavioral control. Similarly, aligning with findings from Earle et al. (2020) and Kothe and Mullan (2015), the interaction between subjective norm and perceived behavioral control was not significant.

As expected, perceived behavioral control significantly predicted sustainable purchasing behavior, a finding that aligns well with existing literature, including studies by Kang et al. (2013), Kumar et al. (2017, 2021), Paul et al. (2016), and Rausch and Kopplin (2021). The simple slope analysis of the Attitude \times Perceived Behavioral Control interaction produced somewhat puzzling results. Our results

indicate that lower perceived behavioral control correlates with a stronger positive relationship between attitude and sustainable purchasing behavior. This observation, seemingly at odds with the TPB's assertion that higher perceived control enhances the translation of attitudes into behavior, can be understood through alternative theoretical frameworks. First, Brehm's reactance theory (1966) suggests that when individuals perceive their freedom or control as restricted, they may assert their attitudes more strongly to regain a sense of autonomy. This could explain why, in contexts of low perceived behavioral control, attitudes toward sustainable clothing purchases are more assertively expressed, thereby aligning with our findings. Second, compensatory control theory (Kay et al., 2008) proposes that individuals compensate for perceived external control limitations by relying more on internal attitudes and values. This theory supports our observation that attitudes become more influential in guiding behavior when perceived behavioral control is reduced. These theoretical perspectives provide valuable insights into the complex interplay between perceived control, attitudes, and behavior in the context of sustainable fast fashion purchasing.

Contrary to expectations, subjective norm did not emerge as a significant predictor of sustainable purchasing behavior. This aligns with the literature on green purchasing behaviors, where a similar lack of association between subjective norm and purchase intentions or behavior has been noted (e.g., Kumar et al., 2017; Rausch & Kopplin, 2021). One possible explanation for our unexpected finding is the use of a measurement approach for subjective norm in this study, which focused on the influence of family, friends, and social media influencers on sustainable purchasing behavior. This approach may not have sufficiently captured the

full spectrum of social influences impacting the participants. White et al. (2019) suggested that the effectiveness of subjective norm on behavior may vary depending on the directness and relevance to the individual. A more comprehensive or nuanced assessment of subjective norm could thus offer different insights. Additionally, in fashion contexts where personal identity and self-expression are key, the association of subjective norm may be less pronounced, as consumers tend to rely more on individual preferences and control beliefs (Bamberg, 2003). The interaction between subjective norm and perceived behavioral control also did not significantly predict sustainable purchasing behavior, paralleling findings from studies such as Earle et al. (2020) and Kothe and Mullan (2015), which reported non-significant interactions between these variables.

The study's findings on the relationships between sustainability awareness and attitude, subjective norm, and perceived behavioral control align with the mixed results reported in the literature. Consistent with other studies, such as those by Kang et al. (2013), we found no significant relationship between sustainability awareness and attitude. However, we did observe a significant relationship between sustainability awareness and perceived behavioral control, similar to findings reported by Chen and Tung (2014) and Paul et al. (2016). While our results indicated no significant relationship between sustainability awareness and subjective norm, the literature presents varied outcomes: studies by Chen and Tung (2014) and Paul et al. (2016) reported positive relationships, whereas Kang et al. (2013) found a negative relationship. Finally, the TPB elucidates a positive association between sustainability awareness and perceived behavioral control. Specifically, sustainability awareness can enhance an individual's perception of control over their purchasing behavior by providing relevant knowledge and tools. Conversely, the lack of significant associations between sustainability awareness and both attitude and subjective norm could be attributed to the possibility that individual awareness may not substantially shape attitude and subjective norm when societal norms or collective attitudes towards sustainability are already deeply entrenched (Schultz et al., 2007).

Our study's findings on the relationships between sustainability awareness and sustainable purchasing behavior are consistent with existing literature, which shows varied mediation effects. While we found that only perceived behavioral control fully mediates the relationship between sustainability awareness and sustainable purchasing behavior, other studies have reported broader mediation effects. For example, Bamberg (2003) identified that both subjective norm and perceived behavioral control fully mediate this relationship, whereas studies by Chen and Tung (2014), Kang et al. (2013), and Paul et al. (2016) found that attitude,

subjective norm, and perceived behavioral control all play mediating roles. This raises questions about the effectiveness of sustainability educational campaigns that primarily focus on building awareness, under the assumption that informed consumers will automatically engage in socially desirable behaviors, such as sustainable purchasing. Our findings indicate that simply enhancing awareness may not be enough. Instead, efforts should simultaneously address both sustainability awareness and perceived behavioral control to foster sustainable purchasing behavior.

Theoretical contribution

This study offers several key theoretical contributions to our understanding of sustainable purchasing behavior. First, it applies the TPB to examine this behavior, directly addressing the current limited knowledge about the factors that predict consumers' decisions to make sustainable clothing purchases, as highlighted by scholars such as Rausch and Kopplin (2021) and Rozenkowska (2023). Furthermore, our findings demonstrate that the TPB exhibits strong predictive power for sustainable purchasing behavior, reinforcing the theory's relevance and applicability in this context.

Second, addressing the recent calls by researchers (e.g., Canova et al., 2023) for more studies exploring the role of background factors (such as knowledge, awareness, values, and demographic characteristics) in predicting the constructs of the TPB, our study introduces a novel mediation model. This model elucidates how the background factor of sustainability awareness predicts sustainable purchasing behavior. Our findings reveal that perceived behavioral control fully mediates the relationship between sustainability awareness and sustainable purchasing behavior. This supports a fundamental principle of the TPB, which posits that the relationship between background factors and behavioral intentions or actual behavior is entirely mediated by the TPB's constructs.

Third, our study addresses the calls by researchers (e.g., La Barbera & Ajzen, 2020) to test the interaction hypothesis within the TPB. We found a significant interaction between attitude and perceived behavioral control, which supports the hypothesis and underscores the importance of examining these interactions. This finding provides insight into how and under what conditions these constructs interact to shape sustainable purchasing behavior, offering a more nuanced understanding of the TPB's mechanisms.

Finally, our study advances theory by employing a non-WEIRD sample from South Africa. This approach addresses Henrich et al.'s (2010) critique of the over-reliance on Western, Educated, Industrialized, Rich, and Democratic (WEIRD) populations in behavioral research. It also responds to recent calls from researchers such as Busalim et

al. (2022) and Miranda and Roldán (2024), who emphasized the need for diverse samples to deepen our understanding of sustainable purchasing behavior. By incorporating perspectives from a developing country, our research broadens the application of the TPB and provides additional insights into sustainable purchasing behavior across social, economic, and cultural settings.

Practical implications

The findings of this study have practical implications for various stakeholders aiming to promote sustainable purchasing behavior. First, the simple slopes analysis of the significant interaction between attitude and perceived behavioral control indicated that lower perceived behavioral control correlates with a stronger positive relationship between attitude and sustainable purchasing behavior. A practical implication is the importance of strengthening positive attitudes towards sustainable purchasing among consumers with low perceptions of control over their ability to make sustainable purchases. At the community level, sustainable behaviors (e.g., sustainable purchasing) can be fostered by engaging community leaders as role models and advocates who share their personal stories and experiences to promote sustainable purchases, and by establishing platforms that allow community members to exchange tips, experiences, and encouragement about sustainable purchasing (Lasker & Weiss, 2003).

Second, the finding that perceived behavioral control directly predicts sustainable purchasing behavior suggests that companies and policymakers aiming to enhance this behavior might allocate resources differently based on consumers' perceived behavioral control levels. For consumers with low perceived behavioral control, investing more in attitudinal change could be more effective. Conversely, for consumers with higher perceived behavioral control, resources might be better spent on removing barriers to action, such as providing more information on clothing's country of manufacture or durability and improving the availability and affordability of sustainable fashion. Third, our results demonstrate that perceived behavioral control acts as a mediator in the relationship between sustainability awareness and sustainable purchasing behavior. This finding shows that while raising awareness about sustainability is essential, alone it is insufficient; it must be coupled with efforts to increase consumers' perceived control over making sustainable purchases. To bridge this gap, interventions must focus on empowering consumers, facilitating an easier translation of their awareness into tangible actions.

Fourth, our findings indicate that subjective norm did not significantly predict sustainable purchasing behavior, suggesting that consumers do not regard the approval of 'significant others' as important when making sustainable

purchases. This implies that sustainability interventions should instead prioritize highlighting the personal benefits to the individual consumer, such as the positive environmental impact of their choices. Consequently, sustainability marketing and communication strategies should emphasize the personal satisfaction consumers derive from making sustainable choices, rather than focusing on social approval or norms. Despite our findings, it is recognized that subjective norm play a critical role in creating societal pressure that encourages sustainable purchasing behavior (Rozenkowska, 2023; Testa et al., 2021). Therefore, leveraging peer influence through social norms marketing campaigns is an effective intervention to promote sustainable behaviors (Schultz et al., 2007).

Finally, our results demonstrate that sustainability awareness positively and significantly predicts perceived behavioral control. This finding highlights the importance of increasing sustainability awareness to strengthen perceived behavioral control among consumers. Achieving this can involve implementing educational programs that demonstrate the impact of individual choices on environmental sustainability. Additionally, marketers and retailers should deploy strategies that underscore the convenience and personal advantages of making sustainable purchases, which can enhance consumers' sense of control and their ability to make such choices. Furthermore, policymakers play a crucial role by enhancing transparency and facilitating access to information on product sustainability, including the implementation of mandatory sustainability labeling.

Strengths, limitations, and avenues for future research

This study has several strengths, including that it enriches the understanding of sustainable purchasing behavior by utilizing a sample from South Africa, a non-WEIRD setting. Methodologically, the use of hierarchical regression analyses provided a nuanced exploration of the predictors of sustainable purchasing behavior. Theoretically, this study extends the TPB by integrating sustainability awareness through a novel mediation model for the TPB and exploring interaction effects within the TPB framework, thereby enhancing its predictive capability for sustainable purchasing behavior. Notably, the study's focus on actual behavior, rather than intention, mitigates the intention–behavior gap observed in sustainability research, enhancing the study's design.

This study boasts several strengths that enhance our understanding of sustainable purchasing behavior. Methodologically, we employed hierarchical regression analysis to provide a nuanced exploration of its predictors. Theoretically, we expanded the TPB by integrating a novel mediation

model that includes sustainability awareness and by exploring interaction effects within the TPB framework. This approach not only enhances the predictive capability of the TPB for sustainable purchasing behavior, but also addresses the often-observed intention-behavior gap in sustainability research by focusing on actual behavior. Additionally, by utilizing a sample from South Africa, a non-WEIRD setting, this study enhances our understanding of sustainable purchasing behavior across varied social, economic, and cultural settings.

Despite these strengths, limitations exist which point to directions for future research. The study's cross-sectional design limits causal inference. Reliance on self-reported data, while necessary, may introduce bias, thus incorporating objective data in future studies could strengthen the findings. Despite fast fashion typically targeting younger demographics, our study's sample notably deviated from this trend, with the largest age group represented (37%) being individuals aged 40 to 49, which may have influenced our results. The specific focus on the South African context, while valuable, may limit generalizability, highlighting the need for research in diverse cultural and economic settings. Another limitation is the potential lack of geographic specificity in our sample. Despite targeting South African participants via personal contacts and social media through snowball sampling, the study lacked a definitive process to verify each respondent's location. Additionally, the relatively modest sample size of 123 limited the use of more complex analytical techniques, such as structural equation modeling, which allow for the consideration of model fit. Future research should endeavor to construct TPB measures not only based on the literature, but also by rigorously adhering to the standardized guidelines for measurement of TPB constructs. This approach will enhance the reliability of the measures used in TPB-based studies.

Future research should explore causal relationships using longitudinal designs. Given the general lack of diversity in samples in behavioral sciences research (Henrich et al., 2010), researchers should consider samples drawn from diverse populations and contexts, particularly in other developing countries as well as among ethnic and racial minority groups. Developing and testing TPB-based interventions to promote sustainable purchasing behavior presents a promising research direction given the study's finding on the predictors of this behavior. Expanding variables to include fashion influencers, willingness to pay, self-identity, personal values, and/or moral norms may yield deeper insights into sustainable purchasing behavior. Collaborations with fast fashion companies to incorporate objective purchase data could also provide a more robust understanding of sustainable purchasing behavior.

Conclusion

This study makes major contributions to the understanding of sustainable purchasing behavior within the theoretical framework of the TPB. Our findings demonstrate that sustainability awareness does not directly predict this behavior, as its relationship is entirely mediated by perceived behavioral control. This indicates that it is not enough to increase consumers' sustainability awareness; rather, sustainable purchasing behavior is predicted by a combination of perceived behavioral control and positive attitudes. Notably, the interaction between attitude and perceived behavioral control is predictive of sustainable purchasing behavior, underscoring the importance of these factors in determining this behavior. This research not only extends the TPB by exploring its application in the context of fast fashion in a developing country, but also provides practical insights for various stakeholders. By highlighting the importance of comprehensive strategies that encompass awareness, attitudes, and perceived control, this study paves the way for more effective interventions aimed at promoting sustainable fashion choices. Ultimately, this study contributes to the broader dialogue on sustainable consumer behavior and the urgent need for more environmentally and socially responsible practices in the fast fashion industry.

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Author contributions Frank Magwegwe functioned as the principal designer of the article, overseeing its overall writing and editing, and bears the primary responsibility for its content and organization. The foundational data for this research, which contributes significantly to the article, were gathered by Abdulla Shaik for his MBA research.

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Data availability The data supporting the findings of this study are openly available at the Open Science Framework repository, accessible via the following link: <https://osf.io/v9p42>. This repository includes all relevant datasets necessary to interpret, replicate, and build upon this research.

Declarations

Ethical approval The study was conducted in accordance with the 1964 Helsinki Declaration and was approved by the ethics committee of the Gordon Institute of Business Science, University of Pretoria.

Informed consent Informed consent was obtained from all subjects involved in the study.

Conflict of interest We hereby declare that there are no known conflicts of interest associated with this research. Furthermore, we confirm

that there has been no financial support for this research that could have influenced its outcomes.

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References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Allied Market Research. (2023). *Fast fashion market size, share, competitive landscape, and trend analysis report by gender, by end user, by distribution channel: Global opportunity analysis and industry forecast, 2023–2032*. <https://www.alliedmarketresearch.com/fast-fashion-market-A33267>
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *The British Journal of Social Psychology*, 40(4), 471–499. <https://doi.org/10.1348/014466601164939>
- Bamberg, S. (2003). How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. *Journal of Environmental Psychology*, 23(1), 21–32. [https://doi.org/10.1016/S0272-4944\(02\)00078-6](https://doi.org/10.1016/S0272-4944(02)00078-6)
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182. <https://doi.org/10.1037/0022-3514.51.6.1173>
- Bläse, R., Filser, M., Kraus, S., Puumalainen, K., & Moog, P. (2023). Nonsustainable buying behavior: How the fear of missing out drives purchase intentions in the fast fashion industry. *Business Strategy and the Environment*, 33(2), 626–641. <https://doi.org/10.1002/bse.3509>
- Bocti, M., Zein, E., S. A., & Giannini, R. (2021). Exploring antecedents to the attitude-behavior gap for sustainable fashion consumption in Germany. *Journal of Sustainable Marketing*, 2(2), 27–38. <https://doi.org/10.51300/jsm-2021-39>
- Brehm, J. W. (1966). *A theory of psychological reactance*. Academic.
- Busalim, A., Fox, G., & Lynn, T. (2022). Consumer behavior in sustainable fashion: A systematic literature review and future research agenda. *International Journal of Consumer Studies*, 46(5), 1804–1828. <https://doi.org/10.1111/ijcs.12794>
- Camargo, L. R., Pereira, S. C. F., & Scarpin, M. R. S. (2020). Fast and ultrafast fashion supply chain management: An exploratory research. *International Journal of Retail & Distribution Management*, 48(6), 537–553. <https://doi.org/10.1108/IJRDM-04-2019-0133>
- Canova, L., Bobbio, A., & Manganelli, A. M. (2023). Sustainable purchase intentions: The role of moral norm and social dominance orientation in the theory of planned behavior applied to the case of fair trade products. *Sustainable Development*, 31(2), 1069–1083. <https://doi.org/10.1002/sd.2441>
- Chen, M. F., & Tung, P. J. (2014). Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. *International Journal of Hospitality Management*, 36, 221–230. <https://doi.org/10.1016/j.ijhm.2013.09.006>
- Dunlap, R., & Jones, R. (2002). Environmental concern: Conceptual and measurement issues. In R. Dunlap & W. Michelson (Eds.), *Handbook of environmental sociology* (pp. 485–524). Greenwood.
- Earle, A. M., Napper, L. E., LaBrie, J. W., Brooks-Russell, A., Smith, D. J., & de Rutte, J. (2020). Examining interactions within the theory of planned behavior in the prediction of intentions to engage in cannabis-related driving behaviors. *Journal of American College Health*, 68(4), 374–380. <https://doi.org/10.1080/0748481.2018.1557197>
- Grob, A. (1995). A structural model of environmental attitudes and behaviour. *Journal of Environmental Psychology*, 15(3), 209–220. [https://doi.org/10.1016/0272-4944\(95\)90004-7](https://doi.org/10.1016/0272-4944(95)90004-7)
- Hagger, M. S., Cheung, M. W. L., Ajzen, I., & Hamilton, K. (2022). Perceived behavioral control moderating effects in the theory of planned behavior: A meta-analysis. *Health Psychology*, 41(2), 155–167. <https://doi.org/10.1037/hea0001153>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, 466(7302), 29. <https://doi.org/10.1038/466029a>
- Kang, J., Liu, C., & Kim, S. H. (2013). Environmentally sustainable textile and apparel consumption: The role of consumer knowledge, perceived consumer effectiveness and perceived personal relevance. *International Journal of Consumer Studies*, 37(4), 442–452. <https://doi.org/10.1111/ijcs.12013>
- Kay, A. C., Gaucher, D., Napier, J. L., Callan, M. J., & Laurin, K. (2008). God and the government: Testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology*, 95(1), 18–35. <https://doi.org/10.1037/0022-3514.95.1.18>
- Khare, A., & Sadachar, A. (2017). Green apparel buying behavior: A study on Indian youth. *International Journal of Consumer Studies*, 41(5), 558–569. <https://doi.org/10.1111/ijcs.12367>
- Kothe, E. J., & Mullan, B. A. (2015). Interaction effects in the theory of planned behavior: Predicting fruit and vegetable consumption in three prospective cohorts. *British Journal of Health Psychology*, 20(3), 549–562. <https://doi.org/10.1111/bjhp.12115>
- Kumar, B., Manrai, A. K., & Manrai, L. A. (2017). Purchasing behavior for environmentally sustainable products: A conceptual framework and empirical study. *Journal of Retailing and Consumer Services*, 34, 1–9. <https://doi.org/10.1016/j.jretconser.2016.09.004>
- Kumar, A., Prakash, G., & Kumar, G. (2021). Does environmentally responsible purchase intention matter for consumers? A predictive sustainable model developed through an empirical study. *Journal of Retailing and Consumer Services*, 58, 102270. <https://doi.org/10.1016/j.jretconser.2020.102270>
- La Barbera, F., & Ajzen, I. (2020). Control interactions in the theory of planned behavior: Rethinking the role of subjective norm. *Europe's Journal of Psychology*, 16(3), 401–417. <https://doi.org/10.5964/ejop.v16i3.2056>
- Lasker, R. D., & Weiss, E. S. (2003). Broadening participation in community problem solving: a multidisciplinary model to support collaborative practice and research. *Journal of Urban Health*, 80, 14–47. <https://doi.org/10.1093/jurban/jtg014>
- Lundblad, L., & Davies, I. A. (2016). The values and motivations behind sustainable fashion consumption. *Journal of Consumer Behavior*, 15(2), 149–162. <https://doi.org/10.1002/cb.1559>
- Magwegwe, F. M., & Lim, H. (2020). Factors associated with the ownership of individual retirement accounts (IRAs): Applying the theory of planned behavior. *Journal of*

- Financial Counseling and Planning*, 32(1), 116–130. <https://doi.org/10.1891/JFCP-19-00023>
- Maloney, M. P., & Ward, M. P. (1973). Ecology: Let's hear from the people: An objective scale for the measurement of ecological attitudes and knowledge. *American Psychologist*, 28(7), 583. <https://doi.org/10.1037/h0034936>
- Miranda, J. A., & Roldán, A. (2024). Fast fashion: A successful business model forced to transform. In V. Pouillard & V. Dubé-Sénécal (Eds.), *The Routledge History of Fashion and Dress, 1800 to the Present* (pp. 267–285). Routledge. <https://doi.org/10.4324/9780429295607-18>
- Muposhi, A., & Chuchu, T. (2022). Influencing millennials to embrace sustainable fashion in an emerging market: A modified brand avoidance model perspective. *Journal of Fashion Marketing and Management: An International Journal*, 1–21. <https://doi.org/10.1108/JFMM-07-2021-0169>
- Niinimäki, K. (2010). Eco-clothing, consumer identity and ideology. *Sustainable Development*, 18(3), 150–162. <https://doi.org/10.1002/sd.455>
- Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. *Nature Reviews Earth & Environment*, 1(4), 189–200. <https://doi.org/10.1038/s43017-020-0039-9>
- Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, 29, 123–134. <https://doi.org/10.1016/j.jretconser.2015.11.006>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Rausch, T., & Kopplin, C. S. (2021). Bridge the gap: Consumers' purchase intention and behavior regarding sustainable clothing. *Journal of Cleaner Production*, 278, 1–15. <https://doi.org/10.1016/j.jclepro.2020.123882>
- Rozenkowska, K. (2023). Theory of planned behavior in consumer behavior research: A systematic literature review. *International Journal of Consumer Studies*, 47(6), 2670–2700. <https://doi.org/10.1111/ijcs.12970>
- Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, 18, 429–434. <https://doi.org/10.1111/j.1467-9280.2007.01917.x>
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Pearson Education.
- Testa, F., Pretner, G., Iovino, R., Bianchi, G., Tessitore, S., & Iraldo, F. (2021). Drivers to green consumption: A systematic review. *Environment, Development and Sustainability*, 23, 4826–4880. <https://doi.org/10.1007/s10668-020-00844-5>
- Thompson, C. J., & Haytko, D. L. (1997). Speaking of fashion: Consumers' uses of fashion discourses and the appropriation of countervailing cultural meanings. *Journal of Consumer Research*, 24(1), 15–42. <https://doi.org/10.1086/209491>
- White, K., Habib, R., & Hardisty, D. J. (2019). How to SHIFT consumer behaviors to be more sustainable: A literature review and guiding framework. *Journal of Marketing*, 83(3), 22–49. <https://doi.org/10.1177/0022242919825649>
- Wiederhold, M., & Martinez, L. F. (2018). Ethical consumer behavior in Germany: The attitude-behavior gap in the green apparel industry. *International Journal of Consumer Studies*, 42(4), 419–429. <https://doi.org/10.1111/ijcs.12435>
- Yzer, M., & van den Putte, B. (2014). Control perceptions moderate attitudinal and normative effects on intention to quit smoking. *Psychology of Addictive Behaviors*, 28(4), 1153–1161. <https://doi.org/10.1037/a0037924>
- Zhang, B., Zhang, Y., & Zhou, P. (2021). Consumer attitude toward sustainability of fast fashion products in the UK. *Sustainability*, 13(4), 1646. <https://doi.org/10.3390/su13041646>

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